



**Department of
Environmental
Conservation**

REMEDIAL INVESTIGATION/FEASIBILITY STUDY

HEALTH AND SAFETY PLAN

WORK ASSIGNMENT D007622-37

FORMER KENWOOD CLEANERS SITE NO. 447032,
SCHENECTADY, SCHENECTADY COUNTY, NY

Prepared for:
NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
625 Broadway, 12th Floor
Albany, NY 12233-7016

Basil Seggos, Commissioner

DIVISION OF ENVIRONMENTAL REMEDIATION
Remedial Bureau B

URS Corporation
257 West Genesee Street
Suite 400
Buffalo, New York 14202

February 2017



HAZWOPER Health and Safety Plan Remedial Investigation/ Feasibility Study Former Kenwood Cleaners Site. No. 447032 445 Duane Avenue Schenectady, New York 12304

Prepared for
New York State Department of
Environmental Conservation
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HASP SUMMARY

Note: This Summary is intended to provide key information only and cannot be substituted for reading, understanding, and complying with the full HASP. This summary may be continually updated as tasks and personnel change. Use Continuation Sheets if necessary.


Project Name:	Remedial Investigation/ Feasibility Study	Project Number:	60523012
Summary Revision Date:	Initial	Client Name:	New York State Department of Environmental Conservation
Report ALL SH&E Incidents, no matter how minor, to the Incident Hotline: 800-348-5046			
Injury, Property Damage, Vehicle, Security, Regulatory Inspection, Environmental Impact, and any potentially work related injury, discomfort/ pain, or damage.			
Identify the nearest Occupational Clinic and Hospital to the site that accepts URS Workers Compensation Insurance (see Attachment A for instructions). If the nearest such clinic or hospital is an unreasonable distance from the site, identify nearer hospitals or clinics. Attach maps and directions to the clinics and hospitals in Attachment A .			
Occupational Clinic:	St. Peter's Urgent Care - Clifton Park	Nearest Hospital:	Ellis Hospital
Address:	1 Tallow Wood Drive, Clifton Park, NY 12065	Address:	100 Rosa Rd, Schenectady NY 12308
Phone Number:	(518) 373-4444	Phone Number:	(518) 243-4121
Key Personnel			
Project Manager (PM):	Chuck Dusel	Cell Phone:	716-353-3016
Site Supervisor (SS)	Greg Dunlavy	Cell Phone	(518) 384-4212
Safety Officer (SSO):	Greg Dunlavy	Cell Phone	(518) 384-4212
URS SH&E Mgr.	Peter Gregory	Cell Phone:	(201) 602-3511
Client PM:	Michael Haggerty	Cell Phone:	(518) 526-8782
List ALL Short-Service Employees, including subcontractors (<6 Months with Company in Current Area/Job Description):			
List ALL Subcontractors and their Site Safety Officers: Geologic NY, Inc., TBD			
PM must positively verify subcontractors are approved in Subpart for the work described. If there were any limitations/ conditions of approval, describe them and how they are being met.			
<input checked="" type="checkbox"/> I have verified that all subcontractors are approved in Subpart, and that all conditions of approval are met.			
PM Name <u>Chuck Dusel</u> PM Signature <u></u> Date <u>2/2/2017</u>			

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FIGURES

Figure 1: Site Location

Figure 2: Site Plan

ATTACHMENTS

Attachment A: Hospital/Clinic Maps and Incident Reporting and Response Flow Chart

Attachment B: URS SH&E Procedures

Attachment C: Safety Data Sheets

Attachment D: Site Orientation

Attachment E: Project/Task-Specific Pre-Job Hazard Assessments Forms

Applicable References

This Health and Safety Plan (HASP) conforms to the regulatory requirements and guidelines established in the following documents:

- Title 29, Part 1910 of the Code of Federal Regulations (29 CFR 1910), Occupational Safety and Health Standards (with special attention to Section 120, Hazardous Waste Operations and Emergency Response).
- Title 8 of the California Code of Regulations (8 CCR), with special attention to Section 5192 Hazardous Waste Operations and Emergency Response, and Section 3202, Injury Illness Prevention Program.
- 29 CFR 1926, Safety and Health Regulations for Construction.
- 8 CCR, with special attention to Sub Chapter 4, Sections 1500 - 1938 Construction Safety Orders.
- National Institute for Occupational Safety and Health/Occupational Safety and Hazards Administration/U.S. Coast Guard/U.S. Environmental Protection Agency, Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, Publication No. 85-115, 1985.
- The requirements in this HASP also conform to URS's Safety for Life Program requirements as specified in the URS Safety, Health and Environment (SH&E) Manual.
- NYSDEC Standby Contract D007622, Former Kenwood Cleaners Site. No. 447032, Remedial Investigation/ Feasibility Study, WA #D007622-37, Schedule 1 (Scope of Work)
- Record of Decision, Former Kenwood Cleaners Site, Schenectady, Schenectady County New York, Site Number 447032 (March, 2009)

1.0 INTRODUCTION

This written HASP is designed to identify, evaluate, and control safety and health hazards, and to outline emergency response actions for URS-managed activities. This HASP must be kept on site during work activities and made available to all workers including subcontractors and other site occupants for informational purposes. URS subcontractors are expected to independently characterize, assess, and control site hazards created by their specific scope of work.

This section of the HASP summarizes important URS SH&E Procedures that apply to all Design and Consulting Services (DCS) Americas jobs. See **Attachment B** for complete copies of applicable field SH&E Procedures.

1.1 APPLICABLE REFERENCES

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Project Assumptions [add or delete as applicable]

- This site is an URS-controlled site.
- Site management will assist in locating subsurface utilities, vessels, and structures located on the property and outside the scope of the utility locator service.
- No confined spaces will be entered on this project.
- No excavations will be entered.
- Work will be performed during daylight hours.

2.0 SITE INFORMATION AND SCOPE OF WORK

2.1 SITE DESCRIPTION

The former Kenwood Cleaners site is located in the city of Schenectady, Schenectady County, New York and occupies approximately 1.4 acres (Figure 1).

2.2 SITE BACKGROUND/HISTORY

There have been numerous owners and commercial activities on the site including a dry cleaning establishment. The sole owner of interest was Kenwood Cleaners from 1950 to 1964. No contact information could be located for this entity and the property was transferred to several individuals between 1964 and 1994. Historical releases of hazardous wastes have caused documented contamination of soil and groundwater at the site.

There is currently a mixed-use metal building on the site that was constructed in 2004-2005, and an asphalt parking lot. The building is a slab-on-grade structure with approximately 15,000 square feet (sf) of warehouse space and 1,200 sf of office space. The floor's cross section consists of a relatively permeable sub-base (sand), one-inch foam board insulation, a 10 mil poly vapor barrier membrane, fiberglass/steel-reinforced pre-stressed 4500 PSI concrete and an epoxy sealer/paint. The building is equipped with a loading dock situated in the southeast portion of the building. Asphalt paved parking surfaces surround the building on the south and west. The current building occupant provides diagnostic testing and repair services for train power converters. Surrounding land uses include light manufacturing, parking, housing, and highway I-890.

A Voluntary Cleanup Program (VCP) application that included the site was filed with the NYSDEC Division of Environmental Remediation (DER) in 1998. An investigation at that time indicated the presence of a commonly used dry cleaning solvent, PCE, which is consistent with the past use of the site as Kenwood Cleaners. Petroleum-related hydrocarbons were also detected in soil and groundwater beneath the site though the source is unclear. Site investigation results were documented in a letter report prepared by Environmental Hydrogeology Corporation (EHC) in December 1998. Based on historical drawings, the former dry cleaner building is estimated to have been located in the area of the southwest corner of the existing building (Figure 2). The VCP application was subsequently withdrawn.

URS performed field activities under an Immediate Investigation Work Assignment (IIWA) in May 2005 to confirm the continued presence of PCE and the hydrocarbons. Contamination was again detected in both soil and groundwater, though at lower levels that previously detected.

2.3 CLIENT OR THIRD-PARTY OPERATIONS AT SITE

Client or third party operations are not anticipated during URS' on-site activities.

2.4 SCOPE OF WORK

The Scope of Work (SOW) includes:

- Soil borings, both inside and outside the site building, with one soil boring advanced 10 feet into bedrock;
- Collection of soil samples from these borings for target compound list (TCL) volatile organic compound (VOC) analyses by SW-846 Method 8260;
- Collection of soil samples from these borings via Shelby tubes for geotechnical analyses (i.e., triaxial, consolidation, shear strength, etc.);
- Redevelopment of existing extraction and monitoring wells;
- A complete synoptic round of water levels will be collected after the wells have been re-developed and sufficient time has passed for the wells to fully recharge;

- Collecting groundwater samples from the aforementioned wells for TCL VOC analyses by SW-846 Method 8260;
- Conducting an indoor air quality questionnaire, chemical inventory and building survey of the site building;
- Collecting indoor air, outdoor air, and subslab soil vapor samples from within and adjacent to the site building; and,
- Surveying recently installed soil borings.

2.5 SCOPE OF WORK RISK ASSESSMENT

- ☐ Low Risk (examples: non-intrusive work, occasional exposure and/or low risk hazards)
- ☒ Medium Risk (examples: intrusive work, heavy equipment use, frequent exposure and/or moderate hazards)
- ☐ High Risk (examples: complicated scope, large/ multiple work crews, and/or constant exposure to hazards).

The following tasks/ hazards automatically trigger high risk ranking. Check all which apply. Include hazard mitigation procedures later in the appropriate Physical, Chemical, or Environmental section of the HASP.

<input type="checkbox"/> Asbestos removal/ contact	<input type="checkbox"/> Ordinance, Munitions, Explosives use
<input type="checkbox"/> ATV use	<input type="checkbox"/> Pile Driving
<input type="checkbox"/> Bridge/dam Inspections/ Snooper Truck use	<input type="checkbox"/> Radiation or Radioactive Instrument use
<input type="checkbox"/> Confined Space	<input type="checkbox"/> Remote location or lone worker
<input type="checkbox"/> Cranes and Rigging use	<input type="checkbox"/> Respirator use (does not include dust mask)
<input type="checkbox"/> Demolition	<input type="checkbox"/> Scaffolding use
<input type="checkbox"/> Diving- scientific or commercial	<input type="checkbox"/> Use or exposure to toxic chemicals
<input type="checkbox"/> High speed traffic exposure	<input type="checkbox"/> Trenching/ Excavation
<input type="checkbox"/> Hot Work	<input type="checkbox"/> Tunnel/ Underground work
<input type="checkbox"/> Conditions Immediately Dangerous to Life or Health (IDLH)	<input type="checkbox"/> UXO/ MMR
<input type="checkbox"/> Laboratory Operations	<input type="checkbox"/> Work at Heights > 4ft.
<input type="checkbox"/> LOTO or Live Energy Source work	<input type="checkbox"/> Work at angle >30 deg.
<input type="checkbox"/> On-rail/ Near Rail work	<input type="checkbox"/> Work On/Over Water

2.6 URS POLICY

AECOM

Safety, Health and Environment Policy Statement

Purpose

This policy establishes the framework to attain best-in-class Safety, Health and Environmental (SH&E) performance for AECOM's employees in the global marketplace.

Commitment

AECOM is committed to exceptional levels of performance in protecting its people and the environment. As stated in our Core Values, keeping our people safe is our most important measure of success. We strive to be the beacon of safety excellence in the industries and global communities in which we work.

To advance our SH&E program, we are committed to:

- Zero work-related injuries to AECOM employees and protection of the environment as a result of our activities.
- Providing a highly effective SH&E management system that drives continual review and improvement.
- Meeting client requirements and properly incorporating all safety, health and environmental rules and regulations at the local, state, provincial and national levels.
- Developing an exceptional safety culture where our people embrace ownership for the safety of themselves and others.
- Substantial improvements toward our goals of pollution prevention, resource conservation and environmental sustainability.
- Setting and meeting aggressive SH&E performance goals and Core Value Metrics to promote continuous improvement.
- Working with employees and business partners in order to continuously improve SH&E performance.
- Recognizing and celebrating those who contribute to excellent SH&E performance.
- Striving to make AECOM the provider of choice for the safe execution of design, build, finance, operate and maintenance work globally.

The commitment to this policy by the leadership, management and employees of AECOM provides the foundation for a safe workplace, operational excellence and long-term business success.

Expectations

Safety is a core value and a key to our success. We demand continuous improvement in our journey toward a zero incident culture, where everyone is committed to safety, health and environmental excellence.

To that end, we demand:


- Our leaders, managers, supervisors and employees demonstrate their commitment in their actions and decisions to assure that every person goes home safe every day.
- Our employees embrace safety as a core value both on and off the job.
- Each employee is committed to his/her own safety and that of his/her fellow employees.
- We will incorporate Life-Preserving Principles into our work planning and execution.
- We proactively and aggressively identify, manage and eliminate hazards in the workplace.
- We train and prepare our people to have the knowledge, skills, competency and equipment required to work safely.
- We stop our employees from working if the work cannot be executed safely or if conditions or behaviors on the work activity are unsafe.
- All employees immediately report safety, health and/or environmental incidents, near-misses, unsafe conditions, and at-risk behaviors to their supervisor; and that we diligently work to correct the problem.

Our SH&E expectations will be accomplished by the demonstrated leadership of management, compliance with regulatory requirements and participation of AECOM personnel.

Communication

This Policy will be reviewed annually to ensure it meets the needs of the company, and will be made available to all persons under the control of the company.

Sincerely:



Michael S. Burke
Chairman and Chief Executive Officer

04 March 2016
Date

2.7 SAFETY FOR LIFE



"Safety for Life" is a comprehensive integrated URS Safety Management System that drives our nearly 100,000 employees toward URS's commitment to achieving zero work-related injuries and/or illnesses; preventing damage to property and the environment; and maintaining an environmentally friendly and sustainable workplace. Our Safety for Life program is supported by nine Life Preserving Principles that apply to all URS activities.

2.8 LIFE PRESERVING PRINCIPLES

Demonstrated Management Commitment

Our Executive, senior and project managers will lead the SH&E improvement process and continuously demonstrate support and commitment.

Employee Participation

Our employees will be encouraged and empowered to become actively engaged in our safety processes through their active participation in safety committees, training, audits, observations and inspections. Employees will be encouraged to participate in health initiatives and adopt a healthy lifestyle.

Budgeting and Staffing for Safety

Our safety staff will be competent, fully trained and qualified to provide technical resources to our internal and external clients. A budget to support safety activities will be included in project proposals.

Pre-Planning

Our design, engineering, project and construction management staff will deploy effective risk mitigation efforts to design, plan and build safety into every project. Pre-Project and Pre-Task planning will be an effective tool in protecting our employees and the environment.

Contractor Management

Our project staff will work closely with our sub-consultants, subcontractors, contractors and Joint Venture Partners to provide a safe work environment for employees and members of the public. Our goal of SH&E performance excellence will be equally shared by all project participants.

Recognition and Rewards

Our employees will be recognized for their efforts in working safely and their support of our safety efforts.

Safety Orientation and Training

Our employees will be provided with effective safety training in order to identify and mitigate hazards in the workplace to prevent injuries to themselves and others who may be affected by their actions.

Incident Investigation

Our managers and safety professionals will investigate all recordable incidents and serious near misses to identify contributing factors and root causes in order to prevent a reoccurrence. Lessons learned shall be identified, communicated and implemented.

Fit for Duty

Our employees are responsible to report to work each day fit for duty and not to pose a health and safety hazard to themselves or others.

2.9 DRIVING AND VEHICLE SAFETY

The proper operation of vehicles is critical to protecting the safety of URS employees and subcontractors. Drivers face numerous hazards while operating vehicles. Some of the hazards include collision with another vehicle, collision with a fixed object, vehicle break down or failure, or falling asleep or becoming otherwise incapacitated while driving. All employees will adhere to Driving procedure S3NA-005-PR, which includes the following key practices:

- **Authorized Drivers** - Managers must authorize drivers following evaluation of driver criteria to drive and maintain an URS-owned, leased or rented vehicle, a client or customer-owned vehicle, or a personal vehicle operated in the course of conducting URS business.
- **Electronic Devices Prohibited** - URS prohibits use of all portable electronic devices while operating a motor vehicle/ equipment which includes being stopped at a traffic light or stop sign. This includes cell phones, two-way radios and other items whether hand-held or hands-free. Electronic devices include, but are not limited to, all mobile phones, pagers, iPods, MP3s, GPS, DVD players, tablets laptops and other portable electronic devices that can cause driver distraction. Hands-free device use is not allowed.
 - GPS units and devices used for navigation may only be used if factory installed or secured to the vehicle with a bracket that allows the driver to view the image without having to take their

eyes off the road. Electronic devices shall be setup for operation prior to commencing driving activities and shall not be changed by the driver while driving.

- **Vehicle Inspections** - The driver shall conduct pre-trip vehicle inspections prior to each trip. A vehicle inspection checklist, S3NA-005 FM2, can be used to guide and document the inspection process. Vehicle inspection is to include a 360-degree walk around and visual inspection under the vehicle for leaks and obstructions prior to moving the vehicle.
- **Training** - All drivers shall complete defensive driver training. Additional training (i.e., hands-on defensive driver training) may apply for medium and high-risk drivers; see Driving procedure S3NA-005-PR and SHE Training procedure S3NA-003-PR for more details.
- **Journey Management Plan** - Drivers who undertake trips in excess of 250 miles (400 kilometers) one way, drive in remote or hazardous areas, or when otherwise deemed necessary, shall develop and document a Journey Management Plan using S3NA-005-FM1 or equivalent.
- **Secure Loads** - Cargo is only to be carried within the passenger compartment of a vehicle when segregated and restrained to prevent objects from becoming distractions, obstructions or projectiles to occupants should emergency vehicle maneuvers be required (e.g., harsh braking or crash). All goods transported on flatbed trucks or in pickup beds must be securely fastened to prevent them from becoming hazards. All applicable laws and regulations regarding securing of loads must be met. It is prudent to check the load after a few miles to ensure that load has not shifted or loosened prior to completing the remainder of the trip.
- **Backing Up** - Reversing the vehicle is to be avoided if at all possible. If backing up is necessary, use the following guidelines:
 - Pre-plan all vehicle movements.
 - If the pull-through method of parking is not possible, drivers will scan parking spot/area for hazards and back in; thereby, facilitating departure where the first move is forward.
 - A light tap of the horn should be used to alert others of your intention to back up.
 - Avoid tight spaces.
 - Vehicles over 10,000 pounds gross vehicular weight are required to have a competent spotter in place when backing. A competent spotter is one that has received spotter training.
 - All vehicles shall have a competent spotter in place when backing in an active work zone. Parking and public access areas are recommended but not required to have a spotter.

2.10 FITNESS FOR DUTY

One of URS's nine Life-Preserving Principles is Fitness for Duty (see Fitness for Duty procedure S3NA-008-PR). Fitness for Duty means that individuals are in a state (physical, mental, and emotional) that enables them to perform assignments competently and in a manner that does not threaten the health and safety of themselves or others. On certain projects or for specific tasks, fit for duty certifications may be requested of medical providers by SH&E Managers or Human Resources (HR). Employees should report to work fit for duty and unimpaired by substances or fatigue. Supervisors must observe their employees and work with the employee, SH&E staff, and HR to address deficiencies. URS will not tolerate retaliation against any employee for filing a complaint or concern regarding their fitness for duty or participating in any way in an investigation.

2.10.1 Medical Surveillance

URS's S3NA-128-PR, Medical Screening and Surveillance, details the requirements to participate in a medical monitoring program. Medical Surveillance provides a streamlined process to determine if employees meet the physical requirements to perform assigned duties as defined by applicable regulations. It is also designed to provide a means to collect data relevant to exposure to chemical and physical agents for the protection of the workers and to confirm the effectiveness of health and safety programs.

2.10.2 Fatigue

One aspect of fit for duty is fatigue management. URS has developed procedures that limit work periods or requires additional rest under certain circumstances, including during long-distance travel or when working at high altitudes. These procedures also set limits on extended work periods of 14 hours per day or 60 hours per week. A fatigue management plan is required if longer working hours are necessary (see Fatigue Management Procedure S3NA-009-PR).

2.10.3 Substance Abuse

Drug and alcohol abuse pose a serious threat to the health and safety of employees, clients, and the general public as well as the security of our job sites, equipment and facilities. URS is committed to the elimination of illegal drug use and alcohol abuse in its workplace and regards any misuse of drugs or alcohol by employees to be unacceptable. URS Substance Abuse Prevention Procedure (S3NA-019-PR) prohibits the use, possession, presence in the body, manufacture, concealment, transportation, promotion or sale of the following items or substances on company premises. Company premises refer to all property, offices, facilities, land, buildings, structures, fixtures, installations, aircraft, automobiles, vessels, trucks and all other vehicles and equipment - whether owned, leased, or used.

- Illegal drugs (or their metabolites), designer and synthetic drugs, mood or mind altering substances, and drug use related paraphernalia unless authorized for administering currently prescribed medication;
- Controlled substances that are not used in accordance with physician instructions or non-prescribed controlled substances; and
- Alcoholic beverages while at work or while on any customer- or URS-controlled property.

This policy does not prohibit lawful use and possession of current medication prescribed in the employees name or over-the-counter medications. Employees must consult with their health care provider about any prescribed medication's effect on their ability to perform work safely and disclose any restrictions to their supervisor.

Although some states may pass laws legalizing medical or recreational marijuana use, the use, sale, distribution and possession of marijuana are violations of federal law and URS policy, and will subject an employee to disciplinary action up to and including termination in accordance with controlling law.

2.11 HAND SAFETY

The hands are exposed to hazards more than any body part. SH&E Hand Safety Procedure S3NA-317-PR describes requirements and best practices including these notable practices:

- **All personnel shall have gloves in their immediate possession 100%** of the time when in a shop or on a work site. Gloves that address the hazard shall be worn when employees work with or near any materials or equipment that present the potential for hand injury due to sharp edges, corrosives, flammable and irritating materials, extreme temperatures, splinters, etc. Use the Gloves Needs Assessment (S3NA-317-FM1) to help determine the appropriate glove for the hazard(s).

- **Fixed open-blade knives are prohibited** from use during the course of URS work. Examples of fixed open-blade knives include pocket knives, multi-tools, hunting knives, and standard utility knives. For more information about cutting tools, see [S3NA-317-ATT1](#) Safe Alternative Tools.

2.12 HAZARD COMMUNICATION

Hazardous materials that may be encountered on-site as existing environmental or physical/health contaminants are addressed in this HASP. Their properties, hazards, and associated required controls will be communicated to all affected staff and subcontractors in accordance with the requirements of URS Procedure [S3NA-115-PR1](#) Hazardous Materials Communication including these key elements:

- All personnel shall be briefed on the hazards of any chemical product they use and shall be aware of and have access to the Safety Data Sheets (SDS).
- All containers on site shall be properly labeled to indicate their contents. Labeling on any containers not intended for single-day, individual use shall contain additional information indicating potential health and safety hazards (flammability, reactivity, etc.).

In addition, any employee or organization (contractor or subcontractor) intending to bring any hazardous material onto this URS-controlled work site must first provide a copy of the item's SDS to the Site Supervisor or Site Safety Officer for review and filing. The Site Supervisor or Site Safety Officer will maintain copies of all SDS on site and in **Attachment C**. SDS may not be available for locally obtained products, in which case an alternate form of product hazard documentation will be acceptable.

2.13 HAZARDOUS MATERIAL HANDLING AND WASTE MANAGEMENT

If hazardous, solid, and/or municipal wastes are generated during any phase of the project, the waste shall be accumulated, labeled, and disposed of in accordance with applicable Federal, State, Provincial, Territorial and/or local regulations and SH&E Procedure [S3NA-116-PR](#) Hazardous Materials Shipping. A site-specific Entity Letter may be required for the site/client; if so, only persons named on the entity letter are allowed to sign waste shipping papers "**on behalf of New York State Department of Environmental Conservation**". Any individual signing shipping papers must have valid Department of Transportation and Resource Conservation and Recovery Act training for waste shipment. Consult the [HZM/HZW & TDG page](#) on ecosystem or the SH&E Manager for further guidance on URS and regulatory procedures and training requirements.

2.14 HOUSEKEEPING AND PERSONAL HYGIENE

Basic housekeeping requirements for offices and work sites, as well as personal hygiene and sanitation standards can be found in [S3NA-013-PR](#) Housekeeping. Inspections should be performed at the regular interval specified below. The housekeeping inspection form [S3NA-013-FM1](#) is available for use.

Complete the table below regarding site-specific Housekeeping and Personal Hygiene requirements:

Housekeeping: Inspection Frequency: Daily	Inspector: SS/ SSO or designee
Eating, Drinking, Smoking: Permitted only in designated area(s) located outside the site building.	
Handwashing: Water, soap and paper towels or equivalent supplies are located in the site building's restroom. Site staff will wash hands and face after completing work activities and prior to breaks or meals.	
Toilets are located in the site building's restroom	
NOTE: A minimum of one toilet must be provided for every 20 personnel on site. For mobile crews where work	

activities and locations permit transportation to nearby toilet facilities on-site facilities are not required.
<p>Water is located in the site building's restroom.</p> <p>A water supply meeting the following requirements will be utilized:</p> <p><i>Potable Water</i> - An adequate supply of potable water will be available for field personnel consumption. Potable water can be provided in the form of water bottles, canteens, water coolers, or drinking fountains. Disposable drinking cups for single use and a waste receptacle will be provided as needed. Water containers will be refilled daily and disinfected regularly. Potable water containers will be properly identified in order to distinguish them from non-potable water sources.</p> <p><i>Non-Potable Water</i> - Non-potable water may be used for hand washing and cleaning activities. Non-potable water will not be used for drinking purposes. All containers of non-potable water will be marked with a label stating "Non-Potable Water, Not Intended for Drinking Water Consumption"</p>
Illumination will be provided in the form of flashlights if natural light or installed lighting fixtures are not sufficient in the work area, toilet, and/or break area.

2.15 LONE WORKER

URS discourages employees from working alone (i.e. where URS personnel are out of visual and audio range of others) when performing field tasks (see SH&E Procedure [S3NA-314-PR, Working Alone](#)). If lone work is to be performed, a communications/check-in plan must be developed and implemented using the table below.

Lone Worker	<i>[Name and mobile phone number of Lone Worker]</i>
Justification	<i>[Identify why this work must be performed by a Lone Worker]</i>
Check-In Requirement	<i>[Identify frequency, times, and method. AT MINIMUM check in is required within 1 hour of end of each shift. Verbal contact is preferred, all messages-voicemail, email, text- must have an exchange confirming receipt by the check-in contact]</i>
Check-In Contact	<i>[List name, number, and title or relationship to the employee/ project]</i>
Hazard Summary	<i>[Identify the location along the route where the site visit will occur and any additional hazards associated with working alone]</i>
Response Plan	<i>[Specify what will be done to track-down the lone worker if check-in is not performed – i.e., dispatch backup employee (specify name), call police, call hotel, etc.]</i>

2.16 SAFETY OBSERVATIONS

Safety observations are observations made by employees or subcontractors of a condition or behavior which could contribute to an incident, prior to the incident occurring. Observations can also identify positive behaviors or interventions which contribute to the prevention of incidents. Large, long-term projects may benefit from the use of LifeGuard to track and trend observations on a site level. All other projects should log their observations using IndustrySafe. Both reporting systems can be accessed on any safety page of ecosystem. Or the QR codes below can be used while off the URS network from a smartphone/ device.



2.17 SHORT SERVICE EMPLOYEE

A Short Service Employee is an employee with fewer than 6 months experience working on field projects or an employee who has not completed the required training or received required certifications (see the Short Service Employee procedure, [S3NA-015-PR](#)). The Project Manager will identify all Short Service Employees working on the project, and each Short Service Employee will be assigned to an experienced team member so all activities may be monitored. Short Service Employees shall be easily identified in the field environment, such as through wearing a specific colored hardhat, a manufacturer-approved orange stripe applied to their hardhat, or be clearly identified by some other system. Any new employee shall wear the designated Short Service Employee identifier until the Project Manager determines the employee has the knowledge, skills, and ability related to the specific hazard on the project.

2.18 STOP WORK AUTHORITY

URS empowers and expects all employees to exercise their Stop Work Authority (see Stop Work Authority Procedure [S3NA-002-PR](#)) if an incident appears imminent, or when hazardous behaviors or conditions are observed. A stop work request can be informal if the situation can be easily corrected, or may require shutting down operations if revised procedures are necessary to mitigate the hazard. If an URS employee observes an imminently hazardous situation on a site controlled by others (i.e., a client-managed contractor), the employee can always stop work for themselves by removing themselves from the situation.

Employees also may attempt to stop work to avoid allowing the contractor to come to harm by immediately notifying the contractor foreman or site engineer, or if necessary, the client or party managing the contractor.

No employee should object to the issuance of a stop-work request, nor can any disciplinary action be levied against the employee. All employees must agree that the situation has been mitigated before resuming work. No employee will be disciplined for refusing to work if they feel it is unsafe.



3.0 ROLES AND RESPONSIBILITIES

Roles and responsibilities for the project team are defined in SH&E Procedure S3NA-001-PR, Safe Work Standards and Rules. The Project Manager (PM) is ultimately responsible for the development of this HASP and establishing a budget to implement the controls and training required. The Project Manager is also responsible for ensuring that the plan is implemented, that appropriate documentation is generated, and that records are maintained. The SH&E Manager is responsible for reviewing and approving this HASP, and assisting with other SH&E matters upon request. A Site Safety Officer may be appointed to oversee implementation of the HASP in the field. All project team members are responsible for reviewing and abiding by this HASP, performing daily (or more frequent) task hazard assessments, stopping work when necessary to correct unsafe behaviors or conditions, and reporting incidents promptly to the PM and URS Incident Reporting Hotline (Incident Hotline 800-348-5046).

3.1.1 Project Manager

The Project Manager has overall management authority and responsibility for all site operations, including safety. The Project Manager will provide the site supervisor with work plans, staff, and budgetary resources, which are appropriate to meet the safety needs of the project operations. Some of the Project Manager's specific responsibilities include:

- Verifying that personnel, to whom this HASP applies, including URS subcontractors, have received a copy of it, with ample opportunity to review the document and to ask questions.
- Providing the concurring SH&E Manager with updated information regarding conditions at the site and the scope of site work if changes occur that will affect the accuracy of this HASP.
- Providing adequate authority and resources to the Site Supervisor or Site Safety Officer to allow for the successful implementation of all necessary SH&E Procedures.
- Maintaining regular communications with the Site Supervisor or Site Safety Officer and, when necessary, the URS Client SH&E Program Manager.
- Coordinating the activities of URS subcontractors and ensuring that they are aware of the pertinent health and safety requirements for these projects, when applicable.
- Conducting Safety System Auditing by way of Management Site Visits and/or Project Manager Self Assessments on a regular basis.
- Approving amendments to the HASP (in conjunction with the Site Supervisor or Site Safety Officer).
- Coordinating activities with the client as needed to ensure the safe implementation of this HASP.

3.1.2 Site Supervisor

The Site Supervisor has the overall responsibility and authority to direct work operations at the job site according to the provided work plans and HASP. The Project Manager may act as the Site Supervisor while on site. The Site Supervisor's responsibilities include:

- Discussing deviations or drift from the work plan with the Site Safety Officer and Project Manager.
- Discussing safety issues with the Project Manager, Site Safety Officer, and field personnel.
- Assisting the Site Safety Officer with the development and implementation of corrective actions for site safety deficiencies.

- Assisting the Site Safety Officer with the implementation of this HASP and ensuring compliance.
- Assisting the Site Safety Officer with inspections of the site for compliance with this HASP and applicable SH&E Procedures.
- Reviewing Job Safety Analyses (JSAs) and Task Hazard Assessments (THAs) with the work crew.
- Reporting incidents and ensuring incidents and observations are logged into Lifeguard or IndustrySafe.
- Verifying that all operations are in compliance with the requirements of this HASP, and halting any activity that poses a potential hazard to personnel, property, or the environment.
- Temporarily suspending individuals from field activities for infractions against the HASP pending consideration by the Site Safety Officer, the SH&E Manager, and the Project Manager.

3.1.3 Site Safety Officer

The Site Safety Officer supports the Site Supervisor in providing a safe work environment. Not all sites will have a designated Site Safety Officer; the decision should be made by the Project Manager and SH&E Manager taking into consideration the complexity and risks of the scope of work. The Site Supervisor may act as the Site Safety Officer on sites without one. The Site Safety Officer's responsibilities include:

- Updating the site-specific HASP to reflect changes in site conditions or the scope of work. HASP updates must be reviewed and approved by the SH&E Manager.
- Inspecting the site for compliance with this HASP and the SH&E Procedures using the appropriate field audit inspection checklist found in IndustrySafe.
- Coordinating with Site Supervisor to review JSAs and THAs with the work crew.
- Assisting as needed to report incidents and verify that incidents and observations are logged into Lifeguard or IndustrySafe.
- Working with the Site Supervisor and Project Manager to develop and implement corrective action plans to correct deficiencies discovered during site inspections. Deficiencies will be discussed with project management to determine appropriate corrective action(s).
- Contacting the SH&E Manager for technical advice regarding safety issues.
- Determining emergency evacuation routes, establishing and posting local emergency telephone numbers, and arranging emergency transportation.
- Checking that all site personnel and visitors have received the proper training, orientation and medical clearance prior to entering the site.
- Establishing controlled work areas (as designated in this HASP or other safety documentation).
- Facilitating or co-leading daily tailgate meetings and maintaining attendance logs and records.
- Discussing potential SH&E hazards with the Site Supervisor, the SH&E Manager and the Project Manager.
- Selecting an alternate Site Safety Officer by name and informing him/her of their duties, in the event that the Site Safety Officer must leave or is absent from the site.

- Verifying that all operations are in compliance with the requirements of this HASP.
- Issuing a “Stop Work Order” under the conditions set forth in this HASP.
- Temporarily suspending individuals from field activities for infractions against the HASP pending consideration by the SH&E Manager and the Project Manager.

3.1.4 Employees

Responsibilities of employees associated with this project include, but are not limited to:

- Understanding and abiding by the SH&E Procedures specified in the HASP and other applicable safety policies, and clarifying those areas where understanding is incomplete.
- Providing feedback to SH&E management for continuous improvement relating to omissions and modifications in the HASP or other safety policies and procedures.
- Notifying the Site Supervisor or Site Safety Officer of unsafe conditions and acts.
- Stopping work if there is doubt about how to safely perform a task or if unsafe acts or conditions are observed (including subcontractors or team contractors).
- Speaking up and refusing to work on any site or operation where the SH&E procedures specified in this HASP or other safety policies are not being followed.
- Contacting the Site Supervisor or Site Safety Officer or the SH&E Manager at any time to discuss potential concerns.

3.1.5 Subcontractors

The requirements for subcontractor selection and subcontractor safety responsibilities are outlined in URS Procedure *S3NA-213-PR Subcontractor Management*. Each URS subcontractor is responsible for assigning specific work tasks to their employees. Each subcontractor's management will provide qualified employees and allocate sufficient time, materials, and equipment to safely complete assigned tasks. In particular, each subcontractor is responsible for equipping its personnel with any required personnel protective equipment (PPE) and all required training.

URS considers each subcontractor to be an expert in all aspects of the work operations for which they are tasked to provide, and each subcontractor is responsible for compliance with the regulatory requirements that pertain to those services as well as all other requirements applicable to their work. Each subcontractor is expected to perform its operations in accordance with its own unique safety policies and procedures, in order to ensure that hazards associated with the performance of the work activities are properly controlled. Copies of any required safety documentation for a subcontractor's work activities will be provided to URS for review prior to the start of on-site activities.

Hazards not listed in this HASP but known to any subcontractor, or known to be associated with a subcontractor's services, must be identified and addressed to the URS Project Manager or the Site Supervisor prior to beginning work operations. The Site Supervisor or authorized representative has the authority to halt any subcontractor operations, and to remove any subcontractor or subcontractor employee from the site for failure to comply with established health and safety procedures or for operating in an unsafe manner.

3.1.6 Visitors

Authorized visitors (e.g., client representatives, regulators, URS management staff, etc.) requiring entry to any work location on the site will be briefed by the Project Manager, Site Supervisor, or Site Safety Officer on the

hazards present at that location. Visitors will be escorted at all times at the work location and will be responsible for compliance with their employer's health and safety policies. In addition, this HASP specifies the minimum acceptable qualifications, training and PPE that are required for entry to any controlled work area; visitors must comply with these requirements at all times.

If the site visitor requires entry to any exclusion zone (EZ), but does not comply with the above requirements, all work activities within the EZ must be suspended.

Unauthorized visitors, and visitors not meeting the specified qualifications, will not be permitted within established controlled work areas.

4.0 TRAINING AND DOCUMENTATION

The following sections describe the standard practices or programs that URS will establish to prepare employees to perform work safely and consistent with URS policy and Procedures.

4.1 HASP/SITE ORIENTATION

The Project Manager shall conduct a project/site-specific HASP orientation prior to the start of field operations, with support as needed by the SH&E Manager, Site Safety Officer, or Site Supervisor. This meeting will involve representatives from all organizations with a direct contractual relationship with URS on the job site. Minimum items to be covered are listed in **Attachment D**. Participants will then sign the HASP Personnel Acknowledgement register at the end of the HASP.

4.2 DAILY TAILGATE MEETINGS AND THA REVIEW

The Site Supervisor, Site Safety Officer or designee shall facilitate a tailgate meeting to discuss the specific requirements of this HASP, review the applicable JSAs and/or complete THAs prior to the commencement of daily project activities. Attendance at the daily tailgate meeting is mandatory for all employees and subcontractors at the site contracted to URS. Simultaneous operations are encouraged to attend each other's tailgate meetings or at the very least the supervisors shall discuss the coordination of activities and associated hazards of each other's tasks. The supervisor will then convey the information to the work crew. The Tailgate Meeting must be documented by the Site Supervisor or Site Safety Officer on a Daily Tailgate Meeting form, a blank copy of which is included in **Attachment E**.

4.3 WORKER TRAINING AND QUALIFICATIONS

All personnel at this site must be qualified and experienced in the tasks they are assigned. SH&E Training Procedure S3NA-003-PR establishes the general training requirements for URS employees. In addition, S3NA-117-PR, Hazardous Waste Operations, explains the HAZWOPER training and S3NA-128-PR, Medical Screening and Surveillance, details the medical surveillance requirements.

Check all required training on the table below. Verify training records of employees and subcontractors.

Site Specific Training Requirements	
Training	Applies to
<input checked="" type="checkbox"/> HASP Orientation	All Employees and Subcontractors
<input checked="" type="checkbox"/> HAZWOPER 40 –HR	On HAZWOPER sites, in EZ, exposed to hazardous contamination
<input checked="" type="checkbox"/> HAZWOPER Supervisor	Employees managing others in HAZWOPER activities
<input checked="" type="checkbox"/> Fit Test/ Respiratory Protection	Employees needing to wear respirators
<input checked="" type="checkbox"/> Hazardous Materials Shipping	Employee responsible for shipping HZM/HZW/DG and/or signing manifests
<input checked="" type="checkbox"/> Annual Medical Surveillance/ Clearance	Employees working in an exclusion zone and the regulatory required exposure limit <u>is</u> exceeded for 30 or more days a year

<input type="checkbox"/> Biennial Medical Surveillance/ Clearance	Working in an exclusion zone more than 30 days a year and the regulatory required exposure limit is not exceeded
<input type="checkbox"/> OSHA 10 Hr Construction	Employees working near heavy equipment
<input type="checkbox"/> OSHA 30 Hr Construction	Supervisor/SSO overseeing work with heavy equipment
<input type="checkbox"/> Local requirements:	
<input type="checkbox"/> Client requirements:	

4.3.1 Competent Person

A competent person is an employee who, through education, training and experience, has knowledge of applicable regulatory requirements, is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

URS's Competent Person Designation Procedure, S3NA-202-PR, explains the roles, responsibilities and procedures of naming a competent person. Complete the table below and include a S3NA-202-FM1 Competent Person Designation Form for each URS competent person (subcontractors to use an equivalent process).

These activities require a competent person. Mark all that apply and list the name of the person.

	Activity	Name of Person
<input type="checkbox"/>	Asbestos	
<input type="checkbox"/>	Assured Equipment Grounding Conductor	
<input type="checkbox"/>	Blasting & Explosives	
<input type="checkbox"/>	Concrete & Masonry Construction	
<input type="checkbox"/>	Confined Spaces	
<input type="checkbox"/>	Control of Hazardous Energy (Lockout-Tagout)	
<input type="checkbox"/>	Crane Assembly / Disassembly	
<input type="checkbox"/>	Cranes & Derricks	
<input type="checkbox"/>	Demolition	
<input type="checkbox"/>	Electrical Wiring Design & Protections	
<input type="checkbox"/>	Elevated Work Platforms & Aerial Lifts	
<input type="checkbox"/>	Fall Protection	

<input type="checkbox"/>	Hearing Protection	
<input checked="" type="checkbox"/>	Heavy Equipment	Geologic
<input type="checkbox"/>	Ionizing Radiation	
<input type="checkbox"/>	Lead	
<input type="checkbox"/>	Material Hoists & Personnel Hoists	
<input checked="" type="checkbox"/>	Respiratory Protection	SSO
<input type="checkbox"/>	Rigging Equipment	
<input type="checkbox"/>	Scaffolds	
<input type="checkbox"/>	Stairways & Ladders	
<input type="checkbox"/>	Steel Erection	
<input type="checkbox"/>	Trench & Excavations	
<input type="checkbox"/>	Underground Construction	
<input type="checkbox"/>	Welding & Cutting	

5.0 HAZARD ASSESSMENT AND CONTROL

URS has adopted an approach to hazard assessment and control that incorporates both qualitative and quantitative methods to identify hazards and the degree to which they may impact employees and URS operations. See S3NA-209-PR, Risk Assessment and Management, for details regarding URS's process. This approach involves the following:

5.1 SH&E PROCEDURES

All URS SH&E procedures, in their controlled copy version, are available on the internal SH&E Policy and Procedures ecosystem page. Programmatic procedures referenced in this document (for example SH&E Training) do not need to be printed for inclusion in this HASP. Only procedures that are needed for field activity reference and application MUST be printed in full and included in this HASP. The applicable field procedures checklist is in the Physical Hazards section below and procedures are included in **Attachment B**.

5.2 PRE-JOB HAZARD ASSESSMENT/ JOB SAFETY ANALYSIS

A pre-job hazard assessment or JSA is to be developed for each discrete task planned as part of the project. This assessment lays out the steps of the job, potential hazards, and mitigation measures. Form S3NA-209-FM4 or a client required equivalent may be used. A blank copy is included in **Attachment E**.

5.3 TASK HAZARD ASSESSMENT

The THA is a handwritten field form which is based on "Stop and Think" as the first thing you do before starting work activities often paired with the daily tailgate meeting or work permit issuance. Not all risks can be anticipated in this HASP or the pre-job hazard assessment process; therefore, the THA is used to assess, mitigate, and document the site-specific conditions and changes to the hazard profile prior to and throughout the work task. Proper implementation of the THA program protects worker health and safety. A blank THA form is included in **Attachment E**. The THA must be signed by all employees each day and initialed whenever a changed condition provokes a change in hazard controls.

5.3.1 Hazard Categories

JSAs and THAs should include consideration of the following hazard categories when identifying hazards and task specific controls:

- Energy Sources (line of fire, electricity, pressure, compression/ tension)
- Fall (slip/trip, fall to same level, fall from height)
- Contact with (struck against, struck by, contact with sharp/ abrasives)
- Caught (in, under, between, by)
- Strain/ Overexertion (lifting, repetition, push/pull, bending, twisting)
- Exposure (temperature, radiation, noise, chemicals, radiation, hazardous atmosphere)

5.4 4-SIGHT

When preparing hazard assessments and throughout the day workers should use 4-Sight. This is a mental process through which workers ask themselves (and each other) four questions designed to effectively assess hazards. Using these questions during each task, especially those without formal JSA or THA, will help workers identify hazards and condition changes so that they can control them or stop work to seek assistance.

- 1) What am I about to do?
- 2) What could go wrong?
- 3) What could be done to make it safer?
- 4) What have I done to communicate the hazards?



6.0 PHYSICAL HAZARD ASSESSMENT

6.1 PHYSICAL HAZARDS

A physical hazard is a hazard that threatens the physical safety of an individual; contact with the hazard typically results in an injury. The following table summarizes the physical hazards or activities containing physical hazards present at the site and the associated procedures that address protection and prevention of harm.

All checked procedures **MUST** be included in **Attachment B** for implementation and reference.

Check all applicable hazards/ activities and add site specific description of the hazard.

	Hazard/ Activity (note: text in this column links to procedure)	Site Specific Description	Applicable Procedure
<input type="checkbox"/>	Abrasive Blasting	[where, what phase of work, frequency, etc.]	S3NA-335-PR
<input type="checkbox"/>	Aerial Work Platforms		S3NA-323-PR
<input type="checkbox"/>	All-Terrain Vehicles		S3NA-319-PR
<input type="checkbox"/>	Blasting and Explosives		S3NA-336-PR
<input checked="" type="checkbox"/>	Bloodborne Pathogens	If first aid treatment is provided on-site.	S3NA-111-PR
<input type="checkbox"/>	Cofferdams		S3NA-344-PR
<input checked="" type="checkbox"/>	Cold Stress	Working outside in the winter time	S3NA-112-PR
<input type="checkbox"/>	Compressed Air Systems and Testing		S3NA-337-PR
<input checked="" type="checkbox"/>	Compressed Gases	Handling calibration gases	S3NA-114-PR
<input type="checkbox"/>	Concrete Work		S3NA-338-PR
<input type="checkbox"/>	Confined Spaces		S3NA-301-PR
<input checked="" type="checkbox"/>	Corrosive Reactive Materials	Handling bottelware preservatives	S3NA-125-PR
<input type="checkbox"/>	Cranes and Lifting Devices		S3NA-310-PR
<input type="checkbox"/>	Demolition		S3NA-339-PR
<input type="checkbox"/>	Diving (scientific and commercial)		S3NA-334-PR
<input checked="" type="checkbox"/>	Drilling, Boring & Direct Push Probing	Installing and backfilling soil borings	S3NA-321-PR
<input checked="" type="checkbox"/>	Electrical Safety	Extension cords, portable generators	S3NA-302-PR
<input type="checkbox"/>	Excavation		S3NA-303-PR
<input type="checkbox"/>	Fall Protection		S3NA-304-PR
<input type="checkbox"/>	Flammable and Combustible Liquids		S3NA-126-PR
<input type="checkbox"/>	Gauge Source Radiation		S3NA-122-PR
<input checked="" type="checkbox"/>	Hand and Power Tools	Driller hand tools, sampling tools. Using hammer drill for subslab soil vapor sampling	S3NA-305-PR
<input checked="" type="checkbox"/>	Hazardous Waste Operations	Generating and removing potentially hazardous investigation derived waste (IDW)	S3NA-117-PR
<input type="checkbox"/>	Heat Stress		S3NA-113-PR
<input checked="" type="checkbox"/>	Heavy Equipment	Working near drill rigs and support	S3NA-309-PR

		vehicles	
<input type="checkbox"/>	High Altitude		S3NA-124-PR
<input type="checkbox"/>	Highway and Road Work		S3NA-306-PR
<input type="checkbox"/>	Hoists Elevators and Conveyors		S3NA-343-PR
<input type="checkbox"/>	Hot Work		S3NA-332-PR
<input type="checkbox"/>	Ladders		S3NA-312-PR
<input type="checkbox"/>	Lockout Tagout		S3NA-325-PR
<input type="checkbox"/>	Machine Guarding Safe Work Practice		S3NA-326-PR
<input type="checkbox"/>	Marine Safety and Vessel Operations		S3NA-333-PR
<input type="checkbox"/>	Material Storage		S3NA-316-PR
<input type="checkbox"/>	Mine Site Activities		S3NA-341-PR
<input type="checkbox"/>	Mining Operations		S3NA-345-PR
<input type="checkbox"/>	Non Ionizing Radiation		S3NA-121-PR
<input checked="" type="checkbox"/>	Overhead Lines	Overhead power lines in relation to drill mast	S3NA-322-PR
<input type="checkbox"/>	Powder-Actuated Tools		S3NA-327-PR
<input type="checkbox"/>	Powered Industrial Trucks		S3NA-324-PR
<input type="checkbox"/>	Radiation		S3NA-120-PR
<input type="checkbox"/>	Railroad Safety		S3NA-329-PR
<input checked="" type="checkbox"/>	Respiratory Protection	Potential exposure to VOCs	S3NA-123-PR
<input type="checkbox"/>	Scaffolding		S3NA-311-PR
<input type="checkbox"/>	Steel Erection		S3NA-340-PR
<input type="checkbox"/>	Temp. Floors, Stairs, Railings, Toe-boards		S3NA-342-PR
<input checked="" type="checkbox"/>	Underground Utilities	Potential damage via drilling boreholes	S3NA-331-PR
<input type="checkbox"/>	Underground Work		S3NA-330-PR
<input type="checkbox"/>	Wildlife, Plants and Insects		S3NA-313-PR
<input type="checkbox"/>	Working Alone		S3NA-314-PR
<input type="checkbox"/>	Working On and Near Water		S3NA-315-PR

7.0 CHEMICAL HAZARD ASSESSMENT

URS will perform tasks that can expose personnel to a variety of hazards due to the operational activities, physical conditions of the work locations, and potential presence of environmental contaminants. This section presents a variety of potential chemical hazards, exposure pathways, and related mitigation actions. See S3NA-110-PR, Toxic and Hazardous Substances, for information on planning, training, monitoring, and details on several specific chemicals (Benzene, Cadmium, Chromium, Hydrogen Sulfide, Lead, and Silica).

7.1 POTENTIAL CHEMICAL HAZARDS

[Complete table, delete chemicals that do not apply to the site]

Summary of Hazardous Properties of Contaminant Exposure Hazards

PEL: Permissible Exposure Limits

TLV: Threshold Limit Values

Chemical Name	Maximum Concentration found onsite	Media	Primary Routes of Exposure	PEL	TLV	IP electron volts (eV)
cis-1,2-Dichloroethene (cis-1,2-DCE)	920.0 µg/L	Soil, GW, Vapor,	inhalation, ingestion, skin and/or eye contact	200 ppm	200 ppm	9.65
Tetrachloroethene (PCE)	4,600 µg/L	Soil, GW, Vapor,		100 ppm	25 ppm	9.32
Trichloroethene (TCE)	405.0 µg/L	Soil, GW, Vapor,		100 ppm	10 ppm	9.45
Vinyl Chloride (VC)	180.0 µg/L	Soil, GW, Vapor,	inhalation, skin and/or eye contact	1 ppm	1 ppm	9.99

7.2 POTENTIAL EXPOSURE PATHWAYS

Occupational exposure to chemical hazards associated with the work activities could potentially occur by two primary routes (inhalation and skin contact) and one indirect route (incidental ingestion).

7.2.1 Inhalation

The primary risks associated with URS's scope of work pertain to potential exposure to airborne contaminants and explosion hazards. Constituents that potentially pose an occupational concern to employees by the inhalation route are carbon monoxide, hydrogen sulfide, methane, and volatile organic compounds. Air monitoring will be performed within the employee breathing zone to assess the need to implement appropriate control measures or stop work. In addition, air monitoring will be performed at the source to assess potential explosion hazards.

7.2.2 Skin Contact

Personnel handling residual product or waste and associated equipment may be exposed to chemical hazards by skin contact or adsorption. However, exposure is expected to be limited since workers will be required to wear appropriate PPE (i.e. appropriate work gloves, body clothing, and/or face shield).

7.2.3 Ingestion

Personnel handling residual product or waste and associated equipment, including project hazardous materials, may be exposed by incidental ingestion. Typically, this exposure occurs if proper PPE was not used or personal hygiene was not practiced. Personal protection against exposure via ingestion can be accomplished by performance of proper decontamination procedures when exiting contaminated work areas as well as using the correct PPE.

7.3 DECONTAMINATION

All possible and necessary steps shall be taken to reduce or minimize contact with chemicals and contaminated/impacted materials while performing field activities. Decontamination steps are outlined in Hazardous Waste Operations procedure S3NA-117-PR. Some key elements are as follows:

- All persons and equipment entering the EZ shall be considered contaminated, and thus, must be properly decontaminated prior to exiting to clean areas of the site.
- Avoid reactions between the solutions and contaminated materials. Review the applicable SDS.
- All contaminated PPE and decontamination materials shall be contained, stored and disposed of in accordance with site-specific requirements determined by site management.
- Use caution while working around decontamination stations, including the decontamination pad, which may be a slip or trip hazard.
- Use disposable equipment when possible and practical.
- All employees performing equipment decontamination shall wear the appropriate PPE to protect against exposure to contaminated materials. The level of PPE may be equivalent to the level of PPE required in the EZ. Other PPE may include splash protection, such as face-shields and splash suits, and knee protectors.
- All decontaminated equipment shall be visually inspected for contamination prior to leaving the Contaminant Reduction Zone (CRZ).

Decontamination Procedures & Equipment		
Procedure	Equipment Needed	
Washing reusable sampling equipment	Alconox/ Liquinox & Deionized Water	
Equipment Decontamination Procedures		
Type Equipment	Decontamination Solution	Procedure
Macrocore downhole sampling equipment	Alconox/ Liquinox & Deionized Water	Wash with Alconox/ Liquinox & Deionized Water solution, then rinse with Deionized Water

Downhole groundwater sampling equipment	Alconox/ Liquinox & Deionized Water	Wash with Alconox/ Liquinox & Deionized Water solution, then rinse with Deionized Water
Waste Handling for Decontamination		
Waste Streams/Products		Disposal Procedures
Used PPE (i.e. Non-coated Tyvek suits, etc.).		Place in drum pending off-site shipment-label drum with contents
Spent decon water		Place in drum pending off-site shipment-label drum with contents

7.4 AIR MONITORING

Monitoring shall be performed within the work area on site in order to detect the presence and relative levels of toxic substances. The data collected throughout monitoring shall be used to determine the appropriate levels of PPE. Monitoring shall be in accordance with Exposure Monitoring Procedure S3NA-127-PR and specified in the work permit and/or JSAs for the tasks. Key elements of the procedure include:

- Calibration of monitoring equipment and/or daily bump tests to verify calibrations and confirm alarm function.
- Personal monitoring and result evaluation must be directed by a Certified Industrial Hygienist or Certified Safety Professional.

7.4.1 Real- Time Exposure Measurement/ Equipment

Monitoring shall be performed within the work area on site in order to detect the presence and relative levels of toxic substances. The data collected throughout monitoring shall be used to determine the appropriate levels of PPE. Monitoring shall be conducted as specified in the work permit and JSAs as work is performed. All instrumentation need to be rated intrinsically safe to prevent fire or explosion.

Check which real-time monitoring equipment will be used and update the model type if needed:

	Instrument	Manufacturer/Model	Substances Detected
<input checked="" type="checkbox"/>	Photo Ionization Detector (PID)	RAE Systems mini-RAE (min. 10.6 eV bulb)	<ul style="list-style-type: none"> • Petroleum hydrocarbons • Organic Solvents

	Instrument	Manufacturer/Model	Substances Detected
<input checked="" type="checkbox"/>	Multi or 4 Gas Detectors	RAE Systems Multi-RAE	<ul style="list-style-type: none"> • Lower Explosive Limit • Oxygen • Carbon Monoxide • Hydrogen Sulfide
<input checked="" type="checkbox"/>	Combustible Gas Indicator (CGI) May be combined with individual or multi-gas detectors.		<ul style="list-style-type: none"> • Explosivity
<input type="checkbox"/>	Particulate Monitor	MIE Model PDM-3 mini-RAM	<ul style="list-style-type: none"> • Aerosols, mist, dust, and fumes
<input type="checkbox"/>	Personal Monitoring/ Badges	n/a	<ul style="list-style-type: none"> • n/a

7.4.2 Health and Safety Action Levels

An action level is a point at which increased protection is required due to the concentration of contaminants in the work area or other environmental conditions. The concentration level (above background level) and the ability of the PPE to protect against that specific contaminant determine each action level. The action levels are based on concentrations in the breathing zone.

If ambient levels are measured which exceed the action levels in areas accessible to unprotected personnel, necessary control measures (barricades, warning signs, and mitigation actions to limit, etc.) must be implemented prior to commencing activities at the specific work area.

Personnel should also be able to upgrade or downgrade their level of protection with the concurrence of Site Supervisor or Site Safety Officer or the Safety Manager.

Reasons to upgrade:

- Known or suspected presence of dermal hazards;
- Occurrence or likely occurrence of gas, vapor, or dust emission; or
- Change in work task that will increase the exposure or potential exposure to hazardous materials.

Reasons to downgrade:

- New information indicating that the situation is less hazardous than was originally suspected;
- Change in site conditions that decrease the potential hazard; or
- Change in work task that will reduce exposure to hazardous materials.

7.4.3 Monitoring Procedures

The monitoring procedures shown below are general guidelines for sampling activities. The reviewing SH&E Manager may modify any or all of these for site-specific application. A reading in excess of action level outlined below will require additional ventilation for 30 minutes, followed by re-monitoring.

Monitoring Procedures and Action Levels

Parameter	Zone Location and Monitoring Interval	Response Level	Response Activity
Volatile Organic Compounds (VOCs) and volatile hydrocarbons (total by PID)	Breathing zone, continuously during tasks where exposure to VOCs and volatile hydrocarbons is possible	< 5 ppm	Continue monitoring, may continue work in required PPE
		5- 25 ppm (sustained for 5 minutes)	STOP WORK and notify PM. Investigate the cause of elevated VOC measurements and identify measures to reduce concentrations (cover impacted soils, ventilation, etc.). Work activities shall only continue once levels have decreased to or below 5 units above background. If levels continue above 5 units, only individuals who are medically qualified to wear respiratory protection are permitted to continue work activities with Project Manager approval. Don Level C PPE (organic vapor respirator cartridges), continue monitoring, and initiate continuous air monitoring for benzene.
		> 25 ppm (sustained for 5 minutes)	Cease work, exit, and contact the Site Safety Officer, Site Supervisor and Project Manager.
Hydrogen Sulfide (multi-gas detector or individual H ₂ S meter)	Breathing zone, continuously during tasks where exposure to hydrogen sulfide is possible	< 5 ppm	Continue work activities. Contact the Site Safety Officer to investigate the potential for contributing factors.
		> 5 ppm	Cease work, exit the area or confined space, and contact the Site Safety Officer, Site Supervisor and Project Manager.
Combustible Gas (multi-gas meter or individual combustible gas indicator, CGI)	Breathing zone or in the immediate work area continuously during tasks where explosive atmospheres are possible	> 5% of LEL	Cease work, exit, and contact the Site Safety Officer, Site Supervisor and Project Manager.
Oxygen (O₂) (multi-gas detector or individual O ₂ meter)	Breathing zone, continuously during tasks where oxygen enriched or deficient atmospheres are possible	< 19.5 % O ₂	Cease work (deficient atmosphere), exit the area or confined space, and contact the Site Safety Officer, Site Supervisor and Project Manager.
		> 23.5 % O ₂	Cease work (enriched atmosphere), exit the area or confined space, and contact the Site Safety Officer, Site Supervisor and Project Manager.
Carbon Monoxide (CO) (multi-gas detector or individual CO meter)	Breathing zone, continuously during tasks where exposure to CO is possible	< 10 ppm	Continue work in Level D and continue monitoring
		> 10 ppm	Cease work, exit the area or confined space, and contact the Site Safety Officer, Site Supervisor and Project Manager.

8.0 ENVIRONMENTAL IMPACT PREVENTION

URS strives to avoid or control environmental impacts from our operations through planning and implementation of best practices as well as preparing responses to react to environmental incidents. Environmental Compliance procedure S3NA-204-PR provides details on permitting and planning requirements.

	Potential Environmental Impact	Description of hazard and permit or control being implemented
<input type="checkbox"/>	Air Emissions	Any operations where air emissions may negatively impact the surrounding environment, air emission permits, etc. and discuss associated control
<input checked="" type="checkbox"/>	Hazardous Waste Management	Storage, treatment, or disposal of hazardous waste at the project site, RCRA Part B permits or equivalent, 90-day storage procedures, etc.
<input type="checkbox"/>	Storm Water Pollution	Operations that may generate/discharge storm water from the project site, NPDES/general construction storm water discharge permits, etc.
<input type="checkbox"/>	Wetlands	Use the FWS online wetlands mapper (http://www.fws.gov/wetlands/Data/mapper.html) to determine if any wetlands exists on your project site, are adjacent to your project, or may be negatively impacted by your project, any regulatory permits and control measures
<input type="checkbox"/>	Critical Habitat	Use the FWS online critical habitat mapper tool (http://criticalhabitat.fws.gov/) to determine if any plant or animal critical habitats exists on, adjacent to, or may be otherwise impacted by your project, any regulatory permits and control measures
<input type="checkbox"/>	Other:	

8.1 INCIDENTAL SPILL PREVENTION AND CONTAINMENT

Spill prevention and containment planning must be conducted and appropriate control measures established, consistent with regulatory requirements. Personnel are not expected to perform a response action related to an uncontrolled release of a hazardous substance. However, in the event of an incidental release of a hazardous material, a response will be performed to absorb, neutralize or otherwise control the release within the immediate work area. Procedures contained in the SDS of the hazardous material will be implemented to perform the response. The Emergency Response section of this HASP contains information on spill reporting, pre- and post-spill evaluation, and response

8.1.1 Spill Prevention and Containment Practices

Work activities may involve the use of hazardous materials (i.e. fuels, solvents) or work involving drums or other containers. When these activities exist the procedures outlined below will be used to prevent or contain spills:

- All hazardous material will be stored in appropriate containers and labelled.
- Tops/lids will be placed back on containers after use.
- Containers of hazardous materials will be stored appropriately away from moving equipment.
- Containers shall only be lifted using equipment specifically manufactured for that purpose.

- Drums/containers will be secured and handled in a manner which minimizes spillage and reduces the risk of musculoskeletal injuries.
- Equipment will be inspected daily for signs of leaks, wear, or strain on parts that, if ruptured or broken, would result in a spill.
- Refueling should occur in designated areas where incidental spills can be prevented from reaching permeable ground surfaces.
- Whenever possible, position parked or stationary equipment over secondary containment and/ or absorbent materials to prevent spills from reaching permeable ground surfaces.
- A spill response kit, to include an appropriate empty container, materials to allow for booming or diking the area to minimize the size of the spill, and appropriate clean-up material (i.e. speedy dri, absorbent pads, etc.) will be available on the project site and positioned for quick and easy access.

9.0 PERSONAL PROTECTIVE EQUIPMENT

PPE is considered the last line of defense in hazard control. PPE is meant to protect workers when all other methods (elimination, engineering, and administrative) have been exhausted. All employees must be trained in the proper use and maintenance of PPE. See Procedure S3NA-208-PR, Personal Protective Equipment.

A PPE assessment (see S3NA-208-FM1) can be performed to help determine PPE requirements. PPE upgrades for individual tasks or steps of a task are to be identified in JSAs or THAs.

Minimum Required PPE (per URS PPE and HAZWOPER Procedures):

- Hard hat
- Safety glasses w/ side shields (may be clear or shaded)
- Safety toe work boots
- Long pants and shirts with sleeves (short or long- cover shoulders no tank or muscle shirt styles)

Complete the table below for site-specific PPE

Additional PPE Needed on Site (to encompass all task specific additions and upgrades)

Face/ Eyes <input type="checkbox"/> Spoggles (Safety Glasses with foam liner for dust protection) <input type="checkbox"/> Welding mask/goggles <input type="checkbox"/> Chemical goggles <input type="checkbox"/> Face shield (splash) <input type="checkbox"/> Face shield (impact)	Head/ Ears <input type="checkbox"/> Helmet with chin strap <input checked="" type="checkbox"/> Wide brimmed hat <input checked="" type="checkbox"/> Earplugs <input type="checkbox"/> Over-ear hearing protection
Hands <input checked="" type="checkbox"/> Nitrile <input type="checkbox"/> Leather <input type="checkbox"/> Cut, abrasion and puncture resistant <input type="checkbox"/> Impact-resistant <input type="checkbox"/> Other Chemical Resistant: _____	Legs/ Feet <input checked="" type="checkbox"/> High ankle boots <input type="checkbox"/> Snake guards <input type="checkbox"/> Rubber boots/waders <input type="checkbox"/> Metatarsal Guards <input type="checkbox"/> Electrically-resistant boots
Body <input type="checkbox"/> Sunscreen <input type="checkbox"/> Insect repellent (DEET) <input type="checkbox"/> Permethrin applied to clothing <input checked="" type="checkbox"/> Long-sleeved shirt <input type="checkbox"/> High-visibility vest <input type="checkbox"/> High-visibility pants <input checked="" type="checkbox"/> Disposable coveralls <input type="checkbox"/> Flame retardant clothing <input type="checkbox"/> Fall protection <input type="checkbox"/> Personal floatation device <input type="checkbox"/> Other: _____	Equipment <input type="checkbox"/> Air/noise monitoring equipment (specify): <input type="checkbox"/> Traffic/Work zone control equipment (specify): <input type="checkbox"/> Communication beyond cell phones (specify): <input type="checkbox"/> Fire controls (specify):

10.0 SITE CONTROL

The purpose of site control is to protect the public from inadvertently coming into contact with site hazards and to protect URS employees being impacted by hazards. This section details the equipment and actions needed to promote optimal site control.

10.1 SITE WORK ZONES

Site layout and site control need to be coordinated achieve a productive work environment and efficient work process while minimizing exposure of employees and the public to hazards associated with the work. Consider the following items when planning the site layout and controls:

- “Line of Fire” hazards- overhead utilities, falling/ tipping equipment, release of energy/ pressure, flying debris,
- Noise, dust, odor suppression
- Contamination containment and decontamination area layout
- Traffic control for site vehicles/ equipment (public traffic control requires Traffic control Plan)
- Restricted access for areas requiring special training, skills, or certifications
- Restriction of work near railroads
- Presence or creation of excavations
- Loading/unloading areas
- Portable restrooms
- Dumpsters and bins
- Equipment lay down
- Heavy equipment parking
- Overnight safety and security needs

Check the description of the site controls **already** in place:

<input type="checkbox"/>	Work area is within a facility/ property with secure and restricted access provided by client or third party
<input type="checkbox"/>	Work area is enclosed within facility/ property but access is not restricted via locks, guards, or gates
<input type="checkbox"/>	Work area is on a property that is open and access by the public is likely
<input checked="" type="checkbox"/>	Work area is on a property that is open but access by the public is unlikely
<input type="checkbox"/>	Work area is in a roadway or right of way of a roadway (Traffic Control Plan required <u>S3NA-306-PR</u>)
<input type="checkbox"/>	Work area is on or near railroad (including right of way, active lines, and crossings)
<input type="checkbox"/>	Other (describe):

Check and describe the site controls that need to be added to protect the public and the URS work team.

	Control Item	Description of type and application
<input checked="" type="checkbox"/>	Fence	Pre-existing chain link fence around current operating facility
<input type="checkbox"/>	Locks	
<input type="checkbox"/>	Barricades	
<input type="checkbox"/>	Cones	
<input type="checkbox"/>	Tape	
<input type="checkbox"/>	Hole Covers	
<input type="checkbox"/>	Other:	

10.2 SITE CONTROL MAP/ DIAGRAM



10.3 SIMULTANEOUS AND NEIGHBORING OPERATIONS

Simultaneous and neighboring operations present a need for added coordination and communication to address hazards that are presented by multiple operations.

Complete the tables below or mark "N/A"

Activity/ Company	Hazard	Controls/ mitigations & Communication methods
Simultaneous Operation (within the site)		
N/A	N/A	N/A
Neighboring Operation (outside/ bordering the site)		
N/A	N/A	N/A

10.4 SITE SECURITY

All projects should be reviewed for the potential for personal security issues (e.g., assault, robbery, threat, etc.). Check all of the following that apply:

- ☐ Project site located in a higher crime area or has a history of security incidents
- ☐ Working outside of regular cellular telephone service
- ☐ Idle property with potential for trespasser(s) to shelter in buildings/structures and assault personnel
- ☐ Working at night

Detail the security measures to address the above risks: N/A

11.0 EMERGENCY RESPONSE

URS requires that all projects plan for reasonably foreseeable emergencies (see Emergency Response Planning Procedure S3NA-010-PR). Prior to the start of site operations, all personnel shall review the table below for site-specific information regarding evacuations, muster points, communication, and other site-specific emergency procedures. An Incident Response Flow Chart is included in **Attachment A**.

11.1 INCIDENT/ EMERGENCY CONTACT INFORMATION

URS Contacts			
Name	Title	Telephone Number	Mobile Phone
Chuck Dusel	Project Manager	(716) 856-5636	(716) 353-3016
Greg Dunlavey	Site Supervisor	(518) 951-2277	(518) 384-4212
Greg Dunlavey	Site Safety Officer	(518) 951-2277	(518) 384-4212
Ben Bertolotti, CIH	Region SH&E Manager	(973) 777-3003	(973) 572-3916
Peter Gregory, CSP, MPH, STS	Area SH&E Manager	(973) 883-8683	(201) 602-3511
Incident Reporting	DCS Incident Reporting & Help Line	800-348-5046	
URS Nurse direct	Use only after incident reporting line	877-878-9525	
Client Contacts			
Michael Haggerty	Client Project Manager	(518) 402-9768	(518) 526-8782
Organization/Agency			
Police Department (local)			911 [or insert here]
Fire Department (local)			911 [or insert here]
Ambulance Service (EMT will determine appropriate hospital for treatment)			911 [or insert here]
Hospital: (Site personnel to use for emergency care) Ellis Hospital, 100 Rosa Rd., Schenectady NY 12308			(518) 243-4121
Occupational Clinic: (Site personnel to use for non-emergency care) St. Peter's Urgent Care - Clifton Park, 1 Tallow Wood Drive, Clifton Park, NY 12065			(518) 373-4444
Poison Control Center			(800) 222-1222
Pollution Emergency- NYSDEC Spill Hotline			(800) 457-7362
INFOTRAC (URS's account number 74984)			800-535-5053

URS Hazardous Material Shipping Help Line	800-381-0664
Public Utilities	
National Grid	(800) 642-4272
City of Schenectady Water Department	518-382-5023
Call Before You Dig	811

11.2 MUSTER LOCATION



11.3 COMMUNICATION PROCEDURES

The SSO/SS will notify all site personnel of any emergency. Once notified, all operations will cease, equipment will be shut down and all personnel will assemble at the muster location (above) to receive further word from the SSO/SS.

11.4 CPR/ FIRST AID TRAINED PERSONNEL

SS/SSO

11.5 INCIDENT REPORTING

Incidents involving or affecting an URS employee or subcontractor will be reported in a prompt manner verbally to the site supervisor and project manager.

1. If the incident is a significant or life-threatening emergency, the employee or supervisor shall immediately dial 911 or the appropriate emergency contact phone number for your site.
2. The employee or supervisor shall contact the Incident Hotline (800-348-5046).
3. The employee or supervisor must notify their operational leaders and the Area SH&E Manager.
4. The supervisor, or delegate, must make initial notification in IndustrySafe within 4 hours for significant incidents, or 24 hours for less significant events event.
5. Client and account management notifications may also apply. The Project Manager will make any necessary notifications.

Any injury, even if no treatment is required, and any incident for which assistance by SH&E Management is needed must be immediately communicated to the Incident Hotline at 1-800-348-5046.

All incidents are also to be reported to IndustrySafe within the timeframes listed below:

Incident Type	IndustrySafe Reporting Time Frame
Significant Incident, including any injury	→ 4 Hours
All Other Incidents	→ 24 Hours

Significant Incident:

- Fatality;
- Amputation;
- Hospitalization for treatment for more than 24 hours (admission);
- Any single event resulting in more than one employee requiring medical treatment or more than one employee being away from work more than 3 days;
- Any SH&E-related Consent Agreement/Order/Lawsuit or enforcement action seeking more than \$10,000 or alleging criminal activity;
- Any spill or release of a hazardous material that is reportable to a regulatory agency;
- Any Notices of Violation resulting from not operating within a regulatory agency permit/license or consent;
- Any incident resulting in property damage expected to exceed \$10,000 United States (US) dollars;
- Any security-related incident that could have caused significant harm to an URS employee; and/or
- Any Near Miss event that may have resulted in any of the above consequences but because of "luck" did not result in harm to persons, property or the environment.

All Other Incidents:

- Any injury or illness to an URS employee or subcontractor, even if it does not require medical attention, including work-related injuries/illnesses that have become significantly aggravated by the work environment;
- An injury to a member of the public, or clients, occurring on an URS-controlled work site;
- Re-occurring conditions such as back pain or cumulative trauma disorders (e.g., carpal tunnel syndrome);
- Fire, explosion, or flash that is not an intended result of a planned event (e.g., remediation process, laboratory Procedure);
- Any incident involving company-owned, rented, or leased vehicles (including personal vehicles used for company business); and/or
- Any failure to comply with the requirements of a regulatory permit issued to URS.
- Scan the QR code below to access IndustrySafe reporting system from your smartphone/ device.



11.6 MEDICAL EMERGENCIES

In the event of a life-threatening or critical emergency, URS employees should dial 911 and follow the recommended instructions. However, in less serious situations, an injured employee or a co-worker should contact the Incident Hotline at 800-348-5046 to ensure that the employee receives the best care at the best time (i.e., within the first hour following an injury or potential injury). By contacting the Incident Hotline, the worker can be connected with URS's nurses for first aid advice. If recommended by the nurse, the supervisor or a co-worker should drive the injured employee to the project-designated clinic or hospital. A map to the designated hospital and clinic is attached as **Attachment A** and the locations and addresses are included in the table above as well as in the HASP Summary on Page i.

11.7 VEHICLE INCIDENTS

All vehicles should be rented through Carson Wagonlit Travel (accessible via Ecosystem) to ensure that URS insurance is included in the rental rate. All other insurances should be declined. URS's rental vehicle insurance policy for National/Enterprise or Avis can be found on the DCS Americas [United States](#) or [Canada](#) travel pages. **Drivers MUST print and carry the applicable insurance policy for the rental.**

In the event of a vehicle incident (including collisions as well as mechanical difficulties such as breakdowns and flat tires) the following responses are recommended:

- For breakdowns and flat tires, contact an emergency provider
- For rental vehicles, contact the rental company
- To the extent possible, URS personnel should not change flat tires or perform similar repairs

- If a collision has occurred, assess the situation and move all occupants (except the injured) out of further harm's way. If safe to do so, remove the car from the traveled way. Call 911 if necessary, and report the incident to the Incident Hotline at 800-348-5046 as soon as practical. If appropriate, wait for police to arrive before moving vehicles. Provide insurance information to other drivers if necessary or requested and collect the same. If possible, obtain names and phone numbers of witnesses. Take photographs of the scene if possible. **DO NOT ADMIT LIABILITY, AGREE TO PAY FOR DAMAGE, OR SIGN A DOCUMENT RELATED TO AN INCIDENT EXCEPT AS REQUIRED BY LAW.**

11.8 SPILL OR RELEASE

URS employees are not expected to take action or to participate in rescues or responses to chemical releases (including of petroleum products) beyond the initial discovery of the release and immediate mitigation actions such as closing a valve, placing absorbents, and notifying the client and or public emergency response system (911), unless there is a contractual provision for this response and specially trained employees.

11.8.1 Environmental Spill/Release Reporting

All environmental spills or releases of hazardous materials (e.g., fuels, solvents, etc.), whether in excess of the Reportable Quantity or not, will be reported according to the incident reporting procedure. In determining whether a spill or release must be reported to a regulatory agency, the Site Supervisor or qualified worker will assess the quantity of the spill or release and evaluate the reporting criteria against the state-specific reporting requirements, applicable regulatory permit, and/or client-specific reporting procedures. **If reporting to a US state or Federal regulatory agency is required, URS has 15 minutes from the time of the spill/release to officially report it.**

Chemical-specific Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Reportable Quantities for the known chemicals onsite are shown in the table below.

Table 11-1: CERCLA Reportable Quantities

Hazardous Substance	Regulatory Synonyms	Final RQ (lbs.)
1,1,1-Trichloroethane	TCA	1,000
Arsenic	N/A	1
Benzene	N/A	10
Cadmium	N/A	10
Carbon Tetrachloride	N/A	10
Chromium	N/A	5,000
Ethyl Benzene	N/A	1,000
Lead	N/A	10
Mercury	N/A	1
Methyl Ethyl Ketone	MEK	5,000
Nickel	N/A	100
Pentachlorophenol	PCP	10
Selenium	N/A	100
Tetrachloroethylene	Perchloroethylene, PCE	100
Toluene	N/A	1,000
Trichloroethylene	Trichloroethene, TCE	100
Xylene	N/A	100

CERCLA RQ's can be found at: <http://www.epa.gov/oem/docs/er/302table01.pdf>

The spill containment program addresses the following site-specific information:

- Potential hazardous substance spills and available controls;
- Initial notification and response;
- Spill evaluation and response; and
- Post-spill evaluation.

11.8.2 Spill Evaluation and Response

The SSO is responsible for evaluating spills and determining the appropriate response. When this evaluation is being made, the spill area is isolated and demarcated to the extent possible. When an incidental release occurs, clean-up personnel receive instructions in a pre-clean-up meeting as to spill conditions, PPE, response activities, decontamination, and waste handling.

The procedures of the Emergency Response section of this HASP are immediately implemented when the spill is determined to require emergency precautions and action. If necessary to protect those outside the clean-up area, notification of the appropriate authorities is made. Table 11-1 lists the spill conditions that trigger notification of Federal, state, and local agencies.

The following are general measures that response/clean-up personnel take when responding to a spill:

- To minimize the potential for a hazardous spill, hazardous substances, control/absorbent media, drums and containers, and other contaminated materials are properly stored and labeled;
- When a spill occurs, only those persons involved in overseeing or performing spill containment operations will be allowed within the designated hazard areas. If necessary, the area will be roped or otherwise blocked off. Unauthorized personnel are kept clear of the spill area;
- Appropriate PPE is donned before entering the spill area;
- Appropriate spill control measures are applied during spill response;
- Whenever possible without endangerment of personnel, the spill is stopped at the source or as close to the source as possible;
- Ignition points are removed if fire or explosion hazards exist;
- Surrounding reactive materials are removed;
- Drains or drainage in the spill area are blocked or surrounded by berms to exclude the spilled waste and any materials applied to it;
- Provisions are made to contain and recover a neutralizing solution, if used;
- Small spills or leaks from a drum, tank, or pipe will require evacuation of at least Enter Distance feet in all directions to allow clean-up and to prevent employee exposure. For small spills, sorbent materials such as sand, sawdust, or commercial sorbents are placed directly on the spill to prevent further spreading and aid in recovery;
- Spill area is sprayed with appropriate foam where the possibility of volatile emissions exists;
- If the spill results in the formation of a toxic vapor cloud, from vaporization, reaction with surrounding materials, or the outbreak of fire, further evacuation may be required;
- To dispose of spill waste, all contaminated sorbents, liquid waste, or other spill clean-up will be placed in small quantities Enter QTY pounds) in approved drums for proper storage or disposal as hazardous waste; and

11.8.3 Post Spill Evaluation

As part of the incident investigation and reporting documentation, a written spill response report shall be prepared at the conclusion of clean-up operations. The report will include, at a minimum, the following information:

- Date of spill incident;
- Cause of incident;
- Spill response actions;
- Any outside agencies involved, including their incident reports; and
- Lessons learned or suggested improvements.

The spill area is inspected to ensure the area has been satisfactorily cleaned. The use of surface and air sampling is utilized in this determination as necessary. The root cause of the spill is examined and corrective steps taken to ensure the engineering and control measures in place have performed as required. If alternative precautions or measures are needed, they are made available and implemented.

All durable equipment placed into use during clean-up activities is decontaminated for future utilization. All spill response equipment and supplies are re-stocked as required.

11.9 FIRE

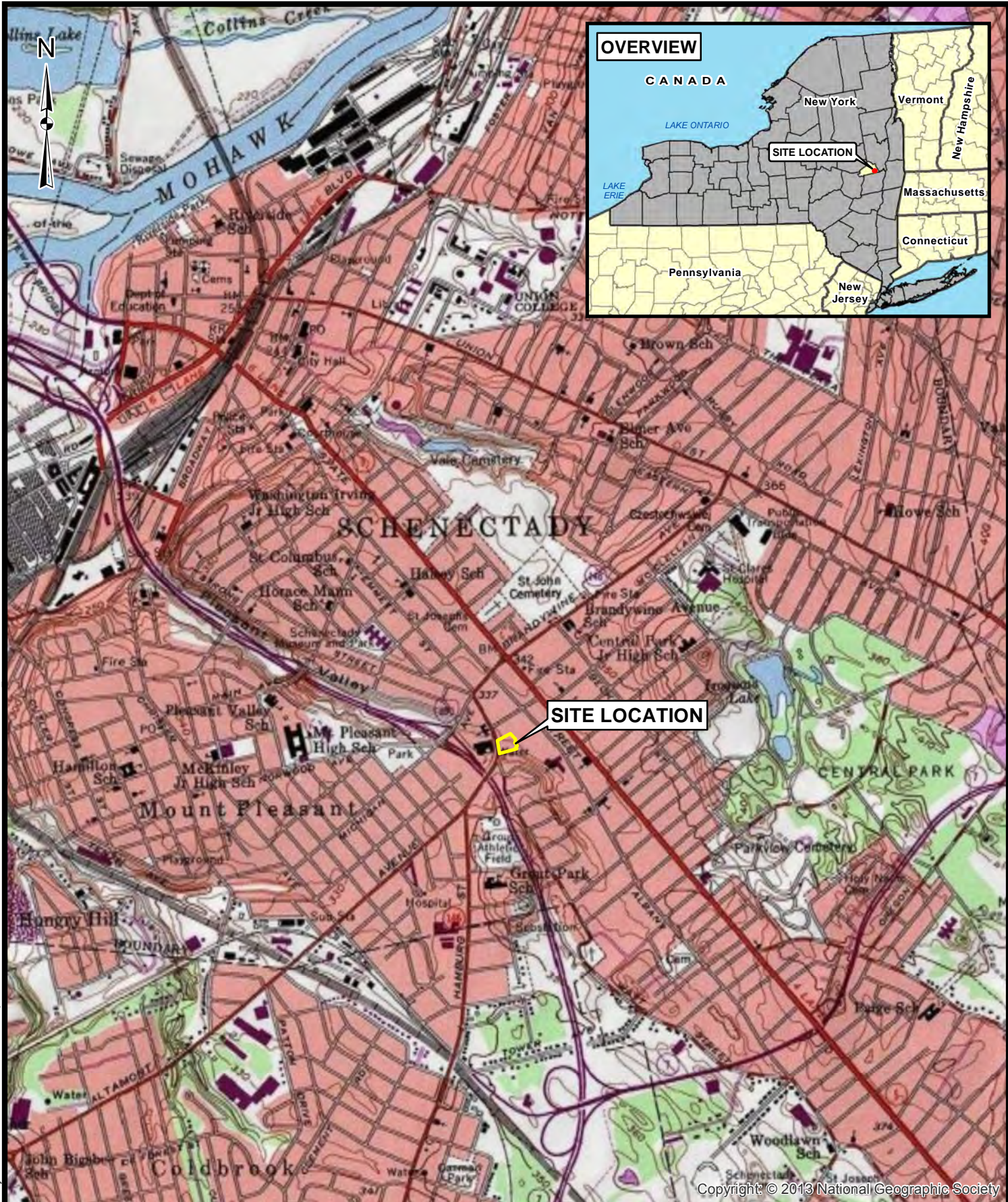
URS employees are not expected to attempt to put out fires. Stop work; notify all URS personnel, move upwind and contact 911 and/or emergency response at the site. If employees have been properly trained in the operation of a fire extinguisher, they may attempt to put out a small fire, provided that the following conditions are met:

- The fire must be small (i.e., smaller than a trash can) and in its early stages
- The employee must have an escape route
- The employee must be trained and know they have the right type of extinguisher
- The employee must be safe from toxic gases
- There must be no hazardous conditions that could quickly accelerate the fire (i.e., presence of chemicals, especially dry grass, etc.)
- Above all, if in doubt, the employee must not attempt to fight the fire

By signing below, the undersigned acknowledges that he/she has reviewed the URS Health and Safety Plan for the Former Kenwood Cleaners Site. No. 447032. The undersigned also acknowledges that he/she has been instructed in the contents of this document and understands the information pertaining to the specified work, and will comply with the provisions contained therein. The employee understands that they are NOT to perform any work that they have not been adequately trained for and that they are to stop work if it is unsafe to proceed. Finally, the employee understands to notify the Site Supervisor and the Incident Hotline at 800-348-5046 for any incident, ***including ANY injury even if no first aid or medical treatment is required.***

[illegible]

Figures



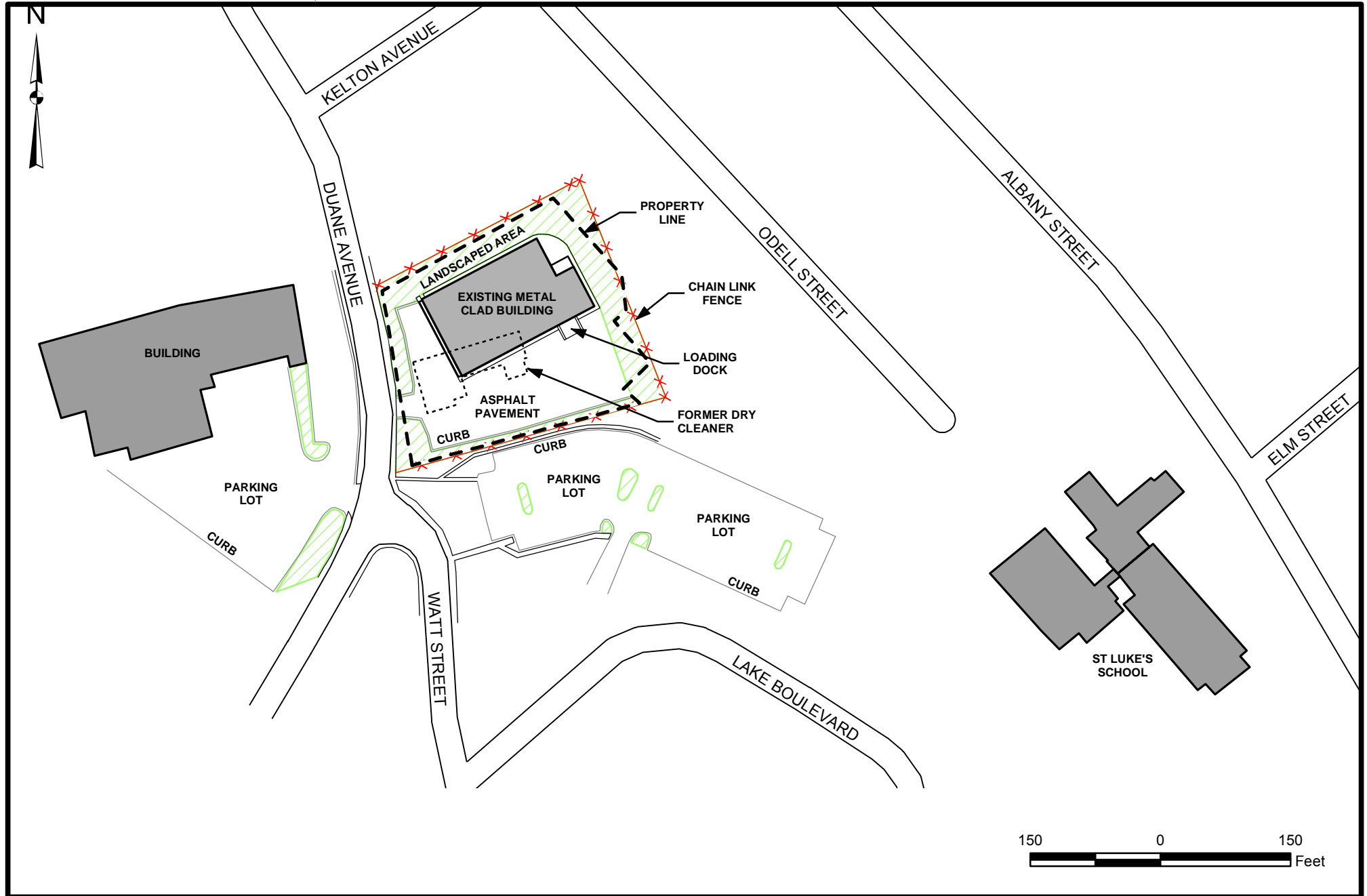
SOURCE:
USGS 7.5 Minute Topographic Quadrangle
Schenectady - 1995

2,000 0 2,000 Feet

URS

FORMER KENWOOD CLEANERS SITE
SITE LOCATION

FIGURE 1



Attachment A

Hospital and Clinic Directions/ Maps

Incident Reporting and Response
Flow Chart

Hospital- Address, written directions, and mapped route from site

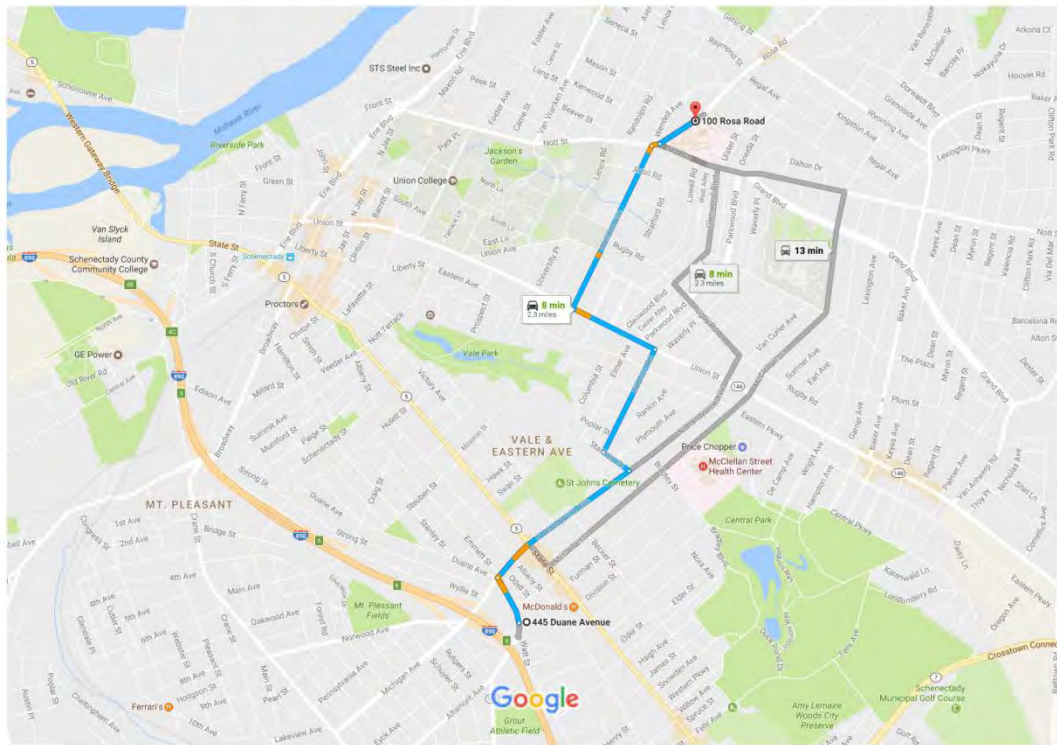
1/30/2017

445 Duane Ave, Schenectady, NY 12304 to 100 Rosa Rd, Schenectady, NY 12308 - Google Maps



445 Duane Ave, Schenectady, NY 12304 to 100 Rosa Rd, Schenectady, NY 12308 Drive 2.3 miles, 8 min

Ellis Hospital Emergency Entrance



Map data ©2017 Google 1000 ft

1/30/2017

445 Duane Ave, Schenectady, NY 12304 to 100 Rosa Rd, Schenectady, NY 12308 - Google Maps

445 Duane Ave

Schenectady, NY 12304

Take S Brandywine Ave to Stanford St

1. Head north on Duane Ave toward Kelton Ave 3 min (0.7 mi)
2. Turn right onto S Brandywine Ave 0.2 mi
0.6 mi

Take Bedford Rd to Union St

3. Turn left onto Stanford St 2 min (0.5 mi)
4. Turn right onto Bedford Rd 0.1 mi
0.4 mi
5. Turn left onto Union St 50 s (0.3 mi)
6. Turn right onto Wendell Ave 2 min (0.6 mi)

Drive to Rosa Rd

7. Turn right onto Nott St 45 s (0.2 mi)
8. Slight left onto Rosa Rd 141 ft
0.1 mi

100 Rosa Rd

Schenectady, NY 12308

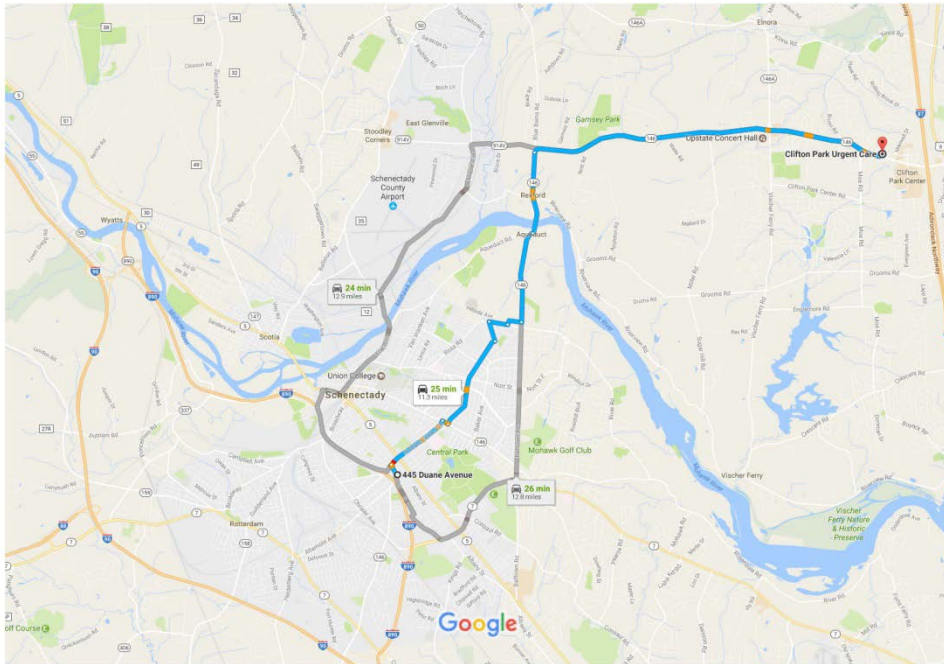
Occupational Clinic- Address, written directions, and mapped route from site

1/30/2017

445 Duane Avenue, Schenectady, NY to Clifton Park Urgent Care - Google Maps



445 Duane Avenue, Schenectady, NY to Clifton Park Urgent Care Drive 11.3 miles, 25 min



Map data ©2017 Google 1 mi

1/30/2017

445 Duane Avenue, Schenectady, NY to Clifton Park Urgent Care - Google Maps

445 Duane Ave

Schenectady, NY 12304

Take S Brandywine Ave to McClellan St

- | | | |
|---|--|----------------|
| ↑ | 1. Head north on Duane Ave toward Kelton Ave | 5 min (1.3 mi) |
| ↘ | 2. Turn right onto S Brandywine Ave | 0.2 mi |
| ↘ | 3. Turn right onto Union St | 1.0 mi |
| | | 495 ft |

Continue on McClellan St to Niskayuna

- | | | |
|---|--|----------------|
| ↶ | 4. Turn left at the 1st cross street onto McClellan St | 5 min (1.7 mi) |
| ↶ | 5. Turn left onto Dean St | 1.4 mi |
| | | 0.3 mi |

Follow NY-146 E to Tallow Wood Dr in Clifton Park

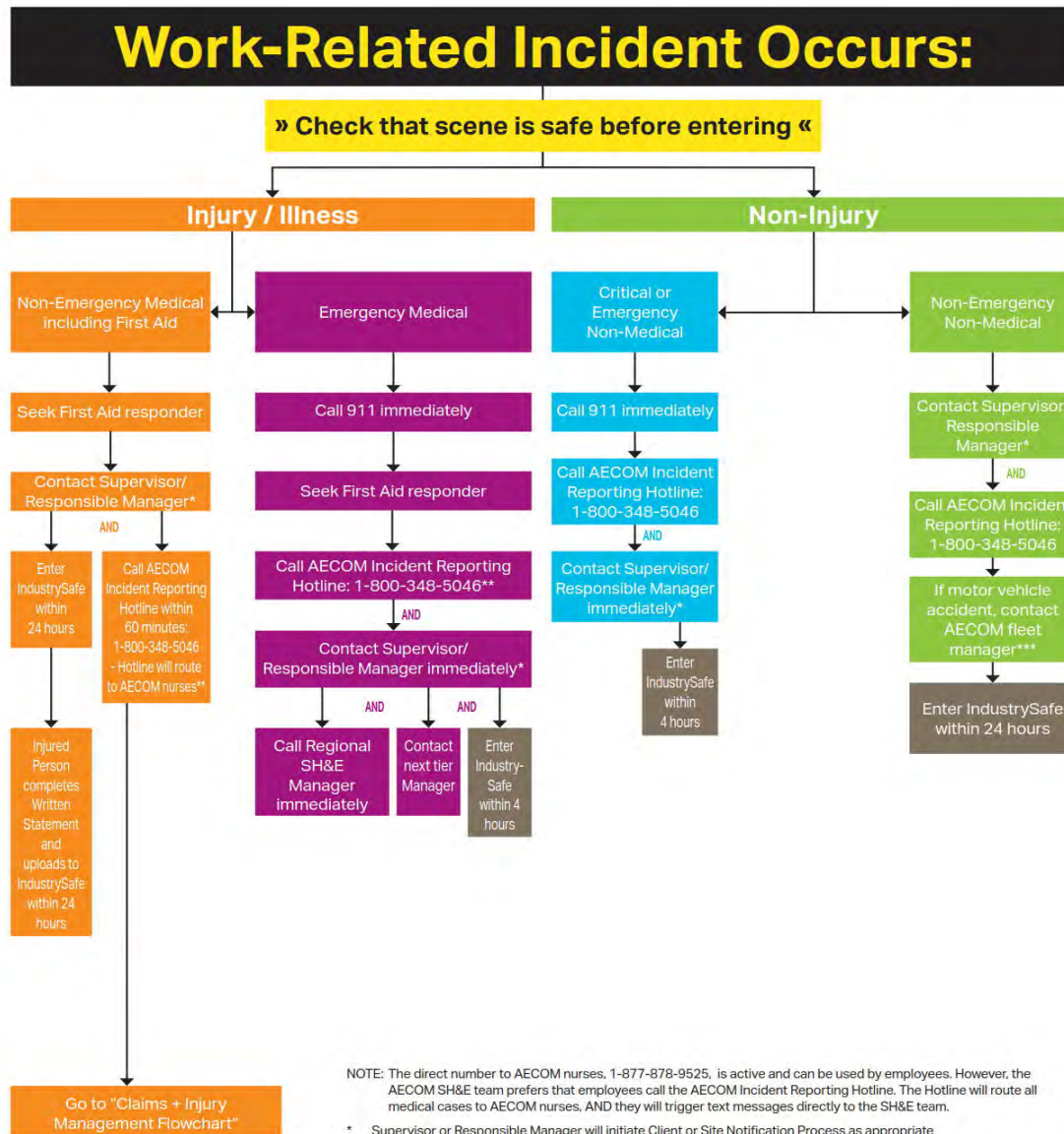
- | | | |
|---|--|-----------------|
| ↘ | 6. Turn right onto Providence Ave | 15 min (6.3 mi) |
| ↶ | 7. Turn left onto Knolls Rd | 0.3 mi |
| ↶ | 8. Turn left onto NY-146 E | 0.2 mi |
| 📍 | 9. At the traffic circle, take the 2nd exit and stay on NY-146 E | 1.4 mi |
| ↘ | 10. Turn right to stay on NY-146 E | 1.2 mi |
| | | 5.2 mi |
| ↶ | 11. Turn left onto Tallow Wood Dr | |
| | 📍 Destination will be on the right | |
| | | 11 s (220 ft) |

Clifton Park Urgent Care

1 Tallow Wood Drive, Clifton Park, NY 12065

Work-Related Incident Flowchart for Employees | Updated October 2016

DCS - Americas



Attachment B

URS SH&E Field Applicable Procedures

All URS SH&E Procedures, in their controlled copy version, are available on the [internal SH&E Policy and Procedures ecosystem page](#).

Programmatic procedures referenced in this document (for example SH&E Training) **DO NOT** need to be printed for inclusion in this HASP. Only procedures that are needed for field activity reference and application **MUST** be printed in full and included in this section.

Copy the Field Procedure Checklist from the Physical Hazards section 7.1 to become your table of contents for these attachments. Include only those procedures checked as applicable to this project.

Safe Work Standards & Rules

S3AM-001-PR1

1.0 Purpose and Scope

- 1.1 Demonstrates AECOM's commitment to the establishment and maintenance of workplaces free from recognized hazards.
- 1.2 This procedure applies to all AECOM Americas based employees and operations.

2.0 Terms and Definitions

- 2.1 **Safety Violation** – Not following verbal or written safety policies, rules and procedures (e.g., horse play, failure to wear selected PPE, abuse of selected PPE, etc.).
- 2.2 **Safe Work Practices** – Safe work practices are generally written methods outlining the requirements associated with how to perform a task with minimum risk to people, equipment, materials, environment, and processes.
- 2.3 **Safe Job Procedures** – Written step-by-step set of instructions about completing a specific task safely including control measures and responding to emergency situations.
- 2.4 **SH&E Plan** - A written, reviewed, and approved plan for how the required work will be completed in a safe manner (may also be known as a Safety Plan, Safe Work Plan, Health and Safety Plan, Accident Prevention Plan, etc.).

3.0 References

- 3.1 AECOM Employee Handbook

4.0 Procedure

- 4.1 Roles and Responsibilities
 - 4.1.1 **Managers and Supervisors**
 - Confirm compliance with all procedures and governmental requirements, and will be held responsible to prevent or bring any violations to the attention of the appropriate level of Management for corrective actions as per AECOM HR policies.
 - Confirm implementation of, and compliance with, this procedure.
 - 4.1.2 **SH&E Managers**
 - Provide guidance as to safe work standards, rules, requirements and guidelines.
 - 4.1.3 **Human Resource Managers**
 - Provide guidance and direction to managers and supervisors implementing the disciplinary process for safety violations (as defined in the Employee Handbook).
 - 4.1.4 **Employees**
 - Responsible for adhering to all AECOM safe work standards, rules, requirements and instructions and to provide input as appropriate.
- 4.2 Safety, Health & Environment (SH&E) Procedures
 - 4.2.1 Safe work practices and safe job procedures are embodied in AECOM's SH&E Procedures and are available on the AECOM SH&E website.

- 4.2.2 Specific safe work practices and safe job procedures have been developed in conjunction with employees and with particular input from those who have significant experience.
- 4.2.3 AECOM SH&E Procedures have been developed to provide clear instruction regarding the safety and reporting requirements of staff and operations.
- 4.3 Inspections and Audits
 - 4.3.1 The Manager directing activities of the facility, site, or project location shall conduct project audits and office inspections to identify safe work practices and potential safety violations.
- 4.4 Any employee who willfully disregards AECOM or client safety standards, rules or requirements is subject to disciplinary action.
 - 4.4.1 Disciplinary action will be documented in accordance with AECOM Human Resources policy.

5.0 Records

None

6.0 Attachments

- 6.1 [S3AM-001-ATT1](#) [Safety Rules](#)

Safety Rules

S3AM-001-ATT1

1.0 Rules for all Employees

- 1.1 Work in a manner that will not put oneself, other personnel, equipment, the public, environment, or facilities at risk.
- 1.2 Identify hazardous conditions and activities in the work environment consistent with the job and training.
- 1.3 If a hazard cannot be eliminated or adequately controlled, report it to the manager or supervisor promptly.
- 1.4 Implement established control methods consistent with procedures and/or training.
- 1.5 Cooperate and comply with all AECOM Policies and SH&E Procedures.
- 1.6 Immediately report all acts of aggression, verbal or physical threats, assaults, sexual or other harassment to your supervisor or manager.
- 1.7 Complete the SH&E Training Matrix and take any safety training required for your job function or tasks.
- 1.8 Use and/or wear all personal protective equipment, devices or clothing required in accordance with manufacturers' instructions and AECOM training and/or procedures.
- 1.9 Do not perform and/or stop any work task or activity which you believe is unsafe. Inform your supervisor immediately.
- 1.10 Immediately report all incidents (including near misses), injuries, property damage, spills, hazards, safety concerns and safety violations to your supervisor or manager. This requirement shall include incidents occurring during work related travel.
- 1.11 Report all observed unsafe acts, conditions, or behaviors that compromise the safety of AECOM employees, its clients, sub consultants, general contractors, or the public to your supervisor.
- 1.12 Keep all personal work areas clean from debris and tripping hazards.
- 1.13 Complete any required AECOM Vehicle and Driver Safety training before operating a vehicle on AECOM business.
- 1.14 Operate all vehicles and mobile equipment in accordance with applicable regulations.
- 1.15 Do not use or operate any equipment, machine or device that may endanger you or another worker.
- 1.16 Do not remove, damage, disable or make ineffective any protective safety, fire-fighting or first aid equipment or devices.
- 1.17 Use only vehicles, equipment and tools that are in safe operating condition and maintained in accordance with manufacturer's specifications. Report, remove from service, or have repaired, any tool or equipment that is damaged, not working properly or may otherwise be hazardous if used.
- 1.18 Do not use any electronic devices whether handheld or hands free, while driving a vehicle or performing other critical tasks like working near traffic or working with power tools.
- 1.19 When travelling, working alone or working away from the AECOM office, particularly in remote areas, follow applicable call-in procedures and the global travel policy.
- 1.20 Do not bring firearms onto AECOM property or allow them on AECOM projects unless expressed permission is provided by management and Global Resiliency.
- 1.21 Do not smoke in areas designated as "NO SMOKING" or in any AECOM facility.
- 1.22 Do not use, sell or distribute, be under the influence, or have in your possession any controlled substances, drugs, alcohol and associated paraphernalia while performing work duties.

2.0 Rules for Project or Field Work

- 2.1 Always report to site supervisor before performing work on site to determine specific requirements for the site or project. Follow all safety requirements, including AECOM's, or that of a client or prime contractor, as applicable.
- 2.2 Use only designated project entrances, parking areas and facilities.
- 2.3 Show or produce evidence of identification or required training if requested to gain entry to or while on a project.
- 2.4 Obey all warning signs (e.g., "Do Not Enter," "Eye, Hearing or Respiratory Protection Required," "Permit Required Confined Space," "Authorized Personnel Only").
- 2.5 Do not block, deface or remove any signage, barricade or fencing without approval.
- 2.6 Keep passageways clean and clear of debris, materials, hoses, cords, and tripping obstructions. Items should be moved to low activity areas or storage.
- 2.7 Verify that all required Permits are in place prior to commencing work.
- 2.8 Follow all applicable AECOM policies and procedures related to the work activity begin performed.
- 2.9 Be aware of work going on, around or above you including contractor activities and public motor vehicles.
- 2.10 Do not work alone when performing high risk or remote work. Examples of high risk work activities include, but are not limited to:
 - 2.10.1 Entering trenches/excavations
 - 2.10.2 Entering permit-required confined spaces
 - 2.10.3 Working at-height (i.e., donning a full-body harness)
 - 2.10.4 Operating an aerial lift
 - 2.10.5 Working over water
 - 2.10.6 Boating
 - 2.10.7 Working in atmospheres that have the potential to contain highly hazardous chemicals (e.g. hydrogen sulfide, explosive atmospheres, etc.)
 - 2.10.8 Working near operating mobile and heavy equipment
 - 2.10.9 Working in or adjacent to work zones containing vehicular activity
- 2.11 Personal cameras, video recorders, and other photographic equipment shall not be permitted on site without the appropriate approval.
- 2.12 Plan work tasks before beginning work (SH&E Plan, Task Hazard Assessment) and consider any hazards that may exist and how to avoid them through use of SH&E Procedures.

Stop Work Authority

S3AM-002-PR1

1.0 Purpose and Scope

- 1.1 This procedure establishes the requirements for AECOM personnel to stop any task or company operation if they believe there is an imminent safety, health, or environmental risk as described within this document.
- 1.2 The AECOM Safety Red Card is a key component in the Stop Work Authority for Unsafe Work procedure. The Safety Red Card is derived from its use in football (soccer), where circumstances are such that a referee has to stop the play, similar to an imminently dangerous situation on a project site. The Safety Red Card is a physical tool that reinforces the Stop Work Authority Procedure.
- 1.3 This procedure applies to all Americas-based employees and operations.

2.0 Terms and Definitions

- 2.1 **Contractor** – For the purposes of this procedure, a person or business whose contract to provide work or services is not with AECOM. AECOM may have the responsibility of safety oversight for Contractor-controlled work on a particular project or construction site if specified in the associated contract.
- 2.2 **Direct Subcontractor** – For the purposes of this procedure, a person or business which has a contract directly with AECOM to provide work or services.
- 2.3 **Imminent Danger** – For the purposes of this procedure, an immediately dangerous situation that, if left uncorrected, is likely to result in serious injury, loss of life, or environmental impairment.
- 2.4 **Project Management / Construction Management (PM-CM)** – AECOM has contractually agreed with the client to the specified roles and responsibilities of oversight of Contractor-controlled work for the given project.
- 2.5 **Safety Red Card** - A tangible reminder of stop work authority for all AECOM employees that can be presented when stopping work. The intent is for every employee to have or have access to their own Safety Red Card.
- 2.6 **Stop Work Order – AECOM and Direct Subcontractors** - A directive to cease AECOM-directed work, issued for failure to follow procedures, Imminent Danger situations/conditions, accumulation of safety violations, etc. The Stop Work Order will also be completed when there is disagreement between those affected or involved regarding the validity of the stop work issue or adequacy of the resolution actions. The Stop Work Order will apply to AECOM employees and AECOM Direct Subcontractors placed at risk by the identified situations or conditions. Refer to *S3AM-002-FM1 Stop Work Order – AECOM Employees and Direct Subcontractors*.
- 2.7 **Stop Work Order – Project Management / Construction Management** – Applies to Contractor-controlled work for which AECOM Project Management / Construction Management (PM-CM) has contractually agreed to the responsibility of safety oversight of Contractors for the given project. A directive served to the Contractor to cease Contractor-controlled work, issued for failure to follow procedures, Imminent Danger situations / conditions, accumulation of safety violations, etc. Refer to *S3AM-002-FM2 Stop Work Order-Project Management / Construction Management*. Note: If PM-CM has not contractually agreed specifically to oversight of safety, this form does not apply.

3.0 References

- 3.1.1 S3AM-004-PR1 Incident Reporting, Notifications & Investigation

4.0 Procedure

4.1 Roles and Responsibilities

4.1.1 Employees

- Any time an employee identifies a condition or act that is likely to cause an Imminent Danger situation:
- Responsible for stopping associated AECOM-directed work and that of Direct Subcontractors, and for bringing it to the attention of the appropriate supervisor, manager, SH&E Representative, and/or Contractor representative.
- Where Employees are working alongside Contractors for which AECOM has contractual Project Management / Construction Management (PM-CM) safety oversight of the Contractor, employees shall be responsible for stopping associated Contractor-controlled work and for bringing it to the attention of the appropriate supervisor, manager, SH&E representative, and/or Contractor representative.
- Where employees are working alongside Contractors for which AECOM PM-CM has not contractually agreed to the responsibility of safety oversight of Contractors for the given project, employees can, as applicable, report unsafe conditions/acts to the Contractor's site representative (supervisor, foreman, etc.) for resolution. Employees shall promptly report the situation to AECOM management.
- Where no contract exists between AECOM and the party presenting the situation, employees can, as applicable, and report unsafe conditions/acts to the parties' site representative (supervisor, foreman, etc.) for resolution. Employees shall promptly report the situation to AECOM management.
- Where Employees are working under the direction of client / customer supervisors and/or working on a task with a client / customer employee, Employees shall be trained, as is applicable, to communicate directly with the worker involved, report the unsafe conditions/acts to their client / customer supervisor and/or point-of-contact for resolution and subsequently report it to AECOM management.
- Decline to participate in client / customer-directed work under unsafe conditions or acts and immediately report the situation to AECOM management.
- Employees shall retain their individual Safety Red Card. An Employee may or may not physically present a Safety Red Card when stopping work.

4.1.2 SH&E Manager

- Review all Stop Work Orders applicable to their scope.
- Provide technical guidance for the development and implementation of corrective actions.
- Training of AECOM Employees should include how to exercise stop work authority and the measures AECOM management will take as a result of the work stoppage.
- Honor any worker refusals of unsafe work. Assist in resolving issues before operations resume, and that all stop work actions are properly resolved with required follow-up completed.

4.1.3 Manager

- Establish a safety culture where the stop work authority is embraced by the workforce as a tool so that all AECOM employees share the responsibility for safe working conditions.
- Training of AECOM Employees should include how to exercise stop work authority and the measures AECOM management will take as a result of the work stoppage.
- AECOM Employees have or have access to their own Safety Red Card and understand its meaning.

- Contractors for which AECOM PM-CM has contractual safety oversight, and Direct Subcontractors are informed of the stop work authority of AECOM and its Employees as a regulatory and Company requirement, as well as the intent of the program, which is to empower employees to work safe and prevent injuries.
- Clients / customers understand stop work authority of Employees is a regulatory and Company requirement, as well as the intent of the program, which is to empower Employees to work safe and prevent injuries.
- Honor any worker refusals of unsafe work, Resolve issues before operations resume, and that all stop work actions are properly resolved with required follow-up completed.
- Confirm reporting is completed any time an Employee exercises stop work authority
- Review so that Reporting is appropriate to the stop work situation, using inspection and observations programs (e.g. LifeGuard, Office Inspections, etc.) and IndustrySafe. Refer to *S3AM-004-PR1 Incident Reporting, Notifications & Investigation* for additional direction.
- Maintain and track reports associated with the stop work situation until resolved/closed.
- Stop work interventions that include a near miss or incident shall be reported as such.
- Review for Stop Work Orders completed when AECOM Employees or Direct Subcontractors completing AECOM-directed work fail to provide resolution to the stop work situation, or if at any time the actions or failure to act of those involved in the Stop Work Order cause Imminent Danger to the health and safety of Employees, any other person at the place of employment, or the environment. Refer to *S3AM-002-FM1 Stop Work Order – AECOM Employees and Direct Subcontractors*.
- Review Stop Work Orders – Project Management / Construction Management are completed when Contractors performing Contractor-controlled work, subject to AECOM contractual safety oversight, fail to provide resolution to the stop work situation, or if at any time the actions or failure to act of those involved in the Stop Work Order cause Imminent Danger to the health and safety of Employees, any other person at the place of employment, or the environment. Refer to *S3AM-002-FM2 Stop Work Order – Project Management / Construction Management*.
- When an unsafe condition or act has been reported by an AECOM Employee of a Contractor for which AECOM does not have specific contractual safety oversight, communicate promptly with client representative(s).
- Review corrective actions have appropriately addressed the conditions leading to the stoppage of work or the Stop Work Order.
- If AECOM has control over the circumstance that led to the condition, initiate additional corrective actions necessary to correct the conditions leading to the Stop Work Order. Otherwise, remain in communication with the persons or entities that are taking the corrective measures.
- Communicate such corrective actions and the effects of such corrective actions on the project / location / office to the client and/or next level of AECOM Management.
- Work activities of AECOM-directed work should not resume until the stop work situation has been resolved to the satisfaction of all involved and/or the appropriate approvals received to resume work.
- Monitor that work activities of Contractors subject to AECOM contractual safety oversight do not resume work until the unsafe situation has been resolved.
- Documentation related to the Stop Work Order and corrective actions is placed in the project / location / office file.

4.2 Requirements

- 4.2.1 Employees shall be trained in how to exercise stop work authority, the use of the Safety Red Card and in the measures AECOM management will take as a result of the work stoppage.
- 4.2.2 Employees will each be provided a Safety Red Card for their own use.

- 4.2.3 It is AECOM's policy and firm commitment that Employees are expected to stop their work to prevent unacceptable exposure to workplace hazards, including unsafe conditions or worker behaviors, without fear of reprimand or reprisal.
- "Stopping work" for AECOM-directed work may include stabilizing an Imminent Danger situation, as is safely possible, to the extent that it can be left unattended for a prolonged period of time until the issue is resolved.
 - Stop work interventions to correct some unsafe situations that do not present an Imminent Danger (e.g., to remind workers to put on their hard hats, safety glasses, etc.) may not require formal stop work notification but should be appropriately reported (e.g. LifeGuard, Inspection Report).
- 4.2.4 There will be no retribution or any form of intimidation directed against an employee for good faith reporting of SH&E issues or the good faith stopping of work due to unsafe conditions.
- 4.2.5 Where Employees identify an unsafe act or condition related to a Contractor or worker for which AECOM does not have specific contractual safety oversight, as applicable, Employees should report the situation to the Contractor or worker's site representative (supervisor, foreman). Employees shall immediately report the situation to AECOM management who, in turn, shall promptly communicate with the client representative(s).
- While Employees may not be authorized to stop client / customer-directed work, Employees shall decline to participate in work under the Imminently Dangerous situation and immediately report the situation to the client / customer representative and AECOM management.
- 4.2.6 AECOM's stop work authority applies to all work AECOM-directed work and to Contractor-controlled work for which AECOM PM-CM has contractually agreed to the responsibility of safety oversight of Contractors for the given project.
- When an Employee identifies an Imminent Danger situation, the Employee shall immediately stop work and notify the affected co-worker(s) and supervisor, manager, SH&E representative and/or Contractor representative.
 - If the supervisor / manager / representative is not readily available and/or the affected person(s) are in an Imminent Danger situation, the stop work intervention should be initiated directly with the Employee(s) at risk. The supervisor / manager / representative shall be informed as soon as possible.
 - The supervisor / manager / representative shall communicate the stop work situation with any other affected personnel and the applicable client / customer representative(s).
 - Managers, and/or SH&E Managers may issue a formal Stop Work Order for AECOM-directed work in the following situations:
 - Imminent Danger exists involving an employee's safety and health, that of any other person at the place of employment or damage to the environment, facilities, or property.
 - A project, or any segment of the project, is executed improperly or is out of compliance with applicable regulations or standards.
- 4.2.7 Stop Work Order – Project Management / Construction Management
- Applies to Contractor-controlled work for which AECOM Project Management / Construction Management (PM-CM) has contractually agreed to the responsibility of safety oversight of Contractors for the given project. Refer to *S3AM-002-FM2 Stop Work Order- Project Management / Construction Management*.
- With a stop work situation related to Contractor- controlled work for which AECOM has contractually specified safety oversight, the Contractor is expected to immediately resolve the stop work situation. A Stop Work Order – Project Management / Construction Management form must be completed if:

- Imminent Danger exists involving the Employees' safety & health, the environment, facilities, or property.
- There is a discrepancy, deficiency, or potentially dangerous condition or act that is likely to cause an unsafe or unhealthy situation or an Imminent Danger situation.
- When a Stop Work Order – Project Management / Construction Management is issued by AECOM, the Contractor is expected to establish and document corrective actions and provide items (e.g. pictures, documents, etc.) related to the stop work situation and related corrective actions. AECOM will monitor the Contractor's corrective actions.

4.2.8 Stop Work Order – AECOM Employees and Direct Subcontractors

With a stop work situation related to AECOM-directed work, the appropriate parties (e.g. affected personnel, supervision, SH&E representative, management, client / customer representative, etc.) shall discuss and gain agreement on the stop work issue.

- If determined and agreed by all involved that the task or operation is cleared to safely proceed, the affected persons shall immediately resume work.
- If determined and agreed that the stop work issue is valid, then every attempt must be made to resolve the issue for the safety of Employees, Contractors, any other person at the place of employment, and the environment.
- If the stop work issue cannot be resolved immediately, work shall be suspended until proper resolution can be achieved to the satisfaction of all involved.
- If all affected by the stop work issue cannot agree that work can be resumed safely (opinions differ regarding the validity of the stop work issue or adequacy of the resolution actions), a Stop Work Order must be completed. Refer to *S3AM-002-FM1 Stop Work Order – AECOM Employees and Direct Subcontractors*.
 - In order for work to resume, the completed Stop Work Order must be reviewed by the Manager, the applicable SH&E Manager and any other parties necessary (this may include the Employee who initiated the stoppage of work) to determine whether work can be resumed safely.
- If it is determined work can be resumed safely but the disagreement remains, work will only commence with the written approval to return to work by the Vice President of the applicable business group and, as applicable, the client representative. Refer to *S3AM-002-FM1 Stop Work Order – AECOM Employees and Direct Subcontractors*.
- If the responsible organization fails to provide resolution, or if at any time the responsible organization's acts or failure to act cause Imminent Danger to the health and safety of **Employees**, that of any other person at the place of employment, or the environment, AECOM may issue a Stop Work Order. Refer to *S3AM-002-FM1 Stop Work Order – AECOM Employees and Direct Subcontractors*.

4.2.9 In most cases, a Stop Work Order affects only those areas immediately involved in the hazardous situation. The Stop Work Order will apply to AECOM – directed work, its **Employees** and its Direct Subcontractors placed at risk by the situations or conditions. The Stop Work Order – Project Management / Construction Management will apply to Contractor-controlled work and its employees for which AECOM PM-CM has contractually agreed to the responsibility of safety monitoring of Contractors for the given project.

4.2.10 AECOM may issue a Stop Work Order for a portion of the work area(s) or for an entire work area when unacceptable risks exist.

4.2.11 The Stop Work Order will remain in effect until the responsible organization resolves the problem(s) and brings the work area(s) to satisfactory conformance with established AECOM SH&E requirements. Corrective actions taken and preventative measures put in place must be communicated to all affected by the Stop Work Order.

- 4.2.12 Work will not resume until appropriate corrective actions have been completed. The “Return to Work” portion of the Stop Work Order must be completed.
- 4.2.13 An AECOM Employee’s failure to comply with any Stop Work Order in whole or in part may result in disciplinary action, and/or termination of employment. An AECOM Direct Subcontractor Employee’s failure to comply with any Stop Work Order may result in immediate removal from the project, location and/or office.

5.0 Records

- 5.1 The completed Stop Work Order and any corrective action reports generated will be maintained at the project site for the duration of the project and placed in the closed project file.

6.0 Attachments

- 6.1 [S3AM-002-FM1 Stop Work Order – AECOM Employees and Direct Subcontractors](#)
- 6.2 [S3AM-002-FM2 Stop Work Order – Project Management / Construction Management](#)
- 6.3 [S3AM-002 ATT1 Stop Work Order – Authority Table](#)

Americas

Stop Work Order – AECOM Employees & Direct Subcontractors

S3AM-002-FM1

This form is applicable regarding contract services that are AECOM - directed and where AECOM has oversight of AECOM subcontractors (***Do not use this form to stop work of contractors over which AECOM Project Management or Construction Management has contractual safety oversight; utilize Stop Work Order - Project Management / Construction Management S3AM-002-FM2***). The form must be completed if any of the following criteria are met:

1. Imminent Danger exists involving the health and safety of employees' or that of any other person at the place of employment, the environment, facilities, or property.
2. The responsible party fails to provide resolution to a stop work situation, or if at any time the responsible party's actions or failure to act cause Imminent Danger.
3. If all affected by the stop work issue cannot agree that work can be resumed safely (opinions differ regarding the validity of the stop work issue or adequacy of the resolution actions).

Project/Location/ Office Name:		Address:	
Project/Location/ Office Manager:		Project #:	
Reported by:		Date/Time:	
Stop Work Order is the result of the following:			
<input type="checkbox"/> Inspection/Audit	<input type="checkbox"/> Environmental Impairment	<input type="checkbox"/> Injury/Incident	
<input type="checkbox"/> Unsafe Condition	<input type="checkbox"/> Unsafe Behavior/Act	<input type="checkbox"/> Improper Scope of Work	
<input type="checkbox"/> Other ()	<input type="checkbox"/> Disagreement between Affected Parties		
Stop Work Order (Describe):			

Corrective Actions / Preventative Measures	Assigned to:	Target Date	Date Complete	Initials

*****All Stop Work Orders**

**AECOM and Subcontractors will be documented in the appropriate reporting database(s)
within 24 hours of issuing the Stop Work Order.*****

Return to Work

The above Stop Work Order issues/concerns have been corrected and documented.

AECOM Title	Print Name	Signature
Manager:		
Individual/Party issuing Stop Work Order:		
Sub-Contractor Supervisor (if applicable):		
SH&E Manager:		
Quality Manager (if applicable):		
<p>The below portion is required if a disagreement remains amongst the affected by the stoppage of work as to whether work can be resumed. The Stop Work Order has been reviewed by appropriate parties and it is determined work can be resumed. Work will only commence with the below signature(s) indicating the written approval to Return to Work by the AECOM Vice President of the appropriate business group, and as applicable, the client representative.</p>		
Vice President _____ Business Group		
Client Representative		

Americas

Stop Work Order – Project Management / Construction Management

S3AM-002-FM2

This form is applicable regarding contract services where AECOM is acting as Project Management or Construction Management **with a specific contractual role for safety oversight** of contractor-controlled work. The form shall be supplied to the relevant contractor and completed if:

1. Imminent danger exists involving the public or employees' safety & health, the environment, facilities, or property.
2. There is a discrepancy, deficiency, or potentially dangerous condition or act that is likely to cause an unsafe or unhealthy situation or an imminent danger situation.

* This form does not apply if AECOM Project Management or Construction Management has not contractually agreed specifically to oversight of safety of contractor-controlled work.*

Project/Location/ Name:		Address:	
Project/Construction Manager (AECOM):		Project #:	
Contractor/ Company Name:		Address:	
Contractor Representative:		Date/Time:	
Stop Work Order is the result of the following:			
<input type="checkbox"/> Inspection/Audit <input type="checkbox"/> Unsafe Condition <input type="checkbox"/> Other ()	<input type="checkbox"/> Environmental Impairment <input type="checkbox"/> Unsafe Behavior/Act	<input type="checkbox"/> Injury/Incident <input type="checkbox"/> Improper Scope of Work	
You are hereby requested to immediately stop work on the following unsafe activity that is posing imminent danger. Stop Work Order (Describe):			

Items to be corrected or in place before work can recommence (as defined by Contractor)

Corrective Action / Preventative Measure	Target Date	Date Complete

Items to be submitted before work can recommence (as defined by Contractor e.g. picture, documents, etc.):

Item	Target Date	Date Complete

***** All Stop Work Orders – Project Management / Construction Management will be documented in the project files/tracked in the appropriate database.*****

Return to Work

Title	Print Name	Signature
The above Stop Work Order scenario has been corrected and work is safe to resume.		
Contractor Representative Title:		
Contractor Representative Title: (If applicable)		
The Contractor's correction(s) have been monitored.		
Project/Construction Manager (AECOM):		
SH&E Manager (AECOM):		
The above Stop Work Order has been reviewed.		
Client Representative		

SH&E Training

S3AM-003-PR1

1.0 Purpose and Scope

- 1.1 This procedure applies to all AECOM Americas-based employees and operations. These are the minimum safety, health and environment (SH&E)-related training requirements and tracking procedures. Additional training requirements may exist related to a specific task. Specific geographic entities, business units, and projects may have additional training requirements.
- 1.2 This procedure was developed to assist employees and managers in the identification of training requirements and to define the AECOM procedures for tracking and documenting SH&E training. The goals of this procedure are to ensure regulatory compliance and to provide employees with the information and training they need to accomplish their work assignments safely; prevent injuries to themselves, coworkers, surrounding communities, and customers; and protect company and/or customer property and the environment.
- 1.3 Major objectives of this procedure include:
 - Identify accountability, responsibility, and authority pertaining to SH&E training program requirements.
 - Establish minimum training course and/or instructor criteria to support compliance with applicable regulatory requirements as well as AECOM policy.
 - Provide a framework to assess participant competency and understanding.
 - Define recordkeeping requirements for the training program.
 - Maintain consistency in SH&E training content throughout the Americas.

2.0 Terms and Definitions

- 2.1 **Compliance Training** – Training meant to provide a safe and healthy workplace for AECOM employees and others through adherence to legislative and regulatory mandates (e.g., Federal, State, Provincial, Territorial, local/municipal governments and agencies thereof).
- 2.2 **Conformance Training** – Training developed by AECOM intended to further develop the AECOM SH&E culture, as specified in AECOM SH&E policy and procedure, or client requirements.
- 2.3 **Learning Management System (LMS)** – An electronic training delivery and data management system utilized for implementation of the SH&E training program.

3.0 References

- 3.1 S3AM-015-PR1 Short Service Employees
- 3.2 S3AM-202-PR1 Competent Person Designation

4.0 Procedure

4.1 Roles and Responsibilities

4.1.1 Executives

- Establish adequate resources (budget, staffing, etc.) to implement this procedure.
- Assignment/support of Learning Management System administration duties.

4.1.2 Supervisors/Managers

- Confirm new employees complete the AECOM Safety Orientation.
- Assist employees in identifying training requirements.

- Confirm supplemental employee training courses are identified based on local/client requirements.
- Confirm additional employee SH&E training requirements are identified based upon prudent risk management considerations and local performance issues.
- Confirm employee's training requirements are re-evaluated whenever an employee's assigned duties change significantly.
- Provide time and resources to allow employee to complete required training.
- Verify corrective actions are implemented when employees fail to meet training requirements.
- Confirm that the appropriate level of training is being assigned to the employee with regard to their specific job and task assignments and client needs.
- Confirm employees have current and applicable training to the employee's assigned tasks associated with the program or project.

4.1.3 **Vice President SH&E**

- Establish and maintain this procedure.
- Provide the necessary tools, support, and staff for on-going development and support of the training program.
- Report/communicate training status to senior management.

4.1.4 **SH&E Managers**

- Confirm management understands the function of the LMS and provide training, access and resources.
- Work with management to develop schedules, develop skills of employees assigned with training and recordkeeping duties, and provide training classes as requested.
- Confirm qualifications of safety training providers are reviewed and approved.
- Confirm training lesson plans and course agendas for training courses are reviewed and approved to verify the course content meets compliance/conformance requirements.
- Offer training participants the opportunity to evaluate training events.
- Report compliance with training program requirements to line management.
- Develop a training calendar.

4.1.5 **Employees**

- Complete the AECOM Safety Orientation.
- Coordinate with their supervisor to complete required training within any specified timeframes.
- Monitor their training expiration dates and coordinate refresher training to prevent expiration of any required training certification.
- Maintain a personal record of all training certifications.
- Supply copies of training completion certificates for inclusion in the LMS, as requested.
- Provide feedback on training through the evaluation process.

4.2 Identifying Required Training

4.2.1 All new employees shall complete the AECOM Safety Orientation.

- The AECOM Safety Orientation communicates the responsibility of each employee for a safe working environment and establishes AECOM's commitment to safety.
- The orientation communicates AECOM's Safety, Health and Environment (SH&E) Policy and the fundamental principles of the SH&E Management System; Safety for Life and the Life Preserving Principles. Employees are informed of various aspects of the program, including but not limited to:
 - Monitoring and evaluation of the program by leadership on an ongoing basis.

- Availability of AECOM policies and procedures and reference to the AECOM intranet site.
- The importance and requirement of pre-planning, including hazard assessment basics.
- Responsibility to report unsafe actions and conditions and the authority to stop unsafe work.
- The availability and importance of task specific training, refresher training, and related initiatives.
- Basic requirements and importance of incident reporting, notifications and investigation.
- Substance abuse prevention program, fit for duty requirements and the availability of medical support.
- Employees shall also complete any applicable site specific field or office orientations.
 - Employees shall be oriented to the layout of the site and instructed on the recognition of unsafe conditions.
 - Employees shall be informed of the site specific field or office hazards, any applicable control measures and any site specific field or office requirements and restrictions (e.g. rules, required PPE, etc.) through the review of the applicable field or office SH&E Plan.
 - Site specific orientations shall include the location specific Emergency Response Plan, including any required actions and responsibilities.
 - As applicable, the site specific orientation may address any Short Service Employee requirements. Refer to *S3AM-015-PR1 Short Service Employees*.
 - As applicable, any regulatory or client specific requirements and restrictions.

4.2.2 Employee training requirements are dictated by the work each employee performs (or is expected to perform) and the geographic area(s) where the employee performs these activities. Employees include all AECOM personnel (e.g. office/field personnel, supervisors, managers, etc.).

- The attached *SH&E Training Matrix (S3AM-003-FM1)* is a matrix of the most common courses that may be required, the frequency, and expected participants. The Attachment contains four tables. Table 1 is applicable to all Business Groups of AECOM. Table 2-4 are Business Group-specific requirements. Table 1 and the applicable Business Group-specific table should be used to evaluate an employee's training requirements.
- Additional tools such as a Training Assessment may be developed at the business group level if desired to further define training requirements.

4.2.3 Training requirements shall be evaluated upon hire. Employees shall not undertake a task for which they have not been adequately trained. SH&E training needs shall also be re-evaluated periodically and may also be identified through individual risk assessments, incident investigations, observed non-compliance, when procedures change, or through the annual staff appraisals process, and whenever an employee's assigned duties change significantly.

4.3 Training Competency Levels

4.3.1 Information Dissemination

- Information is provided to employees through verbal or written communication.
- This type of training may be used in scenarios where the goal is to provide information to employees with no expectation of implementation or executing a regulatory requirement or SH&E procedure.
- The communication is mostly one way and there is no confirmation or knowledge assessment (e.g., test, interactive discussion, etc.) that the employee shall pass to demonstrate understanding and meet a training goal. Examples of this type of communication would be newsletters, safety alerts, webinar presentations, video only presentations, etc.

4.3.2 Awareness Level

- Awareness-level training is applicable to training where the primary goal is to transfer knowledge from the organization to participants.

- Training will typically take the form of instructor-led discussions, presentation of related video content, and/or self-directed e-learning modules.
- In most cases comprehension assessment will be performed through discussion of the training topic with the participants and/or a simple quiz. When quizzes are provided employees will successfully complete at least 80% of the questions.

4.3.3 Performance Level

- Performance-level training will build upon the Awareness level. The goal of Performance Training is to have an employee successfully demonstrate that they can apply the knowledge discussed during training and perform the desired skills necessary to perform their job.
- Training materials are provided and discussed, and will incorporate a demonstration of the skills to be completed.
- The instructor will gauge the level of understanding through interactive discussion with participants and a pass/fail designation of demonstrated skills by the employee. A test or quiz of moderate difficulty will be provided, with participants scoring 80% or better, followed by the successful demonstration of the desired skill to receive certification.

4.3.4 Competent Person Level

- Competent Person-level certifications may be applicable to, and dictated by, specific regulatory standards. Refer to *S3AM-202-PR1 Competent Person Designation* for additional guidance.
- When Competent Person-level certifications are offered, comprehension assessments will build upon Performance-level certification.
- Competent Person certifications will incorporate classroom training along with on-the-job mentoring provided by employees previously certified to the Competent Person-level in the area of competency being sought. Candidates for Competent Person certification will be required to score 80% or better on administered written exams.
- Additionally, candidates shall be capable of repeatedly demonstrating the desired skills and regulatory knowledge, both in a classroom setting as well as in an actual work setting to the Instructor, Manager for the program or project the employee is seeking to gain and apply the certification to, and/or the mentoring Competent Person.
- Competent Person(s) will be designated on a program/project-by-program/project basis, in accordance with *S3AM-202-PR1 Competent Person Designation*. Forms to document certification and designation of a Competent Person are provided with the procedure and a record of the designation will be maintained within the project files and LMS.

4.4 Training Delivery

4.4.1 Internal Training

- Internal training is performed by AECOM's internal resources and may include intranet and classroom-based training.
- To ensure consistency in content and duration and in meeting regulatory and company requirements, AECOM training materials should be used as the basis for training whenever they are available. Trainers may always elect to supplement the base training materials for these courses with specifics for the program, project, customer, office, or geographic unit.
- AECOM instructors shall have the experience, education and competency and any required current licensing, registrations and/or certifications relevant to the course taught. Training format and material shall be appropriate to the topic and audience. Refer to *S3AM-003-FM4 SH&E Training Syllabus Template*.
- Course content of training provided on an annual basis will be updated as appropriate, or multiple versions of training may be developed for rotating use, to provide participants with new learning materials and avoid stagnation.
- Course content shall be periodically reviewed, with no greater than five years between reviews.

4.4.2 External Training

- External vendors conduct training that is not available through internal training sources. This training may be classroom or on-line training. External vendors should be pre-approved by the SH&E Department prior to any employee attending a training class.

4.5 Training Evaluation

- 4.5.1 At the conclusion of a training event, participants will be provided with the opportunity to anonymously evaluate the training session with through the use of *S3AM-003-FM3 Course & Instructor Evaluation* or an online survey.
- 4.5.2 Training instructors will review evaluations at the conclusion of training and request assistance addressing consistently noted issues if appropriate.

4.6 Training Expiration

- 4.6.1 Training will expire in accordance with requirements specified in applicable regulations or on syllabus. Expiration of training will be tracked electronically using the AECOM LMS. Employees tracking training outside of the AECOM LMS are responsible for tracking their individual training expiration dates. If training expires for an employee, they will be disqualified from performing tasks associated with the training when training is required by AECOM defined requirements or legislation/regulation to perform the tasks. Once training has been renewed, the employee will again be qualified to perform associated tasks.

5.0 Records

- 5.1 Those courses denoted in Attachment 1 or commonly required training will be tracked in the AECOM LMS.
- 5.2 Classroom training shall be documented using an attendance record and course agenda. Attachment *S3AM-003-FM2 SH&E Training Sign-In Sheet* may be used to document attendance. Attachment *S3AM-003-FM5 SH&E Training Certificate Template* may be used to document course completion. Course completion may also be documented by LMS-generated certificates when allowed by regulation.
- 5.3 For training provided by customers/vendors, training documentation shall be entered into a training database or LMS and documentation shall be maintained by the employee. Copies of certificates or other evidence of required project training may be included in program or project training files.
- 5.4 In some cases, objective evidence of comprehension is required (passing a test) and this information may be tracked in addition to the course information.
- 5.5 Attendance sheets, agendas, course evaluations, completed tests, and copies of certificates will be maintained. These should be filed in program or project training files by course then by date for easy access/auditing.
- 5.6 Locations/projects/programs will maintain records on any project, program, or location- or site-specific training requirements.

6.0 Attachments

- 6.1 [S3AM-003-FM1 SH&E Training Matrix](#)
- 6.2 [S3AM-003-FM2 SH&E Training Sign-In Sheet](#)
- 6.3 [S3AM-003-FM3 Course and Instructor Evaluation](#)
- 6.4 [S3AM-003-FM4 SH&E Training Syllabus Template](#)
- 6.5 [S3AM-003-FM5 SH&E Training Certificate Template](#)
- 6.6 [S3AM-003-FM6 New Employee SH&E Orientation](#)

Americas

SH&E Training Matrix

S3AM-003-FM1

Employee Name:

Employee Number:

Location:

Date:

Table 1 – All Employees

Course Title	Regulatory	Frequency	Should You Attend?	Check if Required <input checked="" type="checkbox"/>	Comments
10 Hour Outreach Course (OSHA – General Industry or Construction)	N	Once	As required by client or local regulations.	<input type="checkbox"/>	
30 Hour Outreach Course (OSHA – General Industry or Construction)	N	Once	As required by client. Required if you serve as a site safety and health officer on US Army Corps of Engineers (USACE) projects, or other DoD projects which follow the provisions of EM 385-1-1 (USACE Safety and Health Requirements Manual).	<input type="checkbox"/>	
Asbestos Inspector	Y	Annual	You perform asbestos sampling tasks.	<input type="checkbox"/>	
Asbestos Planner	Y	Annual	You serve as the project asbestos planner.	<input type="checkbox"/>	
Automated External Defibrillator (AED)	Y	As established by the training provider	You are designated to be an AED user at an office or project site.	<input type="checkbox"/>	
Bloodborne Pathogens	Y	Annual	Required for employees designated as a first aid responder or others who have a potential bloodborne pathogen exposure.	<input type="checkbox"/>	May be included in first aid or CPR class.
Cardiac Pulmonary Resuscitation (CPR)	Y	As established by the training provider – typically biennial	Required for 1) employees who are designated as first aid responders, 2) employees who are performing high hazard activities (e.g., potential for falls, suffocation, electrocution, amputation) and medical attention is more than 4 minutes away, or 3) required by client contract.	<input type="checkbox"/>	Acquire training from recognized source (e.g., Red Cross, American Heart).
Confined Space Entry	Y	Once	You perform confined space entry/authorizer/attendant duties (including anyone performing non-entry rescue activities).	<input type="checkbox"/>	

Course Title	Regulatory	Frequency	Should You Attend?	Check if Required <input checked="" type="checkbox"/>	Comments
Confined Space Refresher	N	As needed	Recommended if you perform entry activities.	<input type="checkbox"/>	
Confined Space Rescuer	Y	Once	You may have to enter a confined space to perform a rescue.	<input type="checkbox"/>	
Emergency Preparedness Plan/ Emergency Action Plan	Y	Once	Required for all employees.	<input type="checkbox"/>	For office personnel, this information is covered in employee orientation. For field/site personnel, this is covered in project/site safety training.
Excavations/Trenching	Y	Once and as required by client or training provider	You are or may be involved in excavation or trenching operations	<input type="checkbox"/>	Frequency may be established by an applicable standard (e.g., Gold Shovel Standard - annual)
Experienced Miner Training	Y	Once, followed by annual refreshers	You meet the US Mine Safety and Health Administration (MSHA) definition of an "Experienced Miner."	<input type="checkbox"/>	See Surface Miner and Underground Miner training for information on annual refreshers.
Fall Prevention/Protection	Y	Once	You supervise tasks or perform tasks at heights (on roofs, scaffolding, ladders, unfinished flooring).	<input type="checkbox"/>	May be included in OSHA 10 or other classes
Fire Extinguisher	Y	Annual	You may be expected to use fire extinguishers (fixed facilities and project sites).	<input type="checkbox"/>	
First Aid	Y	As established by the training provider - typically biennial	Required for 1) employees who are designated as first aid responders, 2) employees who are performing high hazard activities (e.g., potential for falls, suffocation, electrocution, amputation) and medical attention is more than 4 minutes away, or 3) required by client contract.	<input type="checkbox"/>	Acquire training from recognized source (e.g., Red Cross, American Heart).
Hazard Communication	Y	Initially and if hazards change	Required for anyone who is potentially exposed to/works with hazardous chemicals.	<input type="checkbox"/>	Training must occur before any work with hazardous chemicals. Included (as needed) in safety orientation. After the initial training, required updates will typically be handled as part of project-specific safety training.
Hazardous Materials Shipping	Y	Biennial	Required for anyone who packages, labels, transports, completes paperwork for, or offers for shipment, hazardous materials/dangerous goods.	<input type="checkbox"/>	

Course Title	Regulatory	Frequency	Should You Attend?	Check if Required <input checked="" type="checkbox"/>	Comments
Hazardous Waste Operations (40-hours)	Y	Once	Anyone performing work or expected to perform at hazardous waste sites or treatment, storage, and disposal facilities.	<input type="checkbox"/>	Training must have a 'hands-on' component (i.e., donning/doffing PPE). Any exceptions must be approved by a Regional SH&E Manager.
Hazardous Waste Operations – Refresher (8 hours)	Y	Annual	(See Hazardous Waste Operations.)	<input type="checkbox"/>	When offered as a combination of online modules and classroom instruction, online modules must be completed prior to the classroom portion for participants to receive credit. Both portions (online and classroom) need to be completed within the same calendar year.
Hazardous Waste Operations – Supervisor (8 hours)	Y	Once	Required for anyone serving as the site supervisor at a hazardous waste site.	<input type="checkbox"/>	When offered as a combination of online modules and classroom instruction, online modules must be completed prior to the classroom portion for participants to receive credit. Both portions (online and classroom) need to be completed within the same calendar year.
Hearing Conservation	Y	Annual	Employees exposed to noise ≥ 85 decibels averaged over an 8-hour day, or who otherwise utilize hearing protectors.	<input type="checkbox"/>	May be included in OSHA 10 or other classes
Injury/Illness Prevention	Y	Once	You are assigned to California offices or job sites.	<input type="checkbox"/>	Covered in California office/project Safety Orientation.
Laboratory Safety	Y	Once	You work in a fixed or mobile wet chemistry lab.	<input type="checkbox"/>	Completed as part of site or project orientation.
Lead Project Designer	Y	Every 3 years	You are a lead project designer.	<input type="checkbox"/>	
Lead Risk Assessor	Y	Every 3 years	You are a project lead risk assessor inspector.	<input type="checkbox"/>	
Lockout/Tagout Awareness – Affected Person	Y	Once; follow-up as required by regulations	You work with and around equipment that may need to be locked out/tagged out. (You are not responsible for applying tags/locks).	<input type="checkbox"/>	May be included in OSHA 10 or other classes
Lockout/Tagout – Authorized Person	Y	Once; follow-up as required by regulations	You lock out or tag out machines or equipment in order to perform servicing or maintenance on that machine or equipment.	<input type="checkbox"/>	Specific to individual machines.

Course Title	Regulatory	Frequency	Should You Attend?	Check if Required <input checked="" type="checkbox"/>	Comments
Marine Trash and Debris Awareness and Limitation	Y	Annual	You work on contract operations for lessees and/or operators of oil and gas operations in the Gulf of Mexico.	<input type="checkbox"/>	Provided by lessee or operator.
Nuclear Density Gauge Operator	Y	Once; follow-up as required by regulations	You <u>operate</u> nuclear density gauges / densometers.	<input type="checkbox"/>	Troxler or equivalent training.
Nuclear Density Gauge Transporter	Y	Every 3 years	You <u>transport</u> nuclear density gauges / densometers.	<input type="checkbox"/>	Hazardous Materials shipping.
Orientation Video	N	Within one week of starting at AECOM	Required for all employees.	<input type="checkbox"/>	Training will set the expectations of the AECOM Safety for Life program
Powered Industrial Trucks (Forklifts)	Y	Once	Your job assignments include operating a powered industrial truck (forklift).	<input type="checkbox"/>	Required more frequently if assessments indicate the need.
Radiation Worker	Y	Once; follow-up as required by regulations	You may require non-routine or short-term unescorted access to radiological controlled areas (excluding Radiation Areas and Airborne Radiation Areas), or you work in areas where radioactive materials are stored.	<input type="checkbox"/>	Public dose limits apply. Additional training required when public dose limits may be exceeded.
Radiation Safety Officer	Y	Once	You are designated as a Radiation Safety Officer.	<input type="checkbox"/>	
Respiratory Protection	Y	Annual	Required for any employee who may be required to wear a respirator.	<input type="checkbox"/>	May be included in HAZWOPER refresher training
Safety Trained Supervisor (STS) or Safety Qualified Supervisor (SQS)	N	Once	Any manager directly overseeing revenue generating projects with any aspect of work conducted outside of an AECOM office	<input type="checkbox"/>	Schedule for the associated Business Group established by the applicable VP SH&E or designee..
Self-Contained Breathing Apparatus (SCBA)/Cascade Systems	Y	Once	Required for any employee required to wear SCBAs or to operate a supplied air system.	<input type="checkbox"/>	Part of Project Safety training as needed.
Shipping Specialist	Y	Once	You are designated as a Shipping Specialist.	<input type="checkbox"/>	Updates are required as regulations change.
Substance Specific	Y	Once	Any U.S. employee potentially exposed to a substance covered by the 29 CFR substance specific regulations.	<input type="checkbox"/>	Includes lead, asbestos, benzene, etc. Offered as part of project-specific training.
Surface Miner Training – New (24 hours)	Y	Once	You perform work at surface mine sites regulated by MSHA.	<input type="checkbox"/>	Training is conducted by MSHA-approved instructors under MSHA-approved training plan.

Course Title	Regulatory	Frequency	Should You Attend?	Check if Required <input checked="" type="checkbox"/>	Comments
Surface Miner Training – Annual Refresher (8 hours)	Y	Annual	You perform work at surface mine sites regulated by MSHA.	<input type="checkbox"/>	Training is conducted by MSHA-approved instructors under MSHA-approved training plan.
Supervisor Training in Accountability and Recognition Techniques (START)	N	Once	Required for all supervisors	<input type="checkbox"/>	
Underground Miner Training – New (40 hours)	Y	Once	You perform work in underground mine sites regulated by MSHA.	<input type="checkbox"/>	Training is conducted by MSHA-approved instructors under MSHA-approved training plan.
Underground Miner Training – Annual Refresher (8 hours)	Y	Annual	You perform work in underground mine sites regulated by MSHA.	<input type="checkbox"/>	Training is conducted by MSHA-approved instructors under MSHA-approved training plan.
Waste Specialist	Y	Once with Annual Refresher	You are responsible for waste management at a small or large quantity generator facility.	<input type="checkbox"/>	
Welding/Brazing/Cutting	Y	Once	You job duties include these activities.	<input type="checkbox"/>	May be included in OSHA 10 or other classes
Workplace Hazardous Materials Information System (WHMIS)	Y	Annual	You are assigned to a Canadian facility and work with or around hazardous materials.	<input type="checkbox"/>	Canadian Hazard Communications

Table 2 – Applicable to Energy, Infrastructure and Industrial Construction (EIC) Group

In addition to the courses in Table 1, the following courses may be applicable.

Course Title	Regulatory	Frequency	Should You Attend?	Check if Required <input checked="" type="checkbox"/>	Comments
Defensive Driving	N	Once, followed by refresher as required	Required for all employees who are Authorized Drivers. Recommended for other staff that drive on behalf of AECOM.	<input type="checkbox"/>	
Reasonable Suspicion for Substance Abuse	N	Once upon assignment as responsible supervisor	For project and office supervisors with responsibility for administering the Substance Abuse Program (SAP).	<input type="checkbox"/>	On line training provided by the SAP Program Administrator.
New Employee Safety Orientation Training	N	Once and at each new project assignment	Required for new employees and employees assigned to project sites per site requirements	<input type="checkbox"/>	New employees receive orientation per HR program; project employees per site requirements.
First Aid/CPR/AED/BBP	N	Once plus annual refreshers, or as required by regulations	Recommended for office and project safety floor wardens.	<input type="checkbox"/>	Provided by authorized trainers both internal and external as available

Table 3 – Applicable to Management Services Group

In addition to the courses in Table 1, the following courses may be applicable.

Course Title	Regulatory	Frequency	Should You Attend?	Check if Required <input checked="" type="checkbox"/>	Comments
New Employee Safety Orientation Training (Approx. 1 hour)	N	Once	Required for new employees.	<input type="checkbox"/>	Access through Vision
Standards of Safety Performance (Approx. 1 Hour)	N	Annual	Required for all employees.	<input type="checkbox"/>	Specific content will depend on the site and the employees' expected work.
Site Safety Training (up to 4 hours)	N	Biennial	Site specific training based on site specific work and safety processes (e.g., warehouses, laboratories, vehicle maintenance, and aircraft maintenance).	<input type="checkbox"/>	Specific content will depend on the site and the employees' expected work.
Site Supervisor Safety Training	N	Once	Expected for all Supervisors in the pursuit of STS certification.	<input type="checkbox"/>	

Table 4 – Applicable to Design & Consulting Services (DCS) Group

In addition to the courses in Table 1, the following courses may be applicable.

Course Title	Regulatory	Frequency	Should You Attend?	Check if Required <input checked="" type="checkbox"/>	Comments
10 Hour Outreach Course (OSHA – General Industry or Construction)	Y (as per jurisdiction)	Once	You perform work that exposes you to construction or industrial hazards	<input type="checkbox"/>	
30 Hour Outreach Course (OSHA – General Industry or Construction)	Y (as per jurisdiction)	Once	You manage work with some safety responsibility that exposes you and/or other workers to construction or industrial hazards	<input type="checkbox"/>	
New Employee Orientation	Y	Once	All new employees.	<input type="checkbox"/>	Accomplished via a combination of AECOM University modules and location-specific training.
Vehicle / Driver Safety	N	Once	Required for all employees who drive on behalf of AECOM.	<input type="checkbox"/>	Generally completed upon hire by employees who may become authorized drivers. Available online through the AECOM University.
Ergonomics	N	Once	Required for all employees with significant ergonomic risk.	<input type="checkbox"/>	Generally completed upon hire or change in assignment. Available online through the AECOM University.
Confined Space Entry Awareness	N	As needed	Employees who work around confined spaces but are not responsible for performing entry/authorizer/attendant duties.	<input type="checkbox"/>	Available online through AECOM University.
Defensive Driving	N	Once, followed by refresher every three years	Required for all DCS employees who drive on behalf of AECOM.	<input type="checkbox"/>	National Safety Council, Alert Driving, Smith System or equivalent.
Excavations/Trenching Awareness	N	As needed	Employees who work at sites where excavation/trenching tasks are performed.	<input type="checkbox"/>	Available online through AECOM University.
Field Safety Training (4 hours)	N	Biennial	Required for all employees performing field work who are not in the hazardous waste or mine safety training programs. This training is also required for any DCS Project Manager that manages projects where field work is performed. The 10-Hour OSHA course is an acceptable alternative to Field Safety Training.	<input type="checkbox"/>	Specific content and delivery method will depend on the office and the employees' expected work. The Field Safety requirement (every two years) continues to apply after the completion of the 10-hr course.

Americas

SH&E Training Sign-In Sheet

S3AM-003-FM2

Course Name:					
Region:		District/Area:			
Business Line:		Dept #:			
Office:		Address:			
Date:		Start Time:		Stop Time:	
Certification Level (Check One): Awareness <input type="checkbox"/> Performance <input type="checkbox"/> Competent Person <input type="checkbox"/>					
Lead Instructor:		Instructor 1:		Instructor 2:	
Employee Name: (PRINT LEGIBLY)		Employee Signature		Region/Office Company (if not AECOM)	Instructor ID #: Initials verifying completion
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					

By my signature I certify that the individual(s) beside
whom I have initialled on this roster have attended
and successfully passed the course (assessment).

Lead Instructor Signature

Date

Americas

Course & Instructor Evaluation

S3AM-003-FM3

Course Name:								
Date:		Start Time:		Stop Time:				
Type of Training (Check One): <input type="checkbox"/> AECOM Live (Classroom) <input type="checkbox"/> AECOM Live (WebEx/Teleconference) <input type="checkbox"/> AECOM eLearning <input type="checkbox"/> External Live <input type="checkbox"/> External eLearning <input type="checkbox"/> OTHER:								
Lead Instructor:	Instructor 1:		Instructor 2:					
			Excellent	Good	Average	Below Average	Poor	
1. Please rate the quality of the training materials in the following categories:								
a. The training was technically accurate.			<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> NA
b. The training and discussion aligned with the training objectives.			<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> NA
c. The training was practical and relevant to my job at AECOM.			<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> NA
2. Please provide your assessment of the Trainer's presentation skills and abilities:							<input type="checkbox"/> NA	
a. Instructor was knowledgeable in the subject matter.			<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> NA
b. Instructor was capable of clearly and effectively communicating and teaching.			<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> NA
c. Instructor was able to accurately answer my questions.			<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> NA
d. Instructor was able to engage the class and maintain my attention.			<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> NA
3. Please provide your assessment of the training event as a whole in the following categories:							<input type="checkbox"/> NA	
a. How do you rate the quality of audio/visual materials, handouts and other training aids?			<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> NA
b. How do you rate the overall quality of the entire training event?			<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> NA
c. Was the training location comfortable and large enough to accommodate your class?			<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> NA

Please list any new skills, techniques, or ideas you learned during this training session that you will apply to your job.

Please provide any additional comments on the training.

Americas

SH&E Training Syllabus Template

S3AM-003-FM4

[COURSE TITLE]

Course Title	(Insert Course Title)
Duration	# Hours
Regulatory/policy applicability	(Insert regulatory and/or procedure reference)
Comprehension assessment method	(Insert assessment method [Quiz, Test, Skill Performance] and the percentage required to pass)
Certification Level	(Insert certification level)
Duration of Training Validity	(Insert expiration, if applicable)
Intended Participants	(Use regulatory citation or procedure reference to describe who the training is applicable to, and should be or is required to participate.)
Learning Objectives	(Briefly describe learning objectives for the training and how they will be assessed.)

Training Prerequisites:

- Employee SH&E Orientation including SH&E Fundamentals eLearning

(Discuss any training that may need to be completed prior to attending this course. Examples may include completion of 40-Hour HAZWOPER for 8-Hour HAZWOPER Refresher, or Awareness training required to be completed prior to a Functional/Competency Certification course.)

Course Outline:

(Detail the contents of the course that will include duration and delivery methods. Provide additional description of who the training is applicable to and how participants will be assessed to ensure adequate knowledge transfer. Complete the table below that will be used in creating the attendance sheet that will serve as the record of training.)

Module Title	Module Duration*	Module Content (Specify eLearning provider where applicable)
Click to enter text.	Click to enter	Click to enter text.
Click to enter text.	Click to enter	Click to enter text.
Click to enter text.	Click to enter	Click to enter text.
Click to enter text.	Click to enter	Click to enter text.
Click to enter text.	Click to enter	Click to enter text.
Click to enter text.	Click to enter	Click to enter text.
Click to enter text.	Click to enter	Click to enter text.
Click to enter text.	Click to enter	Click to enter text.

* Indicates module is delivered as eLearning by AECOM or authorized provider.

Expiration of Training:

Training is valid for X years. Re-fresher training may utilize local resources or hands-on training to focus on elements which are unique to the location. Some AECOM clients may require refresher training on a more frequent basis and it is the responsibility of the project team to ensure all employees meet the training needs of their client. If an employee is unable to produce a valid training certificate where one is needed they may be required to complete a new course.

Revision History:

Revision	Date	Change
Original	(Date)	N/A
Revision 1	Click to enter text.	Click to enter text.

CERTIFICATE OF COMPLETION

[Course Name]

This is to recognize that

[EMPLOYEE]

Has completed AECOM SH&E Training Course [Title], required by [Regulatory and/or SOP Reference] on [DATE]. Training expires on [DATE].

[Trainer Name]

[Trainer Title]

New Employee SH&E Orientation

S3AM-003-FM6

AECOM is committed to providing our employees with a thorough understanding of our company's Core Values, including Safety, Health, & Environment (SH&E). AECOM considers the SH&E orientation of new employees a Life Preserving Principle. Supervisors are responsible for communicating AECOM's SH&E culture to enable our employees to engage in safe, ethical, and productive work. Use this form to guide orientation discussion and assignment of training with your employees, and to document successful completion of the orientation process.

1 st Day (30-45 Min discussion led by Supervisor; include SH&E representatives where assistance is needed) ~ 1-2hrs		
Review SH&E Policy Statement , Life Preserving Principles . Discuss each.	<input type="checkbox"/> Completed	
Review AECOM Intranet Site - Ecosystem <ul style="list-style-type: none"> Use 'Browse As' button at bottom of page to select appropriate business group and, as applicable regional page. Review various links, and tools. Business group / region: 	<input type="checkbox"/> Completed	
Review AECOM SH&E Intranet Site - Ecosystem <ul style="list-style-type: none"> Locate SH&E Level III Procedures. Review those applicable to role, including: <ul style="list-style-type: none"> S3AM-002-PR1 Stop Work Authority S3AM-004-PR Incident Reporting, Notifications & Investigation Locate the SH&E Training Matrix and complete 		
Office / Worksite Introductions <ul style="list-style-type: none"> Consult SH&E Organizational Chart - identify applicable SH&E leadership. Identify Manager, first aiders, and location of emergency equipment Review Project/Program/Office Site-Specific SH&E Plan, Emergency Response Plan, SH&E Bulletin Board, Hazard Communication, etc. 	<input type="checkbox"/> Completed	
1 st Week (Employee to perform) ~ 1-4 hours		
<ul style="list-style-type: none"> Locate AECOM University <ul style="list-style-type: none"> All new employees will be assigned Core modules to complete (e.g., <i>AECOM Safety Orientation, Safety for Life, etc.</i>) – check under "My Learning" Find and register for other courses as appropriate based on, as a minimum, the training matrix (e.g., defensive driving, field safety certificate, OSHA 10, etc.). Complete any modules assigned in AECOM University; provide email acknowledgement to Supervisor and SH&E Training required to be completed prior to commencing work? <input type="checkbox"/> Yes <input type="checkbox"/> No 	<input type="checkbox"/> Completed	
Assign an SH&E mentor as per S3AM-015-PR1 Short Service Employee	<input type="checkbox"/> Completed	
Office employees complete S3AM-016-FM1 Office Ergonomics Self-Assessment	<input type="checkbox"/> Completed <input type="checkbox"/> Not Applicable	
Field employees order necessary PPE (with Supervisor)	<input type="checkbox"/> Completed <input type="checkbox"/> Not Applicable	
Consult S3AM-128-PR1 Medical Screening & Surveillance to determine if a Medical Clearance Examination is required (e.g. hazardous material exposure, respirator use, radiation exposure, etc.). Engage supervisor to schedule.	<input type="checkbox"/> Completed <input type="checkbox"/> Not Applicable	
End of 1 st Month (Supervisor performs follow-up assessment) ~ 10 minutes		
Verify scheduled SH&E Training has been completed	<input type="checkbox"/> Completed <input type="checkbox"/> Not Applicable	
Long-term SH&E Performance Goals established	<input type="checkbox"/> Completed <input type="checkbox"/> Not Applicable	
Additional – As required		
Identify Workplace Health & Safety Committee members <input type="checkbox"/> Check if Canada	<input type="checkbox"/> Completed <input type="checkbox"/> Not Applicable	
Workplace violence training <input type="checkbox"/> Check if Canada	<input type="checkbox"/> Completed <input type="checkbox"/> Not Applicable	
End of First Week Acknowledgement		
Employee Name (Print)	Employee Signature	Date
Supervisor Name (Print)	Supervisor Signature	Date
End of First Month Acknowledgement*		
Supervisor Name (Print)	Supervisor Signature	Date

*When Acknowledgements are completed the original is provided to hrrecords@aecom.com (US based employee) or canadahrssc@aecom.com (Canada based employee) for inclusion in employee's file. Copies are provided to the following: employee, supervisor, and SH&E Representative. Copies maintained by the SH&E Representative are to be included in the employee's individual file (within the LMS or hard copy) and referenced as the "Employee SH&E Orientation".

1.0 Purpose and Scope

- 1.1 The purpose of this document is to establish policies and procedures for operation of AECOM-owned, rented, or leased vehicles, client or customer-owned vehicles, and personal vehicles used by AECOM employees.
- 1.2 This procedure applies to all AECOM Americas-based employees and operations. Policies and procedures related to the operation of commercial motor vehicles are in addition to this procedure; refer to *S3AM-320-PR1 Commercial Motor Vehicles*.

2.0 Terms and Definitions

- 2.1 **AECOM Business** – Any activity that is performed in the name of AECOM. This includes, but is not limited to, vehicle travel between work locations, client sites, meeting locations as well as driving performed as a part of work-related travel (e.g., driving to and from airports, hotels, train stations). AECOM business does not include driving that is a part of a daily routine commute from home to an AECOM location.
- 2.2 **Authorized Driver** – AECOM employees who receive manager approval following evaluation of driver criteria to drive and maintain an AECOM-owned, leased or rented vehicle, a client or customer-owned vehicle, or a personal vehicle operated in the course of conducting AECOM business. Authorized Drivers shall maintain a current driver's license with full privileges applicable to the vehicle to be operated. There are three categories of Authorized Drivers;
- Professional (AECOM employee who operates a commercial motor vehicle. Please refer to *S3AM-320-PR1 Commercial Motor Vehicles*).
 - Hired (Employee's specific AECOM role is to drive employees in a normal street vehicle, which may or may not require commercial licensing by the applicable authorities. This category does not include busses or vans with a capacity of more than 12 people.).
 - General (Driving is required as a part of the employee's job duties. This includes driving AECOM-owned, leased, or rented vehicles, client or customer-owned vehicles, or personal vehicles on AECOM business).
- 2.3 **Collision** – Any incident in which a motor vehicle that (whether in motion, temporarily stopped, or parked) makes contact with another vehicle or pedestrian, or results in property damage and/or bodily injury, regardless of who was injured, what property was damaged, or who was responsible.
- 2.4 **Commercial Motor Vehicle (CMV)** – Any self-propelled or towed motor vehicle used for AECOM business (e.g., to transport passengers or property) when the vehicle is one of the following:
- Has a gross vehicle weight rating (GVWR) or gross combination weight rating, of $\geq 10,001$ pounds (4,536 kilograms); or
 - Is designed or used to transport more than eight passengers, including the driver, for compensation; or
 - Is designed or used to transport more than 15 passengers, including the driver, and is not used to transport passengers for compensation; or
 - Is used in transporting hazardous material in quantities $\geq 1,001$ pounds (454 kilograms) combined total weight at any time.
 - Refer to *S3AM-320-PR1 Commercial Motor Vehicles* for additional information.
- 2.5 **Distracted Driving** – An activity that takes the driver's attention away from the primary task of driving.

- 2.6 **Driving Under the Influence (DUI)/Driving While Intoxicated (DWI)** – The operation of a vehicle while under the influence of alcohol, drugs, medications, or other substances capable of inducing an altered mental state and/or impairing physical and mental judgments, such that the influence of the substances produces impairment in violation of the applicable governmental laws.
- 2.7 **Fatigue** – A general term used to describe the experience of being “sleepy”, “tired” or “exhausted”. The effect of fatigue is both physiological and psychological and can severely impair a driver’s judgement. Fatigue can cause lapses in concentration which could prove fatal. Fatigue is not just a problem for drivers on long trips, as drivers can also suffer from fatigue on short trips.
- 2.8 **Incident** – For the purposes of this procedure, a vehicle collision or other event where personal injury or property damage occurs, or where a citation is issued while the employee is on AECOM business. This may also include acts of theft, vandalism, and criminal mischief.
- 2.9 **Journey Management** – A process for planning and executing necessary journeys safely.
- 2.10 **Local Laws** – Signs, postings, laws, regulations, ordinances and codes applicable for the jurisdiction in which the motor vehicle is being operated.
- 2.11 **Motor Vehicle Report (MVR) / Driver’s Abstract** – A listing of the tickets (violations), incidents collision for an individual driver over a period of time (e.g., 3 years, 5 years) provided by a state or provincial authority such as the Department of Motor Vehicles.
- 2.12 **Personal Vehicle** – A motorized vehicle owned or leased by an employee.
- 2.13 **Portable Electronic Device** – A mobile electronic device that is used to receive or communicate voice, email, internet, and/or public media. The device requires user interaction (typing, dialing, reading, keying, etc.) that distracts the motor vehicle operator. Example devices include, but are not limited to:
 - Mobile Communication Devices (MCD)
 - Mobile/Cellular phones
 - Two-way Radios
 - Personal Data Assistant (PDA)
 - iPads, iPods, or other tablet models
 - Computers
 - Global Positioning System (GPS) receivers
- 2.14 **Spotters** – Extra personnel that may provide guidance when maneuvering in close and/or complex situations in order to avoid the occurrence of an incident.
- 2.15 **Task Hazard Analysis (THA)** – A tool for evaluating work activities for the purpose of:
 - Identifying the SH&E hazards and risks associated with the activity being performed;
 - Identifying and implementing control measures to eliminate or reduce hazards and risks; and,
 - Evaluating the effectiveness of control measures and making modifications as needed.

3.0 References

- 3.1 AECOM Global Travel Policy
- 3.2 RS2-001-PR Firearms Standard
- 3.3 S3AM-003-PR1 SH&E Training
- 3.4 S3AM-004-PR1 Incident Reporting, Notifications & Investigation
- 3.5 S3AM-009-PR1 Fatigue Management
- 3.6 S3AM-010-PR1 Emergency Response Planning
- 3.7 S3AM-209-PR1 Risk Assessment & Management

- 3.8 S3AM-314-PR1 Working Alone
- 3.9 S3AM-319-PR1 All-Terrain Vehicles
- 3.10 S3AM-320-PR1 Commercial Motor Vehicles

4.0 Procedure

4.1 Roles and Responsibilities

4.1.1 Manager / Supervisor

- Confirming employees are informed of the provisions of this procedure and related vehicle procedures.
- Providing a copy of this procedure to an employee who will be driving an AECOM-owned, leased or personal vehicle for AECOM business.
- Allowing employees to designate time to complete required driving safety training, vehicle inspections and related activities.
- Assigning driving tasks to authorized employees only.
- Selecting and providing vehicles for use by authorized employees that are appropriate for the planned working conditions and environment.
- Supporting employees in the reporting of vehicle incidents per *S3AM-004-PR1 Incident Reporting, Notifications & Investigations*, including the entry of the incident into the on-line incident management system (e.g., IndustrySafe).
- Confirm notification of AECOM Human Resources and Counsel upon receipt by an employee of a legal summons associated with a moving violation related to the use of a company vehicle.

4.1.2 Employee

- Follow this procedure and applicable laws while operating a vehicle.
- Complete assigned driver safety training based on the training matrix and any additional training assessments developed at the business group. Refer to *S3AM-003-PR1 SH&E Training, including S3AM-003-FM1 SH&E Training Matrix*.
- Report to the Manager / Supervisor if the vehicle selected is not appropriate for the working conditions and environment.
- Report to the Manager / Supervisor if the employee is inexperienced in operating the type of vehicle assigned.
- Report to the Manager / Supervisor if the employee is inexperienced in driving in the type of working conditions and environment assigned.
- Review the completed Task Hazard Assessment and complete journey management. If required, document the Journey Management Plan using *S3AM-005-FM1 Journey Management Plan* or equivalent.
- Immediately report vehicle incidents per *S3AM-004-PR1 Incident Reporting, Notifications & Investigations*, including the entry of the incident into the on-line incident management system (e.g., IndustrySafe).
- Notify the appropriate Manager / Supervisor and SH&E Manager upon receipt of a legal summons associated with a moving violation related to the use of a company vehicle.
- Immediately report a change or limitation(s) to his/her Driver's License to the appropriate AECOM Human Resources representative or his/her Manager / Supervisor.

- Conducting a pre-operational inspection of the vehicle for damage or deficiencies and reporting discovered deficiencies affecting the safe operation of the motor vehicle to the appropriate authority (e.g., supervisor, rental car agency, etc.).

4.1.3 **SH&E Manager**

- Maintaining and updating training resources for vehicle and driver safety.
- Providing guidance.
- Assisting operational leaders with determining the risk incurred by the use of motor vehicles.
- Assist in the incident investigation and review process.

4.2 General Procedures and Practices

- 4.2.1 Only Authorized Drivers are to operate a motor vehicle (rental, personal, client or customer-owned, or AECOM-owned/leased) while on AECOM business.
- 4.2.2 Drivers must comply with AECOM's *Global Travel Policy* and applicable laws, and employ safe driving practices. (NOTE: *Individual state, provincial, and local laws vary.*) Refer to *S3AM-005-ATT1 Authorized Driver Safety Practices*.
- 4.2.3 Authorized Drivers shall confirm their operating license is on their person, and valid registration and insurance is maintained with the respective vehicle prior to operation.
- 4.2.4 All local laws including, signs, postings, regulations, ordinances, and codes applicable for the jurisdiction in which the motor vehicle is being operated shall be adhered to.
- 4.2.5 At-risk driving behavior by AECOM employees shall be identified and managed accordingly.
- 4.2.6 Authorized Drivers must be at least 18 years of age (noncommercial license) or 21 years of age (commercial license) and have a current driver's license for the appropriate class of vehicle (unless more stringent requirements are established by the leasing/renting agency). Employees with conditional licenses are prohibited from operating vehicles on AECOM business.
- 4.2.7 If an Authorized Driver receives a citation resulting in their license being suspended, has his/her driver's license revoked, or is otherwise unauthorized to drive, he/she shall notify the appropriate AECOM Human Resources representative or his/her Manager prior to start of the following work day. Failure to do this may result in disciplinary action up to and including termination.
- 4.2.8 The office to which the vehicles are registered is liable for any damages to the vehicle being operated by an Authorized Driver.
- 4.2.9 Seat belts are to be worn by the occupants. The number of passengers shall not exceed the manufacturer's specifications for the vehicle.
- 4.2.10 The vehicle may not move until all passengers have fastened their restraints in the proper manner (e.g., lap belt secured and shoulder harness placed over the shoulder). Vehicles are not to be operated or used by AECOM employees if seatbelts are not included as part of the vehicle's safety equipment.
- 4.2.11 The vehicle's engine is to be turned off during refueling. Smoking or cellular phone use is not allowed while refueling.
- 4.2.12 Motorcycles may not be operated on AECOM business unless the following requirements are met:
 - Specific approval is provided by the Supervisor with concurrence from the SH&E Manager.
 - A hazard analysis is completed.
 - Required training and license is in place.
 - Headlights or daytime running lights will be used when the vehicle is in operation.
 - A Class 2 or 3 safety vest and appropriate helmet shall be worn while operating a motorcycle.

- 4.2.13 When practical, drivers should travel during daylight hours and avoid driving during adverse weather conditions. Drivers should also inform colleagues of their travel itinerary including destination and anticipated departure and arrival times.
- 4.2.14 Fire arms and weapons are not permitted in AECOM-owned, leased or rented vehicles insured by AECOM. Firearms and weapons in personal vehicles are subject to the laws and regulations of the respective local, provincial, state, territory, federal and region and/or country. Refer to the *RS2-001-PR1 Firearms Standard*.
 - Exceptions to this standard may exist where there is a credible and demonstrated risk to AECOM employees or assets, or when knives or weapons are required as part of the work activity. Under such circumstances, the exception must be approved by the Chief Resilience Officer, and must strictly adhere to the procedures set forth by the Global Resilience Group.
- 4.2.15 Vehicles are to be selected based on the nature of planned use. In some working conditions, specialized vehicles, such as four-wheel drive and higher clearance vehicle, may be required to confirm safe travel. These specialized vehicle requirements/specifications shall be identified in the project specific SH&E Plan and/or THA.
- 4.2.16 Vehicles are to be maintained according to manufacturer's specifications and the applicable environmental and operating factors (e.g. winterized with appropriate fluids, winter tires installed, appropriate coolant for hot climates, etc.).
- 4.2.17 Vehicles are to be outfitted with the appropriate support equipment based on the THA or client vehicle specifications. Support equipment may include, but is not limited to, cones, rotating warning lights, warning flags, vehicle identification (magnetic door signs or similar), wheel chocks, cargo nets, and rollover protection.
- 4.2.18 Drivers are to operate vehicles in a manner that avoids situations where backing is necessary. Whenever possible and as permitted, reverse parking of all vehicles while on business is required. A spotter shall be used when backing of trucks and heavy equipment presents a risk of collision.
- 4.2.19 Non-AECOM drivers (subcontractors, joint venture partners, clients) are prohibited from operating an AECOM company owned, leased or rented vehicle unless the activity is specifically agreed to in the applicable contract and only if the use of the vehicle is consistent with the terms of the contract.
- 4.2.20 Authorized drivers required to operate vehicles with special hazards (e.g., trucks carrying fuel cells, vehicles used to tow trailers, vehicles with limited visibility, etc.) will be thoroughly briefed on the hazards and control measures necessary for safe operation of the vehicle. The local AECOM operation will maintain documentation of the briefing.
- 4.2.21 Define specific vehicle travel routes and parking areas at field sites through the use of fencing, cones, or other markings.
- 4.3 Distracted Driving
 - 4.3.1 Distractions while driving are a major cause of incidents. Distractions include the use of cellular phones (including texting), eating, drinking, smoking, and engaging in intense conversations. AECOM Authorized Drivers must exercise proper control of the vehicle at all times, including the management of possibly distracting actions and behaviors.
 - 4.3.2 The use of portable electronic devices that may distract the driver while driving is prohibited. This includes cell phones, two-way radios and other items whether hand-held or hands-free. Electronic devices include, but are not limited to, all mobile phones pagers, iPods, MP3s, GPS units, DVD players, tablets laptops and other portable electronic devices that can cause driver distraction.
 - Employees shall not use a personal or company mobile communication devices (MCD) while driving any vehicle on AECOM business.
 - Employees shall not use a company MCD while driving a personal vehicle.
 - Driving includes the time spent in traffic or while stopped at red lights or stop signs.

- 4.3.3 GPS units and devices (e.g., smart phones, tablets) used for navigation may only be used if factory installed or secured to the vehicle with a bracket that allows the driver to view the image without having to take their eyes off the road.
- 4.3.4 Electronic devices shall be setup for operation prior to commencing driving activities and shall not be changed by the driver while driving.
- 4.4 Impairment
 - 4.4.1 Impairment can take many forms ranging from fatigue, to the use of prescription medication or alcohol (even small amounts), to the abuse use of illegal and legal drugs and alcohol. AECOM employees shall not drive in an impaired condition.
 - 4.4.2 AECOM employees are prohibited from being under the influence of alcohol or drugs or improperly using medication in a way that could diminish, or raise questions concerning, an employee's ability to perform at his or her best while performing services for or on behalf of AECOM. Operation of vehicles while under the influence may void insurance coverage.
 - 4.4.3 Drivers/operators will not drive or operate vehicles while under the influence of medications when told by a physician, another healthcare provider, or the manufacturer (e.g., instructions on the label) the medication could render the activity unsafe.
 - 4.4.4 AECOM employees are prohibited from operating a vehicle if they are experiencing signs and symptoms of fatigue. Employees should stop work and rest before driving. No employee should operate a vehicle if they have worked 14 consecutive hours within a 24 hour period. Refer to *S3AM-009-PR1 Fatigue Management*.
- 4.5 Journey Management
 - 4.5.1 When practical, alternatives to road travel should be evaluated including teleconferencing/video conferencing, the use of public transportation or carpooling.
 - 4.5.2 Journey management is a process for planning and executing necessary journeys safely and may or may not be documented. Review the completed THA and complete the journey management process. If required, document a Journey Management Plan (JMP) using *S3AM-005-FM1 Journey Management Plan* or equivalent. The journey management process includes the following steps:
 - Determining if the trip is necessary.
 - Evaluating alternative safer modes of transport.
 - Evaluating the potential to combine journeys with others.
 - Planning the trip.
 - Select the safest and most efficient route. Confirm compliance with any site specific specified routes, route rules, or restrictions.
 - Confirm route planning factors in fatigue management. Refer to *S3AM-009-PR1 Fatigue Management*.
 - Review road conditions and potential hazards associated with the route.
 - Review weather conditions and forecast.
 - If applicable, review *S3AM-314-PR1 Working Alone*.
 - Confirm Emergency Response Plan includes procedures to be taken in the event of a collision or vehicle incident.
 - Allow for adequate travel time.
 - Inform others of destination, estimated time of arrival and routing.
 - 4.5.3 Drivers who are to undertake trips in excess of 250 miles (400 km) each way, drive in remote or hazardous areas, or when otherwise deemed necessary, shall develop and document a JMP. This plan typically includes the route, location of route hazards, timing, rest periods and locations, communications, emergency response and security arrangements.

- 4.5.4 Drivers are responsible for developing the JMP and coordinating with the applicable parties identified in the plan.

4.6 Driver Safety Training

Authorized drivers shall have a current driver's license for the appropriate class of vehicle (unless more stringent requirements are established by the leasing/renting agency).

Driver safety training is to be assigned based on the risks posed with the work environment, driver type and vehicle type, using the training matrix and any additional training assessments developed at the business group level. Refer to *S3AM-003-PR1 SH&E Training, including S3AM-003-FM1 SH&E Training Matrix*. A determination of training type is at the discretion of the Manager / Supervisor, with the following guidance applied.

- 4.6.1 All Authorized Drivers (Professional, Hired, and General Drivers) shall be trained in this procedure; *S3AM-005-PR1 Driving*.

- 4.6.2 All Authorized Professional Drivers shall be trained in *S3AM-320-PR1 Commercial Motor Vehicles*.

4.6.3 Vehicle / Driver Safety Training

- Recommended for all employees who drive on behalf of AECOM (Professional, Hired and General Drivers).
- This may be completed online (e.g., AECOM University – Driver Safety).
- Recommended to be completed within 1 month of the Authorized Driver's hire date.

4.6.4 Defensive Driver (online) Training

- Recommended for all Authorized Drivers (Professional, Hired, and General Drivers) who are assigned an AECOM company owned, leased or rented vehicle for a significant period of time with the expectation that the employee utilizes the vehicle on a regular basis for AECOM business.
- It is recommended that authorized drivers who have completed web-based defensive driver training or equivalent also complete a refresher every three years.
- Defensive Driver training is available online through AECOM University or one of the following AECOM-approved training resources:
 - The National Safety Council
 - Alert Driving

4.6.5 Defensive Driver (hands-on) Training

- Recommended for all Authorized Professional Drivers and Authorized Hired Drivers.
- Recommended for Authorized General Drivers who drive in remote locations, hazardous environments (such as refineries, ports, terminals etc.), at-risk drivers, and when required by clients.
- Defensive Driver hands-on training is provided through an AECOM-approved training resource, such as Smith Systems.
- Hands on defensive driver training may be required as a result of an incident or negative Motor Vehicle Report.

4.6.6 Driver Retraining

- Drivers involved in repeated motor vehicle incidents, incidents of sufficient severity or concern, or drivers identified as at-risk through review of their Motor Vehicle Report/Driver Abstract may be retrained or, as applicable, subject to disciplinary action and refused the right to drive on behalf of AECOM.
- Retraining programs will be implemented at the discretion of the Supervisor and SH&E Manager.

- Employees eligible to continue driving shall be subject to a driver retraining program that may include any of the above programs or other training programs appropriate for the type of driving the employees performs.

4.6.7 Special Vehicles and Driving Conditions

- Vehicles such as All-Terrain Vehicles (ATVs), four wheel drive vehicles, motorized carts, snowmobiles, box vans and trailers (towing) require specialized training and supervision. For ATVs, Refer to *S3AM-319-PR1 All-Terrain Vehicles* for additional information.
- Use of these types of vehicles is limited to AECOM projects, therefore training and qualification programs for drivers will be project specific. The Manager shall work with the SH&E Manager to tailor training to the specific needs of the project.

4.7 Personal Vehicles (additional requirements)

- 4.7.1 The requirements of this procedure apply to the use of a personal vehicle for AECOM business. Additional requirements are set forth in the *AECOM Global Travel Policy*.
- 4.7.2 Personal vehicles driven by Authorized Drivers for business use must satisfy the jurisdiction's registration and inspection requirements and may not be modified beyond manufacturer's specifications.

4.8 Rental Vehicles (additional requirements)

- 4.8.1 The requirements of this procedure apply to the use of a rental vehicle for AECOM business. Additional requirements are set forth in the *AECOM Global Travel Policy*.

4.9 Requirements for Authorized Drivers

- 4.9.1 Review the *S3AM-005-ATT1 Authorized Driver Safety Practices* for specifics.
- 4.9.2 Drivers are not to permit unauthorized persons to operate an AECOM-owned/leased/rented vehicle.
- 4.9.3 All Authorized Drivers shall perform a walk-around inspection of the vehicle prior to operation.
- 4.9.4 Pre-operation vehicle inspections shall be performed and documented by all Authorized Professional Drivers and all Authorized Hired Drivers. A sample vehicle inspection checklist is provided in *S3AM-005-FM2 Vehicle Inspection Checklist*.
- 4.9.5 Vehicles with deficiencies that affect or could potentially affect the safe operation of the vehicle shall be removed from service and promptly repaired as necessary to permit safe vehicle operation.
- 4.9.6 As applicable, arrange for and/or coordinate with appropriate AECOM personnel to facilitate preventive maintenance services for the vehicle. Maintain it in sound mechanical condition, as per the manufacturer's recommendations provided in the owner's manual.
- 4.9.7 Do not operate the vehicle if unsafe maintenance conditions exist that would likely result in vehicle damage or personal injury. This applies to vehicles owned or leased by AECOM and to personally-owned vehicles used for AECOM business. Escalate other maintenance issues for correction to appropriate authority (e.g., manager, rental car agency, supervisor, etc.).
- 4.9.8 Transport only persons on AECOM related business or those persons receiving transportation as a prescribed service. Only drive vehicles in conditions for which the driver has the appropriate training and experience.
- 4.9.9 AECOM-owned, rented, or leased vehicles are for official business use only and are not to be used for personal activities. Exceptions to this requirement can be made only with the specific written approval of the Manager of the office or location the vehicle is registered to.
- 4.9.10 Smoking (including the use of e-cigarettes) and chewing tobacco is not permitted in AECOM-owned, leased or rented vehicles.
- 4.9.11 Drivers are responsible for damage caused by abuse of the vehicle.

- 4.9.12 Secure the vehicle when left unattended.
- 4.9.13 Securing loads in the inside and outside compartments of the vehicle.
 - Do not rely on weight/shape of load alone. Always use a cargo net, straps, containers or other mechanical device when necessary to confirm load is secure.
 - Mark loads that extend the beyond the end of truck, trailer or similar edge with a red warning flag of at least 16 square inches.
 - Red lights will be utilized at night to mark loads that extend the beyond the end of truck, trailer or similar edge.
- 4.9.14 Do not modify existing equipment (warning sounds, backing alarms etc.) or install aftermarket equipment including toolboxes, truck caps, specialty lights, or towing equipment) without approval from the Manager of the office or location the vehicle is registered to and AECOM Procurement Department.
- 4.10 Emergency Preparedness
 - 4.10.1 AECOM-owned or leased vehicles are to have a “Safety Kit” that contains a first-aid kit, portable fire extinguisher, safety triangle, and two reflective safety vests. If not available, contact the Manager / Supervisor of SH&E Manager to determine how to obtain a kit.
 - 4.10.2 The following suggested items should be kept in vehicles used for AECOM business in remote project locations:
 - First aid kit, appropriate to the work and crew size, or per regulations.
 - Fire extinguisher, safety triangle, and safety vest.
 - Emergency equipment (e.g., flares, flashlight, blanket, drinking water, etc.) based on conditions.
 - Means of communication (cell phone, radio or satellite phone), extra batteries or a charger.
 - 4.10.3 To the extent possible, employees should refrain from changing tires or making repairs to vehicles in the field. A road side assistance service should be identified for vehicles used for AECOM business in advance travel.
 - 4.10.4 Specific emergency procedures are to be identified in the applicable Emergency Response Plan, JMP or the THA. Refer to *S3AM-010-PR1 Emergency Response Planning*.
- 4.11 Vehicle Incidents
 - 4.11.1 Vehicle incidents are to be reported and managed in accordance with *S3AM-004-PR1 Incident Reporting, Notifications and Investigation* regardless of how minor the incident might be.
 - 4.11.2 The Employee(s) involved in a collision shall follow the below guidelines:
 - Assess the situation to confirm everyone is safe, and remove any vehicle occupants from harm's way. Call, or have someone else call 911 immediately, if necessary.
 - As appropriate, remain at the scene of a collision to contact the police. Ask another motorist to call the police if necessary; never leave the scene of a collision.
 - As applicable, provide (if requested) to police and the other driver(s) the liability insurance information. Obtain the officer's jurisdiction, name, and badge number and a copy of the police report.
 - As applicable, consider moving the vehicle out of the traffic flow if it is safe to do so, the vehicle is operational, and/or no further damage to the vehicle can occur.
 - Do not operate a damaged vehicle if its safety is questionable, its operating condition is illegal by applicable laws or its condition is such that further damage would likely result from its operation.
 - Turn on the vehicle's flashers to warn other motorists.

- Obtain:
 - Names, phone numbers, and addresses of owner(s), driver(s), and occupants of the other car(s) involved.
 - Other party's insurance company's name, address, phone number, policy number, and insurance agent.
 - Names, phone numbers, and addresses of all witnesses.
 - Photographs of the accident scene when safe to do so.
 - Cooperate with AECOM Counsel if the incident results in unresolved risks or third party claims, or if the employee receives a summons, complaint or other legal documents relating to a traffic incident.
 - DO NOT ADMIT LIABILITY, AGREE TO PAY FOR DAMAGE OR SIGN A DOCUMENT RELATED TO AN INCIDENT EXCEPT AS REQUIRED BY LAW.
 - Statements made in haste or anger may be legally damaging.
 - If contacted by a third party, do not answer any questions. Immediately report this contact to the Manager / Supervisor and/or Legal Counsel
 - Employees shall report the incident to AECOM's Global Travel Department. If the incident involved a third party, the driver is responsible for obtaining a copy of the police report and providing to global travel
- 4.11.3 Employees must cooperate with the incident investigation team during any investigation of an incident meeting the investigation protocol.
- 4.11.4 Vehicle repairs shall be conducted at the authorization of the Manager / Supervisor.
- 4.12 Drug and Alcohol Testing
- 4.12.1 Testing for Alcohol and/or Drugs procedures shall be administered in accordance with the applicable policy and procedures.
- 4.12.2 In the event that a police/regulatory officer responding to a vehicle incident administers field and/or laboratory impairment testing AECOM reserves the right, as permitted, to obtain copies of such testing results for inclusion in the incident report and consideration in a subsequent incident investigation.
- 4.13 Driving Privileges, Citations and Violations
- 4.13.1 A violation of this vehicle safety standard is subject review by the appropriate AECOM Human Resources representative and may be subject to disciplinary action, up to and including termination. The applicable Manager / Supervisor will review all incidents involving AECOM-owned, rented, or leased vehicles.
- 4.13.2 Citations and violations which occur while driving for AECOM business are to be reported as a vehicle incident in accordance with *S3AM-004-PR1 Incident Reporting, Notification & Investigation* within 24-hours.
- 4.13.3 The AECOM Manager responsible for the employee, in consultation with the appropriate AECOM Human Resources representative, may suspend the privilege to operate vehicles on AECOM business due to noncompliance with the AECOM Vehicle and Driver Safety Program, involvement in a motor vehicle incident, or resulting citations or other legal actions associated with motor vehicle violations.
- 4.13.4 The employee's driving privileges will be suspended for any of the following:
- Accidents or legal action involving alcohol or drug use (e.g., driving under the influence).
 - Driving without a license.
 - Hit-and-run driving or leaving the scene of an accident.
 - Unauthorized use of AECOM vehicles (e.g., using an AECOM vehicle for moving personal items, carrying passengers who are not associated with work activities, etc.).

- 4.13.5 The employee's driving privileges may be suspended for any of the following:
- Two or more at-fault accidents involving the same Authorized Driver within a 12-month period.
 - Multiple complaints from other employees or members of the public about driving performance.
 - Any accident caused by an AECOM Authorized Driver where damages exceed \$2,500.
 - Failure to comply with the distracted driving requirements.
 - Gross misconduct or violation of policy.
- 4.13.6 An Authorized Driver's driving privileges may be reinstated as follows:
- For any suspension resulting from law enforcement agency legal action involving drugs and alcohol on the part of the former Authorized Driver, driving privileges may be reinstated only by concurrent agreement of the Vice President of SH&E for the applicable Business Group and Human Resources Manager.
 - For those Authorized Driver's privilege suspensions that are not related to driving under the influence of drugs or alcohol, privileges may be reinstated with concurrent agreement by the AECOM Manager, the SH&E Manager, and Human Resources Manager upon completion of required remedial training.
- 4.13.7 Disciplinary action may include the following:
- Loss of AECOM driving privileges.
 - Disciplinary warning.
 - Termination.
- 4.13.8 The employee is personally responsible for payment of fines for moving violations and parking citations incurred while driving a vehicle on AECOM business and for reporting such incidents to his/her Manager / Supervisor. The Manager is responsible for notifying Counsel.
- 4.13.9 If an Authorized Driver receives a citation resulting in the license being suspended from driving or has his/her driver's license revoked, he/she is required to notify his/her Manager / Supervisor prior to start of the following work day. Failure to do so may result in disciplinary action up to and including termination.

5.0 Records

- 5.1 Documentation of employee training completed shall be retained in accordance with *S3AM-003-PR1 SH&E Training*.
- 5.2 As applicable, completed *S3AM-005-FM2 Vehicle Inspection Checklists* and/or *S3AM-005-FM1 Journey Management Plans* shall be retained in project files.

6.0 Attachments

- 6.1 [S3AM-005-ATT1 Authorized Driver Safety](#)
- 6.2 [S3AM-005-FM1 Journey Management Plan](#)
- 6.3 [S3AM-005-FM2 Vehicle Inspection Checklist](#)

Authorized Driver Safety

S3AM-005-ATT1

1.0 Before Vehicle Operation

- 1.1 Learning and practicing good driving habits will help reduce the chance of a traffic collision. Learning to properly scan surroundings will improve hazard awareness and avoidance. With correct driving habits, errors can be significantly reduced and incident response time can be decreased.
- 1.2 All Authorized Drivers shall perform a walk-around inspection of the vehicle prior to operation.
 - 1.2.1 Authorized Drivers should use the “Get Out And Look” (GOAL) method before placing a vehicle in motion. Drivers are to make a 360-degree (360°) walk around of the vehicle immediately before placing vehicle into motion in order to determine whether there are hazards or possible obstructions in the proposed path of travel. Drivers are to clear the area of people and objects before placing the vehicle in motion. A check will also be performed to confirm overhead and side clearances are adequate. The following are recommended best practices:
 - Placement of cones on the right side of the front and rear of vehicle upon parking and retrieved during the 360° GOAL walk-around.
 - In lieu of cones, place GOAL magnets on the right side of the hood and truck/tailgate of the vehicle upon parking. The GOAL magnets should then be retrieved during the 360° GOAL walk around just prior to moving the vehicle again.
 - Place a GOAL sticker on the driver side door window as a reminder to get out and look.
 - 1.2.2 Pre-operation vehicle inspections shall be performed and documented by all Authorized Professional Drivers and all Authorized Hired Drivers. A sample vehicle inspection checklist is provided in *S3AM-005-FM2 Vehicle Inspection Checklist*.
- 1.3 Drivers shall be familiar with applicable client rules and regulations when on the client’s sites. The employee may, for example, be required to leave their keys in the ignition with the vehicle turned off or to display a vehicle pass. When parking, it is recommended that employees back the vehicle into the parking space.
- 1.4 Drivers must be trained, competent and in possession of a current driver’s license that is valid to the jurisdiction and the vehicle driven. Any additional certification required given the particular vehicle and equipment transported must also be current (e.g. air brake certificate).
- 1.5 Execute proper travel planning to avoid being in a rush, traveling during peak traffic hours, and traveling through high traffic volume areas. Utilize the *S3AM-005-FM1 Journey Management Plan* as appropriate.
- 1.6 All drivers must be involved in a task hazard assessment applicable to the task(s) undertaken (may exclusively be the driving task or may include the driving task).
- 1.7 Confirm current insurance and registration is maintained with the vehicle and any equipment being towed. License plates must be clean.
- 1.8 As applicable, check all safety equipment (e.g. First Aid Kit, Fire Extinguisher, Flares, Triangles, Reflective Vest, etc.).
- 1.9 As applicable, check for survival gear and equipment. Emergency kits should include blankets, food, water, flashlight, extra batteries, a method of communication and a heat source such as a candle.
- 1.10 When accessing any pickup truck box, staff will: step up into the box to avoid excess reaching and strain and; use three point contact getting in and out of the truck box (i.e., avoid jumping off the tailgate).
- 1.11 Confirm no items are hanging from the rear view mirror that could obstruct vision.
- 1.12 Adjust mirrors to confirm optimal visibility.

2.0 Vehicle Operation – General

- 2.1 Be vigilant of differences between trucks and small cars related to blind spots, turning radius, and required overhead and undercarriage clearances.
- 2.2 It is a personal responsibility of the driver to operate a vehicle safely and in compliance with regulations (e.g. Cargo Securement, Traffic, Dangerous Goods, etc.).
- 2.3 Confirm compliance with applicable traffic legislation, driver regulations, and rules (e.g. commercial driver hours of service, state / provincial highway acts, municipal bylaws, private road/property owner rules, site specific rules, etc.).
- 2.4 All vehicle occupants shall wear seatbelts at all times.
- 2.5 Keep reflectors, lights and windows (inside and out) clean.
- 2.6 Window cleaner should be on hand for cleaning the interior of the windows as well as headlights that have become obscured due to road spray or slush.
- 2.7 A shovel and a supply of sand or gravel can help to extract a stuck vehicle that does not have traction.
- 2.8 Maintain good housekeeping practices and confirm items and loaded materials are secured from movement on both the interior (e.g. cab, glove box, etc.) and exterior (e.g. box, flat deck, etc.) of the vehicle.
- 2.9 Conduct en-route inspections as required to check cargo securement.
- 2.10 Pulling Over
 - 2.10.1 Pull the vehicle off the road to a safe location as required by the applicable jurisdiction (e.g. rest stops, a side road, an unused approach):
 - If, in the ongoing assessment of road and weather conditions, it has been concluded that travel is no longer safe (i.e. heavy rain, sleet), and wait until conditions allow for safe travel.
 - To review or adjust navigation equipment and check cargo securement.
 - To check telephone messages, text messages or to take notes.
 - For interval breaks, to stretch and if fatigued (try to take a break every two hours).
 - To manage and eliminate driver distractions.
 - 2.10.2 If it is necessary to park a vehicle on the shoulder of an active roadway, park as far off the road as possible, and turn on the four-way indicators (hazard lights) prior to leaving the vehicle. Use cones or other warning devices, and wear a high visibility traffic vest.
 - 2.10.3 Observe extra caution in and around emergency and construction zones.
 - 2.10.4 Avoid unattended rest areas, when possible, and especially at night.
 - 2.10.5 If the vehicle breaks down, attempt to get to a secured location. Call police or roadside assistance as appropriate.
 - 2.10.6 Contact the police to help those with car trouble instead of stopping to assist.
 - 2.10.7 When possible, employees should have a car mechanic or roadside assistance change or repair a flat tire. If the Driver or passenger must change a tire, the Driver and passenger must adhere to the manufacturer's specifications and observe the proper lifting technique and safety procedures. Proper lifting is addressed in *S3AM-104-PR1 Manual Material Handling*.
 - 2.10.8 When parking or leaving a vehicle, the following procedures must be followed:
 - Engage the transmission in park (automatic transmission) or first gear (standard transmission).
 - Shut off the engine.

- Set the parking brake.
 - Remove the ignition keys, and lock the vehicle.
- 2.10.9 If work (e.g., surveying) is required alongside an active road, park the vehicle behind the area of work to provide a barrier against out-of-control vehicles.
- 2.11 Backing Up
 - 2.11.1 Keep reverse motion to a minimum as the most common incidents involve backing up.
 - 2.11.2 Whenever possible, vehicles should be parked in a manner that prevents the driver from backing (reversing) upon departure. For example, the vehicle should be backed into a parking spot or drivers should select a parking spot that allows them to “pull” through” so that the vehicle is facing the direction of departure.
 - 2.11.3 Confirm the area behind the vehicle is clear prior to and while reversing a vehicle.
 - 2.11.4 All vehicles with limited visibility operated around workers or on a construction site:
 - Should have an audible back-up alarm installed that functions automatically when the vehicle is put into rear motion; or
 - Shall be backed up only when a signaler communicates that it is safe to do so.
 - If a vehicle is not equipped with an audible back-up alarm, the operator shall sound the vehicle horn twice to indicate intention to back vehicle up.
 - 2.11.5 Confirm compliance with applicable traffic legislation regarding backing up (i.e. Texas – An operator may not back the vehicle on a shoulder or roadway of a limited-access or controlled-access highway; Ontario – No driver of a vehicle shall back the vehicle upon the roadway or shoulder of any highway divided by a median strip on which the speed limit is in excess of 80 km/h; etc.).
 - 2.11.6 Take the time to become acquainted with the area the vehicle is to be backed into.
 - 2.11.7 Inspect the area to be backed into (i.e. walk around it by foot, identify obstructions and possible hazards).
 - 2.11.8 Line up as straight as possible with intended final position prior to backing equipment or vehicle up.
 - 2.11.9 If the area is congested with people or equipment a signaler SHALL be used.
 - 2.11.10 Before putting the vehicle into motion, decide:
 - The method of communication (hand signals, two-way radios or other means).
 - If hand signals are going to be used, confirm both the driver and signaler agree on signals to be used.
 - If two-way radios are being used confirm there is continuous voice contact between the signaler and driver. If there is nothing being transmitted on the two-way radio the driver shall STOP the vehicle.
 - 2.11.11 While backing up:
 - Confirm there is constant visual contact with the signaler when the vehicle is in motion if using hand signals.
 - If driver loses eye contact with the signaler at ANY time, the driver shall STOP the vehicle until eye contact is regained. The exception is where the communication between the signaler and driver is conducted by two-way radio.
 - When possible, the signaler shall stand on the driver’s side of the vehicle during motion.

- The signaler must always keep a safe distance from the vehicle or equipment and never stand directly in the path of motion. Refer to Safe Work Practice – Red Zone.
- While backing up using a signaler, the driver must confirm that the vehicle radio (not to be confused with two-way radio) is off and the windows are down (if possible) to avoid distraction and to be able to hear outside of the vehicle.
- If the driver notices anything out of the ordinary (despite what the signaler is directing) the driver will STOP the vehicle or equipment and assess the situation.
- If at any time the safety of any person or property is at risk, including that of the signaler, the signaler shall signal the driver to STOP the vehicle IMMEDIATELY.
- Any person (other than the signaler) can direct the driver to STOP the vehicle or equipment and the driver must take that as a valid direction to STOP.

3.0 If Vehicle is to be Left Unattended

- 3.1 Turn the ignition off, remove the key and set the emergency brake (if parked on an incline).
- 3.2 Lock and secure the vehicle.
- 3.3 Secure equipment and property in a locked trunk or tool chest.
- 3.4 Do not leave keys in an unattended vehicle.

4.0 Defensive Driving

- 4.1 Demonstrate an effective and positive driving attitude.
- 4.2 Use road courtesy, expect the unexpected and be patient. Do not rush or drive aggressively.
- 4.3 Follow and obey regulations.
- 4.4 Do not make sudden lane changes and always use signal lights.
- 4.5 Be Visible – Be seen by all other drivers, pedestrians, cyclists and others using or crossing the road:
 - 4.5.1 Avoid driving in blind spots of other vehicles.
 - 4.5.2 Confirm vehicle lights are on, working and clean before and during travel.
 - 4.5.3 Confirm the vehicle's horn works and use it as necessary to warn others.
 - 4.5.4 Tapping the vehicle brakes may provide a visible alert for following vehicles.
 - 4.5.5 Confirm adequate distance to enable passing of other motorists safely.
- 4.6 If it is necessary to turn a vehicle around, confirm that the operation is conducted safely and according the applicable traffic legislation and rules.
- 4.7 Always operate a vehicle within operator driving limitations. Do not be enticed by others to exceed driving capability for any reason. When behind the wheel, drivers must be in control of all driving related situations.
- 4.8 Maintain awareness of all objects in the immediate circle of influence. Whenever possible, stay well clear of other vehicles, machinery, equipment and pedestrians.
- 4.9 Scan Ahead – Check the path of travel for obstacles and other vehicles:
 - 4.9.1 Utilize three driving monitoring zones (should not be confused with safe following distances):
 - Action Zone (approximately 4 to 6 seconds in front of the vehicle) – activity in this zone generally requires immediate reaction by the driver.

- Planning Zone (at least 15 seconds in front of the vehicle) – look ahead to visually identify if there is slowing traffic or another type of road hazard ahead or to the side. Do not drive behind vehicles that block visibility.
 - These zones may require enlarging based on speed and driving environment (e.g. traffic congestion, weather, etc.).
- 4.9.2 Get the big picture and look for hazards (other motorists, pedestrians, cyclists, road debris, etc.).
- 4.9.3 Moving eyes every 2 seconds can help to avoid fixating on any one object. Check rear view mirror every 5 to 8 seconds and any time braking.
- 4.9.4 Read and obey traffic signage and controls.
- 4.9.5 Use high beam head lights when possible.
 - Use low beam headlights when following closely behind other vehicles or when approaching and meeting oncoming traffic.
 - Use low beam headlights in fog or heavy snow.
- 4.9.6 Wear appropriately tinted sunglasses to improve visibility in sunny conditions. Do not wear sunglasses at night and, if wearing at dusk or dawn, confirm the tint is of the type that improves and does not hinder visibility.
- 4.10 Keep a Space Cushion:
 - 4.10.1 Maintain a space cushion around the vehicle to improve the potential of avoiding a collision. Create an out by monitoring the space in front, behind and to each side of the vehicle, leaving enough area as a cushion to enable evasive action if needed.
 - 4.10.2 Maintain a minimum of 2 seconds plus 1 second for every 10 feet (3m) of vehicle length between the vehicle driven and the vehicle ahead:
 - Pick a marker on the road ahead, such as a road sign or pole.
 - Count "one thousand one, one thousand two".
 - When the front of the driven vehicle reaches the marker, stop counting.
 - If the marker is reached before "one thousand two," increase the space cushion.
 - Add more time (space) in poor driving conditions.
 - Add more time (space) if the vehicle operated is heavily loaded.
 - Add more time (space) if the vehicle ahead is smaller and lighter and may stop more quickly than the vehicle operated.
 - 4.10.3 When stopped behind another vehicle leave 1 vehicle length between the vehicle driven and the vehicle ahead.
 - 4.10.4 Do not travel in a traffic cluster. Manage the space to the front, left and right of the vehicle driven.
 - 4.10.5 Fog, heavy rain, snow, slush or wind require speed and distance between vehicles to be adjusted accordingly.
- 4.11 Recognize and Anticipate Hazards:
 - 4.11.1 Exercise increased caution at night, dawn and dusk.
 - 4.11.2 When driving at night look to the right of the on-coming headlights and not directly head-on.
 - 4.11.3 Identify changing road hazards or conditions.
 - 4.11.4 Identify changing weather or driving conditions:

- 4.11.5 Light rain and heat can draw oil to the surface of asphalt creating slippery driving conditions.
- 4.11.6 Heavily rain soaked roads can result in a vehicle hydroplaning / aquaplaning.
- 4.11.7 Fluctuating cold temperatures may produce ice.
 - Open hilltops may become icy due to blowing snow accumulating and freezing on the road.
 - Shaded areas, such as overpasses and bridges, will freeze first and dry out last. These locations are prone to black ice.
 - Be aware that black ice may be very difficult to spot. Darker, glossy spots may indicate black ice.
- 4.11.8 At dawn or dusk, the low sun can create a significant visibility hazard.
- 4.11.9 Be aware of changing conditions (i.e. traffic patterns, accidents, traffic lights, other vehicles).
- 4.11.10 Watch for large loads or slow moving agricultural equipment:
 - Exercise extreme caution, provide extra room and pass only if it is safe to do so.
 - Be aware that large loads or heavy equipment cannot stop as quickly as smaller vehicles and require a longer stopping distance.
 - Never pull directly in front of these vehicles after passing or merging, but leave adequate space to confirm safe operation.
 - Signal well in advance of any intended maneuver to give large vehicles additional time to react.
- 4.11.11 Avoid travelling in the blind spots of other vehicles or mobile equipment.
- 4.11.12 Scan road and shoulders for wildlife and pedestrians:
 - Animals may travel in groups. Maintain heightened awareness when spotting one.
 - Leave plenty of room when driving around an animal on or near the road – a frightened animal may run in any direction.
 - Honk in a series of short bursts to make animals move out of the way.
 - Avoid *swerving* for wildlife as this could result in veering into oncoming traffic.
- 4.12 Reduce Speed:
 - 4.12.1 Adjust speed to accommodate traffic flow and patterns.
 - 4.12.2 Adjust speed to all weather pattern changes (Rain/Hydroplaning, Ice & Frost/Traction Loss, and Restricted Visibility).
 - 4.12.3 Adjust speed in response to inconsistent road surfaces.
 - 4.12.4 Reduce speed when required by law, in construction zones and school and playgrounds.
 - 4.12.5 Safely and appropriately reduce speed upon observing any hazard to increase reaction time.
 - 4.12.6 Always be prepared to brake at an intersection.
 - 4.12.7 Always come to a full stop at uncontrolled railway intersections and verify it is safe to proceed.
 - 4.12.8 Make eye contact with other motorists at intersections (particularly uncontrolled intersections) before proceeding.
 - 4.12.9 Never assume other motorists are following and obeying road rules.
 - 4.12.10 Keep to the right of the road or in the right-hand lane on multi-lane roads unless turning left or passing another vehicle.
 - 4.12.11 Confirm driving practice and vehicle position allow for a defensive or avoidance maneuver.

4.13 Eliminate Distractions

- 4.13.1 Confirm appropriate time is taken to become acquainted with an unfamiliar vehicle prior to driving.
- 4.13.2 Do not operate a vehicle if preoccupied, agitated or have existing health issues that could potentially pose a safety issue.
- 4.13.3 Do not operate a vehicle if under any form of impairment (i.e. fatigue, alcohol, drugs, etc.).
- 4.13.4 Remain engaged. Do not succumb to boredom, complacency, or allow the focus to drift from the driving task.
- 4.13.5 Remain focused on driving defensively and follow any given direction when passing an accident scene.
- 4.13.6 Avoid any activity that requires moving a hand from the steering wheel (e.g. changing radio stations, handing articles to passengers, etc.).
- 4.13.7 Do not engage in activities that may distract from the driving task (e.g. operating navigation systems, ridding the cab of an insect, etc.).
- 4.13.8 Do not engage in eating or drinking that may distract from the driving task.
- 4.13.9 The use of electronic devices that may distract the driver while driving is prohibited. This includes cell phones, two-way radios and other items whether hand-held or hands-free (a simple text message sent while travelling at highway speed results in an operator's eyes being off the road for the length of a football field).

5.0 Road Rage

- 5.1 Road rage is a dangerous driving situation that can occur and should be avoided whenever possible, but NEVER instigated. Do not get drawn into a confrontation. Avoid any confrontational eye contact or gestures.
- 5.2 The driver should be aware of the vehicles around them, paying frequent attention to the vehicle's mirrors.
- 5.3 Get out of the way if safely possible, even if the other motorist is speeding. The other driver may be dealing with an emergency situation.
- 5.4 Unless it is necessary to use the horn as an alert, do so sparingly.
- 5.5 If followed after an on-the-road encounter, drive to a public place or to the nearest police station and seek assistance.
- 5.6 Attempt to note the offender's license plate number and write it down as soon as it is safe to do so and the vehicle is not in motion.
- 5.7 Report any aggressive driving to the police immediately. This action may aid in preventing further occurrences by the same driver.

6.0 Winter Driving

- 6.1 Clear snow from exterior vehicle surfaces.
- 6.2 Do not cruise control on icy roads.
- 6.3 Accelerate and brake gently to reduce skids or spinouts.
- 6.4 Wear winter clothing that does not restrict movement, vision or hearing.
- 6.5 Where required, have snow chains for the vehicle and be familiar with their installation.
- 6.6 Use extra caution while driving during hazardous winter conditions.
- 6.7 Avoid sudden changes of speed or direction to reduce possibility of skidding.

- 6.8 Drivers should leave extra distance between their vehicle and the vehicle ahead of them. Stopping on ice takes approximately eight times the distance that it takes on dry pavement.
- 6.9 Carry suitable warm clothing and emergency equipment during the winter months. Temperatures can plunge rapidly.
- 6.10 Be aware of icy patches on the road bridges and intersections that are especially prone to icing.
- 6.11 Be familiar with the skid control procedures for the type of vehicle being driven (e.g., front, rear or four-wheel drive).

7.0 Gravel Roads and Remote Locations

- 7.1 Prior to driving on a road with an assigned radio frequency, the passenger will test the two-way radio to confirm that the proper radio frequency is set, and that the transmission is being received clearly by other traffic. The passenger will operate the two-way radio.
- 7.2 Drivers will maintain appropriate speed for the road conditions.
- 7.3 Headlights will be used when operating the vehicle.
- 7.4 Drivers will respect the understood road protocol, drive defensively and respect intersections.
- 7.5 4WD options will be utilized at the discretion and comfort level of the driver. If road conditions are questionable even for 4WD use, the road will not be traveled and either another route found or the job postponed until road conditions improve.

8.0 Off-road

- 8.1 If inexperienced, seek supervisory advice and training.
- 8.2 Vehicles should only be driven off roads after other available options (e.g., use of ATV's, etc.) have been considered.
- 8.3 Prior to driving off-road, check to see that the vehicle is in good operating condition and tires are properly inflated.
- 8.4 Realize the limitations of the vehicle and do not become over confident.
- 8.5 Seat belts should be kept fastened and loose objects in the vehicle securely fastened to prevent them from becoming projectiles in the event of a sudden stop.
- 8.6 Drive according to the ground conditions.
- 8.7 Speed and power are normally not required in rough off-road driving.
- 8.8 Learn to read the surrounding terrain. Monitor the ground conditions ahead of the vehicle -- it is essential to know what to expect in light of the road conditions.
- 8.9 When slowly traversing difficult areas of soft ground, try to keep the vehicle in motion.
 - 8.9.1 Once stopped it is far more difficult to get the vehicle going again.
 - 8.9.2 If the vehicle becomes stuck, do not spin the wheels, as they will only dig in further or deeper until the vehicle chassis rests on the ground.
 - 8.9.3 Try to slowly back the vehicle in its own tracks, as these have been previously compressed by the vehicle. In most cases this will be successful. If not, place appropriate material (e.g., wooden planks, mats, branches, etc.) under the wheel to improve traction.
- 8.10 Before driving over rough terrain, the terrain should be inspected on foot first.
- 8.11 When climbing hills in the vehicle travel straight up or down.
 - 8.11.1 Be aware of what is on the other side of the hill prior to climbing.

- 8.11.2 At the base of the hill the driver should apply more power. Ease up on the power while approaching the top and before going over the crest.
- 8.11.3 If the vehicle stalls on the ascent, back straight down the hill in reverse.
- 8.11.4 For downhill travel in a vehicle with manual transmission, always use the lowest appropriate gear, and do not disengage the clutch to allow the vehicle to coast. If the vehicle is equipped with an automatic transmission, use low range and the lowest drive setting.
- 8.11.5 DO NOT drive a hill at an angle this increases the risk for a roll-over incident.
- 8.11.6 DO NOT attempt to climb a very steep hill if there is doubt the vehicle can successfully climb the hill.
- 8.12 When driving through water, consider the maximum wading depth of the vehicle.
 - 8.12.1 The air intake must always be kept clear of water.
 - 8.12.2 Driving through water should always be done slowly to keep the bow wave low.
 - 8.12.3 In addition, slow speed prevents a hot engine from suffering tension cracks by sudden contact with cold water.
 - 8.12.4 Check the brakes after leaving the water.
- 8.13 Prior to returning to the road, do a vehicle inspection to confirm the vehicle is road worthy.

9.0 Towing

- 9.1 Conduct a pre-start inspection of the equipment to be towed.
- 9.2 Only hook-up equipment, using a signaler to do so, that has been verified as safe for transport.
- 9.3 Confirm the hitching equipment of the vehicle and that of the equipment to be towed are compatible.
- 9.4 Always inspect the hitch for defects and to confirm it is securely closed (e.g. safety pin in place, safety chains hooked up using the "crossed" or "cradle" method, locking devices on hooks).
- 9.5 Confirm light cord is plugged in and any emergency braking devices are hooked up. Verify all lights are in working order.
- 9.6 Conduct a brake test prior to travelling.
- 9.7 Confirm speed of travel does not exceed the manufacturer's specification for the equipment towed.
- 9.8 Maintain awareness of total dimensions of the vehicle plus the equipment towed. Adjust driving accordingly (i.e. widen turning radius, increase distance between vehicles).

Americas

Journey Management Plan

S3AM-005-FM1

Journey Management Plan – required for trips > 250 miles / 400 kilometers (one way)			
1. Driver and Passenger Information			
Driver Name:		Driver Training Completed:	
Passengers:			
2. Vehicle Information			
Vehicle Type/Description/Registration No.:			
3. Trip Information			
What is the purpose of the trip?		Estimated distance:	
Single Trip: <input type="checkbox"/> Reoccurring Trip: <input type="checkbox"/> / / to / /			
Have alternate modes of travel (telepresence, public transportation, air,) been evaluated? <input type="checkbox"/> Yes <input type="checkbox"/> No			
Has a Safe Work Plan or Task Hazard Assessment been completed and attached? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA			
Destination 1:			
Departure Date:	Time:	Arrival Date:	Time (ETA):
Destination 2:			
Departure Date:	Time:	Arrival Date:	Time (ETA):
Destination 3:			
Departure Date:	Time:	Arrival Date:	Time (ETA):
Destination 4:			
Departure Date:	Time:	Arrival Date:	Time (ETA):
4. Special Conditions / Hazards (Check all that may apply)			
<input type="checkbox"/> Night Driving <input type="checkbox"/> Weather <input type="checkbox"/> Long Driving / Fatigue (Over 2 hours) <input type="checkbox"/> Towing (e.g., trailer) <input type="checkbox"/> Potential for distraction <input type="checkbox"/> Other		<input type="checkbox"/> Rugged Terrain (4 x 4) <input type="checkbox"/> Large Vehicles <input type="checkbox"/> Animals <input type="checkbox"/> Rush Hour/Heavy Traffic <input type="checkbox"/> Road Conditions (e.g., construction, ice, snow) Describe	
Weather forecast:			
5. Contact Information			
Traveler No. 1 (Driver) - Name:		Phone No:	
Traveler No. 1 (Driver) - Personal Contact Name:		Phone No:	
Traveler No. 2 - Name:		Phone No:	
Traveler No. 2 - Personal Contact Name:		Phone No:	
Traveler No. 3 - Name:		Phone No:	
Traveler No. 3 - Personal Contact Name:		Phone No:	
Manager - Name:		Phone No:	
Check-In Contact - Name:		Phone No:	
Alternate Check-In Contact - Name:		Phone No:	
Destination Contact (if applicable) - Name:		Phone No:	
Other (description)	Name:	Phone No:	
Other (description)	Name:	Phone No:	

6. Route of Travel		
Route of travel (insert map or give detailed route directions):		
Is the return route of travel the same? <input type="checkbox"/> Yes <input type="checkbox"/> No		
7. Check-In Procedure		
<ul style="list-style-type: none"> • Check-In Interval - • Advise Manager and any other applicable personnel of travel plans and supply with a copy of this form (including attachments) • Confirm availability of Manager or Check-In Contact. Confirm check-in interval with Manager or Check-In Contact. • Discuss with contacts the possibility of travel within a cell phone "dead zone". • Advise Manager or Check-In Contact of departure. • Call Manager or Check-In Contact upon arrival at destination (e.g. worksite, office, home). • If multiple destinations, the process is repeated. 		
7.A Missed Check-In Procedure for Manager		
<ul style="list-style-type: none"> • Attempt to call traveler(s) using contact number(s) listed above. • Contact traveler's personal contact listed above. • If unsuccessful, discuss options with Manager, Check-In Contact (is anyone nearby who can be sent out along the route to destination, how much daylight remains, etc.?). • Call 911 or local police. 		
8. Emergency Planning		
AECOM Supervisor	Name:	Phone Number:
AECOM Manager	Name:	Phone Number:
Roadside Service:		
WorkCare: 1-877-878-9525		
9. Approvals: All Journey Management Plans shall be reviewed and acknowledged by the driver and the driver's manager / supervisor. Copies of the form shall remain with the driver and the manager / supervisor for the duration of the journey. (Electronic copies are acceptable).		
Driver's Signature:		
Manager or Supervisor	Name:	Signature:

Americas

Vehicle Inspection Checklist

S3AM-005-FM2

Vehicle Tag No:	Mileage:	Date:	Time:	Driver Name:	Location:		
Inspection Checklist: This Pre-Trip Vehicle Inspection Checklist is intended to be completed by the vehicle driver prior to departing on a trip. Checking boxes means that item is present and functioning. Deficiencies that affect or could potentially affect the safe operation of the vehicle shall be repaired or corrected prior to departure. This checklist should only be used in addition to an on-going vehicle maintenance program.							
Item					Yes	No	N/A
1. General							
1-1 Proof of insurance and registration available and current?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1-2 Is the date of the last regular maintenance known, or is the mileage/date of next scheduled maintenance known?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1-3 Is the overall condition of the vehicle good (no body damage, unusual sounds, leaks, odors, etc.)?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Tires							
2-1 Do all tires have sufficient tread for driving conditions? Legal limit: 2/32" (for rain/snow: > 4/32")					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2-2 Are tires sufficiently inflated for driving conditions?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2-3 Are the lug nuts and stem caps present and tight for each tire?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2-4 Is the spare tire and jack present and in good condition?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Vehicle Interior							
3-1 Are the brake and accelerator pedal pads in good condition?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3-2 Are the floor mats in good condition and not interfering with the brake or accelerator pedals?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3-3 Is the seat properly adjusted (including the headrest)?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3-4 Is the seatbelt in good condition?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3-5 Are the mirrors in good condition (not broken, dirty)?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3-6 Are the dashboard/instrument lights working?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3-7 Is the dashboard free of warning lights and do the gauges appear to work when the car is started?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3-8 Does the horn work?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3-9 Are distractions such as cell phones and GPS units secured so they do not encourage use?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Lights and Signals							
4-1 Do the headlights and high beams work?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4-2 Do the tail lights function properly?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4-3 Do the turn signals work (front and rear)?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4-4 Do the brake lights work (including high light in the rear window if applicable)?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4-5 Do the hazard lights (emergency flashers) work?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4-6 Do back up / reverse lights work?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4-7 If equipped with a back-up alarm can it be heard clearly?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Mechanical							
5-1 Do the brakes work and feel solid (not soft)?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5-2 Does the parking/emergency brake work?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5-3 Is the steering in good working condition (not loose)?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5-4 Is the engine oil level full or in the operating zone?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5-5 Excessive vehicle bounce going over bumps reported (possible sign of worn shock absorbers)?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5-4 Is the fuel level full or at an adequate level for the proposed usage?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Item	Yes	No	N/A
6. Windows and Windshield			
6-1 Is the windshield clean and unbroken?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6-2 Are the wiper blades in good condition (front and rear)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6-3 Are all the windows clean and unbroken and windshield fluid available and operational?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Emergency Equipment (as needed per conditions/project requirements)			
7-1 Is there a "Safety Kit" (fire extinguisher, first aid, safety triangle and 2 reflective vests)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7-2 Is there a first aid kit, has it been inspected recently?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7-3 Is survival gear and equipment available (blanket, water, heat source, flashlight, etc.)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7-4 Is a means for emergency communication available?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Other Equipment (as needed per conditions/project requirements)			
8-1 Is there a means to secured loads (cargo next, container)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8-2 Are cones or other warning devices available?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8-3 Is weather specific equipment (snow chains, tired etc.)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8-4 Does the vehicle have a snow brush/ice scraper?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8-5 Does the vehicle have a fire extinguisher?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Comments			
Inspector Name:	Signature:	Date:	

1.0 Purpose and Scope

- 1.1 AECOM is committed to providing a safe workplace for its employees, clients and others. In order to provide a safe work environment, employees must be fit for work, be able to perform their job duties in a safe, secure, productive, and effective manner, and remain able to do so throughout the entire time they are working.
- 1.2 Fit for duty means an individual is in a state (physical, mental, and emotional) that enables them to perform assignments competently and in a manner that does not threaten the health and safety of themselves or others.
- 1.3 Fitness for duty expectations can vary with specific job tasks, location and regulatory requirements. Fitness for duty may be affected by significant fatigue, stress, emotional issues, illness, injury, or the effects of drugs and alcohol. Employees who are not fit for duty may present a safety hazard to themselves, to other employees, to the Company, or to the public.
- 1.4 The decision to request a fitness for duty examination (and repeat examinations as necessary) can be made by Operations, Safety, Health and Environment (SH&E) and Human Resources (HR). The decision will be based on the need to protect the employee and co-workers when there is concern about an employee's ability to perform his or her job safely, based on the observations of a supervisor, manager, or medical personnel.
- 1.5 Should AECOM require a fitness for duty examination, it shall be performed at no expense to the employee and will be performed by an occupational specialist, physician or other medical specialist designated by the Company or Employee Assistance Program (EAP). Employees awaiting a fitness for duty examination may be temporarily relieved of any work duties or may have their work duties modified.
- 1.6 The purpose of this policy is to establish consistent procedures by which AECOM will evaluate an employee's fitness for duty when an employee is:
 - 1.6.1 Having observable difficulty performing work duties in a manner that is safe for the employee, for the employee's co-workers, for the Company, or for the public, as determined by the supervisor;
 - 1.6.2 Posing an imminent and serious safety threat to self or others; or
 - 1.6.3 Involved in the event of a workplace incident or accident.

2.0 Terms and Definitions

- 2.1 None

3.0 References

- 3.1 None

4.0 Procedure

- 4.1 It is the responsibility of all employees to:
 - 4.1.1 Maintain a safe workplace;
 - 4.1.2 Manage their health in a manner that allows them to safely perform their job responsibilities;
 - 4.1.3 Arrive to work fit for duty and capable to perform their job responsibilities in a safe, secure, productive, and effective manner during the entire time they are working and refraining from behavior which could impair safety in the workplace;

- 4.1.4 Notify their supervisor or HR when they are not fit for duty and to declare any medication side effects and/or situations/concerns which may have an impact on their ability to perform work; and
- 4.1.5 Notify a supervisor when they observe a co-worker acting in a manner that indicates the co-worker may be unfit for duty. If the supervisor's behavior is the focus of concern, an employee may inform a senior manager and a HR representative.
- 4.2 The Company will not tolerate retaliation against any employee for filing a complaint or concern or for participating in any way in an investigation. It is the responsibility of AECOM management and supervisors to:
 - 4.2.1 Communicate to all employees the content of this procedure and other applicable safety policies and procedures
 - 4.2.2 Observe (and record when necessary) the attendance, performance, and behavior of the employees they supervise;
 - 4.2.3 Fairly and consistently follow this procedure when presented with circumstances or knowledge that indicate that an employee may be unfit for duty by contacting SH&E and HR as appropriate;
 - 4.2.4 Consider an employee's personal assessment of their own fitness for duty; and
 - 4.2.5 Keep any information of medical conditions or records strictly confidential at all times.
- 4.3 HR and SH&E will assist in the administration of this program, ensuring that the requirements of the procedure are implemented by all responsible departments.
- 4.4 The supervisor who believes they have received reliable information that an employee may be unfit for duty, or through personal observation believes an employee may be unfit for duty, will validate and document the information or observations as soon as is practical and contact SH&E and HR immediately. While there is a great variety and range of acceptable behavior among employees, dramatic or sudden changes in any particular employee's customary behavior may be a cause for concern. Atypical behavior that may trigger the need to evaluate an employee's fitness for duty include, but is not limited to, problems with dexterity, coordination, concentration, memory, alertness, vision, speech, inappropriate interactions with co-workers or supervisors, inappropriate reactions to criticism, or suicidal or threatening statements. Though the mere presence of any one factor or sign of behavior may not be sufficient to require an evaluation, it should not be ignored and may lead to the ordering of an evaluation.
- 4.5 The supervisor will present the information or observations to the employee at the earliest possible time in order to validate them and will allow the employee to explain his or her actions, or to correct any mistakes of fact contained in the description of those actions. An employee is not required to disclose a disability to a supervisor; however, a supervisor may inquire regarding the conduct, behavior or circumstances that give rise to his or her concerns. The supervisor will then determine whether the employee should leave the workplace immediately for safety reasons. Where possible, discussion and meetings with any employee should occur with SH&E and/or HR staff present.
- 4.6 Depending on the severity of the situation or event and the type of behavior, possible actions may include the following:
 - Documenting and noting the event or behaviour.
 - Encouraging the employee to use the EAP (if applicable) or to seek medical treatment.
 - Placing the employee on a paid leave of absence (Paid Time Off (PTO)) or paid administrative leave, depending on the situation).
 - Arranging for the employee's safe transportation home.
 - Making a management referral to the EAP or other local assistance agencies.
 - Taking disciplinary action, if appropriate.
 - Calling 911 or local emergency authorities.

- 4.7 If there is a basis for thinking that a crime may have been committed and/or the employee is making threats to harm himself or herself or others, or is acting in a manner that is immediately dangerous to himself or herself or others, contact 911 or local emergency authorities directly. HR and the EAP should be consulted regarding the fitness for duty procedure after the immediate safety issue has been addressed.
- 4.8 In all other circumstances, the supervisor shall take appropriate action, including contacting HR. If it is not immediately practicable to contact HR, managers have the authority and ability to contact the EAP when they receive reports and validate or personally observe an employee's unfit behavior. Depending on circumstances, such as when an employee's conduct immediately or directly threatens safety, a supervisor may immediately relieve the employee of duty pending further evaluation.
- 4.9 The Company will rely on the EAP or occupational specialist, physician or other medical specialist (which may include a registered psychologist or psychiatrist) to assist with the evaluation process. Each case will be evaluated on a case-by-case basis. In all instances, it is imperative that the EAP or medical professional be provided complete and accurate information on the employee's job duties, responsibilities and expectations in order to make a fully informed decision.
- 4.10 The employee must comply and cooperate with all aspects of the fitness for duty and evaluation procedures, including furnishing necessary consent and release forms to the health service provider. Noncompliance (including delayed compliance) may be grounds for disciplinary action up to and including termination. Information will be requested from the health service provider regarding work restrictions and/or accommodations that may be required upon the employee's return to work.
- 4.11 If it is determined that a fitness for duty evaluation is necessary, the employee will be asked to leave the workplace until the evaluation is completed. A recommendation is provided by the occupational specialist, physician or other medical specialist to HR. When it is determined that the employee can return to work safely, a HR manager will contact that employee with the date and conditions of their return to work. If there are conditions that the employee will need to comply with in order to ensure continued safe working habits, they will be required to sign an acknowledgement that they will comply with those conditions.
- 4.12 This procedure is not intended as a substitute for other Company policies or procedures related to performance nor is intended as a substitute for discipline. Situations involving violations of Company policies or practices may result in disciplinary action being taken.

5.0 Records

- 5.1 None

6.0 Attachments

- 6.1 None

Fatigue Management

S3AM-009-PR1

1.0 Purpose and Scope

- 1.1 The purpose of this procedure is to reduce the potential for employee fatigue by providing criteria for recognition, treatment, and management.
- 1.2 This procedure applies to AECOM Americas employees of operations where fatigue can be a factor impacting an employee's fitness for duty. Fatigue is mental or physical exhaustion that stops a person from being able to function normally.
- Fatigue is mainly caused by a lack of sleep, but may also be associated with prolonged periods of physical and/or mental exertion without sufficient time to recover.
 - Fatigue can be caused by work-related stresses, non-work-related stresses, or a combination of both. Work-related stress may be due to items such as pace of work schedule, location of work, environmental conditions of the work area (e.g., noise, lighting, tasks), and degree and duration of concentration required to perform a task.
 - Non-work-related fatigue is influenced by personal lifestyle, health issues, and family and relationship responsibilities.
 - Long-distance travel causes fatigue primarily by disruption of natural biological rhythms through both external factors and internal factors.
 - Acute Mountain Sickness (AMS) is a group of symptoms including fatigue that jeopardizes the well-being and the work capacity of people who are not acclimated when exposing themselves to altitudes above 3,000 meters. It appears in the first hours after exposure, declining after 1 or 2 days because of acclimatization. Its prevalence is directly related to high-altitude work, ascent speed, and personal susceptibility.

2.0 Terms and Definitions

- 2.1 None

3.0 References

- 3.1 None

4.0 Procedure

- 4.1 Implementation of this procedure is the responsibility of the manager directing activities of the facility, site, or project location.
- 4.2 Fatigue, and the level to which it impacts an employee, is associated with a number of factors including:
- 4.2.1 The quantity and quality of rest obtained before and after a working day.
 - 4.2.2 The time of day in which work takes place.
 - 4.2.3 The length of time spent at work and on work-related activities (including travel time to and from work).
 - 4.2.4 The type and duration of a work task and the environment in which it is performed.
 - 4.2.5 The physical and mental demands of work.
 - 4.2.6 Activities outside the workplace, such as sports, family commitments, or second jobs.
 - 4.2.7 Disruption of normal circadian rhythms (human clock, bio-rhythms).

4.2.8 Individual factors, including existing medical conditions, illnesses, or sleep disorders.

4.2.9 Extreme alcohol intake or sleep deprivation.

4.2.10 Travel requirements, including daily commute distances and long- distance air travel.

4.3 Fatigue Recognition

4.3.1 Employees are expected to carry out their work activities in a manner that does not risk the health and safety of themselves, their fellow employees, or any other personnel on the site (e.g., contractors, clients, the public, etc.). If an employee feels that they are unable to perform their work activities safely due to the effects of fatigue, they are required to stop work immediately and notify their supervisor. If this occurs while an employee is driving a vehicle, the employee is required to stop driving and find a suitable location to rest.

4.3.2 Similarly, if an employee suspects a co-worker (including contractors or clients working with the employee) of suffering from the effects of fatigue, they are required to intervene on behalf of the affected person, stopping work and notifying their supervisor.

4.3.3 Characteristics that may assist in the identification of fatigue may include, but are not limited to:

- Physical Symptoms
 - Bloodshot eyes
 - Poor coordination
 - Slower movements
 - Slower-than-normal response time (e.g., response to commands or radio signals)
- Cognitive Function Symptoms
 - Distraction from task
 - Poor concentration or lapses in concentration
 - Inability to complete tasks
 - Short-term memory loss
 - Nodding off momentarily
 - Fixed gaze
 - Reports of blurred vision
- Emotional/Behavioral Symptoms
 - Appears depressed
 - Does not care about work
 - Easily frustrated with task/irritability
 - Increased or noticeable level of unexplained or unusual absenteeism

4.4 Fatigue Treatment

4.4.1 Where fatigue has been identified, employees are suggested to take action to treat the underlying causes of the fatigue. Suggestions include:

- Getting adequate, undisturbed, regular and consistent amounts of sleep each night. A minimum of 7 hours is recommended.
- Eating well-balanced and nutritious meals at regular intervals.
- Ensuring adequate consumption of water throughout the day.
- Exercising or stretching regularly.

- Maintaining a reasonable work and personal schedule.
- Avoiding alcohol, smoking, and drugs. Note that stimulants, including caffeine, may provide temporary relief from certain types of fatigue, but can increase the problem when the effect wears off.
- Changing stressful circumstances through vacation or personal leave.

4.5 Fatigue Management – Managers and Supervisors

- 4.5.1 Identify factors in the work place that may contribute to fatigue. Inform employees of potential fatigue-producing activities and how to manage them. Re-evaluate work tasks periodically to control fatigue.
- 4.5.2 Monitor employees for the signs and symptoms of fatigue.
- 4.5.3 Provide employees with sufficient breaks for food, water, and rest throughout the work day. Calling for unscheduled breaks/meals where fatigue factors are evident may be necessary.
- 4.5.4 Consult with employees regarding fatigue factors when extended work periods or shift work is anticipated.
 - When possible and apart from shift work, minimize early morning starts before 6:00 AM local time, because early start times give employees less time to get adequate sleep.
 - When possible and apart from shift work, minimize late-evening work after 9:00 PM local time (except where shift work is required), because employee alertness tends to decline after this time.
 - Limit extended work days to a maximum of 14 hours, and extended work weeks to 60 hours. Where this is not feasible, develop project-specific fatigue management guidelines for inclusion in site-specific SH&E plans.
 - For emergency work, a single shift should be limited to 16 hours, and an employee should be off work for at least 12 hours before the next shift start.
 - Project-specific extended work schedules shall be reviewed and approved prior to implementation.
 - Shift lengths longer than 12 hours should have two or more long breaks (at least 20 minutes) to allow time for meals.
 - If shift work is required, employees should be given sufficient time to get a continuous 7- to 8-hour period of sleep in each 24 hours, and at least 50 hours every 7 days.
 - At the end of extended night shifts, there should be a minimum of 36 hours or two sleep periods prior to transition to day shift.
- 4.5.5 Project industrial hygienists must consider extended work shifts in personal monitoring, and permissible exposure limits for acute chemical hazard exposures.
- 4.5.6 Review safety observations, near misses, injuries, and incidents that have occurred which may have resulted due to fatigue. Use the findings of these documents to revise project-specific fatigue management procedures, as necessary.
- 4.5.7 Supply adequate supervision for jobs that are physically or mentally demanding, repetitive, or require a high level of vigilance.
- 4.5.8 Develop job rotation and cross-training strategies for repetitive or monotonous work.
- 4.5.9 Consider providing ergonomic equipment such as anti-fatigue mats in areas of prolonged standing and lift assist devices for repetitive lifting tasks.

- 4.5.10 Remove obviously fatigued workers from activities where there is a risk to safety and health. These employees may be rotated to a task that creates a much lower immediate risk, or advised to go home. Where driving presents a further fatigue risk, provide transportation to ensure the employee reaches their destination safely.
 - 4.5.11 Encourage employees to take adequate time away from work through vacations and personal leave. There should be at least one personal weekend in every 4 weeks of work.
 - 4.5.12 Train employees on how to recognize fatigue, control fatigue through appropriate work and personal habits, and reporting of fatigue to a supervisor.
 - 4.5.13 Where fatigue issues recur with an employee, consider referring the employee to the Employee Assistance Program (EAP) for help in the self-management of fatigue or other issues that may have a bearing on fatigue at work. Review working arrangements to assist employees in managing non-work-related fatigue causes.
 - 4.5.14 Provide training to all employees as required by project-specific conditions or client-specific requirements.
- 4.6 Fatigue Management – Employees
- 4.6.1 Employees are responsible for managing personal fatigue in the work place. This may include the following:
 - 4.6.2 Report to work well-rested and mentally alert. Manage non-work-related choices that enable fitness for duty, including getting sufficient rest and sleep to recover from prior work duties, and managing personal, commuting, medical, and health issues.
 - 4.6.3 Seek medical advice for any personal conditions affecting sleep, such as apnea or insomnia.
 - 4.6.4 Advise your physician of any changes in your regular work schedule if you are taking daily prescriptions. Many medications exhibit important differences in the time course and effects depending on when the medication is administered.
 - 4.6.5 Notify your manager or supervisor when you are feeling fatigued.
 - 4.6.6 Take adequate rest and meal breaks for the working conditions.
 - 4.6.7 Do not operate machinery or perform high-risk activities for at least 24 hours if you travel over 6 or more time zones or if you are required to work at elevations above 3,000 meters without adequate acclimatization.
 - 4.6.8 Inform managers or supervisors when you suspect a co-worker of being fatigued or if you feel fatigued to a point of increased risk of an incident or error.
 - 4.6.9 Consider seeking assistance from the Employee Assistance Program (EAP) for help in the self-management of fatigue or other issues that may have a bearing on fatigue at work.

5.0 Records

- 5.1 The following documentation will be maintained in the project file:
 - 5.1.1 Safety observations, near misses, injuries, and incidents that have occurred as a possible result of fatigue.
 - 5.1.2 Records of site-specific training in fatigue identification and management issues.

6.0 Attachments

- 6.1 None

Emergency Response Planning

S3AM-010-PR1

1.0 Purpose and Scope

- 1.1 Providing the requirements for preparation and planning for potential emergencies that may occur while AECOM staff are working.
- 1.2 Applies to all AECOM Americas-based staff working inside and outside an AECOM office, including location and project environments.
- 1.3 The intent of this plan is to:
 - Enable prompt, informed emergency responses.
 - Promote the safety of workers, visitors, and those responding to an emergency.
 - Reduce the potential for destruction of goods and other property.
 - Reduce the magnitude of environmental and other impacts.
 - Help those responding to an emergency quickly determine and initiate proper remedial actions.
 - Reduce recovery times and costs.
 - Provide confidence to workers, visitors, and those responding to an emergency that emergencies will be properly managed.
- 1.4 This procedure represents AECOM's minimum requirements and should be augmented by more stringent local regulatory requirements and/or client requirements.
- 1.5 Location Specific Emergency Response Plans are to be included in the respective Office Safety, Health and Environment Plan (refer to *Global Office Safety, Health & Environment Plan*) or the location specific SH&E Plan (refer to *S3AM-209-PR1 Risk Assessment & Management*).
- 1.6 Emergency Response is an initial response which may require additional actions as detailed in *RS2-003-PR1 Disruptive Event Response Standard*.

2.0 Terms and Definitions

- 2.1 **Emergency** – An unplanned situation or event (including natural disasters) resulting in involvement of the public emergency services, police, fire, paramedic, or the environmental regulatory authorities.
- 2.2 **Emergency Response Coordinator** – An individual in a worksite or project environment designated to lead and direct the immediate emergency response.
- 2.3 **Local Resilience Coordinator (LRC)** – A manager designated as the Office or Worksite lead for local level organizational resilience who may or may not be the emergency response coordinator. The LRC is the point of contact with the Region Resilience Team in determining further action, including notifications, following an initial emergency response. Refer to *RS2-003-PR1 Disruptive Event Response Standard*.
- 2.4 **First Aid Provider** – Is a First Aid, CPR, and AED trained, volunteer, AECOM employee who provides emergency first aid or treatment (including performing CPR and applying an AED) to someone who is injured or suddenly ill, before emergency medical services (EMS) arrives. This is a voluntary action and not an occupational duty assigned by AECOM. They may use a limited amount of equipment to perform initial assessment and provide immediate life support and care while awaiting arrival of emergency medical services. Refer to *S3AM-012-PR1 First Aid*.
- 2.5 **Floor Marshall** – An individual in the office environment designated to lead and direct the immediate emergency response.

- 2.6 **Floor Warden** – An individual in the office environment, as required by building design and employee numbers, designated to assist the Floor Marshall in directing the immediate emergency response.

3.0 References

- 3.1 GRG-001-RP4 Operational Security Plan
- 3.2 RS2-003-PR1 Disruptive Event Response Standard
- 3.3 S3AM-209-FM1 Office Safety, Health & Environment Plan Template
- 3.4 S3AM-004-PR1 Incident Reporting, Notifications & Investigation
- 3.5 S3AM-011-PR1 Fire Protection
- 3.6 S3AM-012-PR1 First Aid
- 3.7 S3AM-111-PR1 Bloodborne Pathogens
- 3.8 S3AM-209-PR1 Risk Assessment & Management

4.0 Procedure

4.1 Roles and Responsibilities

4.1.1 Managers

- Develop and implement Location Specific Emergency Response Plans and security standards for the applicable office, location and/or project personnel.
- Confirm Location Specific Emergency Response Plans and security standards are included in the respective Office Safety, Health & Environment Plan or location specific SH&E Plan.
- Confirm appropriate training of employees as determined by the potential emergency situations, regulatory requirements and, if applicable, client requirements.
- Confirm the emergency response plan is communicated to all affected personnel.
- Confirm that necessary training and resources appropriate to the potential emergencies is provided to AECOM employees.
- Confirm that necessary and appropriate emergency response equipment is readily available.
- Confirm that emergency drills are completed annually or more frequently as appropriate to the risk of the potential emergency or as required by legislation. Confirm the effectiveness of the procedure and, as needed, take corrective action. The *S3AM-010-FM1 Emergency Response Drill Report* or equivalent shall be used to confirm the completion and effectiveness of the drill.

4.1.2 Safety, Health & Environment (SH&E) Manager

- Assist in the development and implementation of emergency response plans and security standards for the applicable office, location and/or project personnel.
- Review and, as necessary, implement emergency response plans and security standards.

4.1.3 Supervisors

- Review and, as necessary, implement emergency response plans and security standards.
- Confirm employees have completed any required training associated with the identified potential emergencies.
- As applicable, confirm that employees have access to communication devices that are in good working order. Maintain current rosters of employees under their supervision.

4.1.4 Employees

- Participate in any required training and drill exercises.
- Report any potential or actual threatening situations to the Manager, Supervisor and/or Emergency Response Lead.
- As applicable, oriented to the potential risk of violence and instructed how to identify and respond to violent situations.
- Report an injury or adverse symptom as a result of an incident of violence and when appropriate consult a physician for treatment or referral
- Review and, as necessary, implement emergency response plans and security standards.

4.2 Emergency Response Plan (ERP)

- 4.2.1 An assessment shall be completed by the Manager of each location to determine the potential emergency situations and the adequate number of First Aid Providers, first aid supplies and medical requirements, including determining the response time and availability of Emergency Medical Services (EMS). Refer to *S3AM-012-PR1 First Aid*.
- 4.2.2 Managers will establish and implement the location specific ERP using *S3AM-010-FM2 Location Specific Emergency Response Plan Template* or *S3AM-010-FM2-A Short Visit Emergency Response Plan Template*. The ERP shall be communicated to all affected employees.
- 4.2.3 The location specific ERP will include:
 - The location of the muster point, first aid, fire extinguishers, fire exits, AED, and other emergency equipment.
 - Defined roles and responsibilities in the event of an emergency.
 - A contact list that includes, as applicable, fire, police, ambulance, poison control, First Aid Providers on location, fire wardens on location, Site Safety Officer, security, SH&E committee, SH&E Reporting number for reporting all AECOM incidents, and other required emergency contacts.
 - Procedures appropriate to the potential emergency situations.
 - As applicable, maps to appropriate services, such as hospital or medical clinic.
 - *S3AM-010-FM2 Location Specific Emergency Response Plan Template* or *S3AM-010-FM2-A Short Visit Emergency Response Plan Template* shall be completed according to the office or worksite's needs.
- 4.2.4 The location specific Emergency Response Plan (ERP) will comply with all governing regulations.
- 4.2.5 The location specific ERP shall be included in the location specific Office Safety, Health & Environment Plan (refer to *Global Office Safety, Health & Environment Plan*) or the location specific SH&E Plan (refer to *S3AM-209-PR1 Risk Assessment & Management*).
- 4.2.6 If the hazard assessment for the location indicates a need for planned evacuation or rescue, appropriate written procedures will be developed and implemented.
 - Depending upon the various contributing factors to the potential emergencies, the procedures may require coordination with a third party rescue provider, or preparations for mass evacuation away from a site.
 - If applicable, procedures should be developed to assist any personnel with disabilities in the event of an evacuation.
- 4.2.7 The location specific emergency plan will be readily available to personnel.
 - Worksites shall post the ERP at all worksite entrances and/or develop alternate methods to confirm ERP accessibility, such as placing the ERP at muster points, on appropriate vehicle dashboards, driver door pockets, glove boxes, muster points, etc.

- In offices and shop locations the plan will be posted at all entrances and other suitable locations throughout the workplace, such as the SH&E noticeboard or first aid room.
- 4.2.8 Appropriate methods to account for AECOM employees and visitors shall be established.
- Visitor registers, tailgate/toolbox sign-in sheets and/or staff listings shall be available in the event of evacuation.
 - Employees leaving location should alert appropriate personnel (supervisor, reception, or other responsible party) prior to departure, as applicable, provide expected time of return and alert the appropriate personnel upon return.
- 4.2.9 Staff will be trained for involvement in an emergency evacuation or rescue; however, all evacuations may require special preparation and arrangements with third party rescue providers in the following circumstances:
- work at high angles,
 - work in confined spaces or where there is a risk of entrapment,
 - work with hazardous substances,
 - underground work,
 - work on or over water,
 - work in remote isolation, and
 - workplaces where there are persons who require physical assistance to be moved.
- 4.2.10 The ERP will address a clear path of travel to and from a working area, as applicable:
- The access will be made obvious and most direct with adequate illumination.
 - The access will remain clear and unobstructed at all times.
 - No material or equipment may be stored or temporarily left in path of egress.
 - A traffic barrier will be used for facilitating vehicle and pedestrian traffic.
 - Parking areas shall not restrict access by emergency personnel and vehicles.
 - The access route will have a clear line of vision into oncoming traffic lanes.
- 4.2.11 All staff will be advised of the location of first aid services, equipment, and supplies.
- 4.2.12 The ERP shall be tested for deficiencies through emergency response drills annually or more frequently as required by legislation. Emergency drills such as man-down, hurricane/tornado drill, security, first aid are recommended to be conducted and lessons learned documented quarterly.
- 4.2.13 The ERP shall be reviewed annually or more frequently as required by legislation.
- 4.3 First Aid
- 4.3.1 Refer to *S3AM-012-PR1 First Aid* and *S3AM-111-PR1 Bloodborne Pathogens* for additional information.
- 4.4 Other Emergency Response Equipment
- 4.4.1 Portable fire extinguishers shall be provided of appropriate class, size, and quantity in accordance with local legislation and *S3AM-011-PR1 Fire Protection*.
- 4.4.2 Provide eye wash stations (where appropriate to hazards).
- 4.4.3 Maintain an ERP and emergency kit appropriate to the hazards associated with the location (e.g., earthquakes, tornadoes, hurricanes, etc.).

4.5 Communications

- 4.5.1 Supervisors are responsible for confirming that crews have access to communication devices that are in good working order, have reception in the area in which the crews will be working, and meet the needs of the planned check-in and emergency response procedures. This may include:
- 2-way radios,
 - Cellular phones (or combination cell phone/2-way radio),
 - Satellite phones,
 - Car phones, or
 - Personal Locator Beacons.
- 4.5.2 The Manager will be responsible for confirming that crews have the appropriate means of communication before leaving for the worksite. The type of communication device will depend on the location and circumstances of the job task.
- 4.5.3 All staff is responsible for maintaining the communication devices in good working order before leaving for the field and for ensuring that battery-operated electronic devices have been recharged or have fresh batteries.
- 4.5.4 All staff is responsible for keeping communication devices clean and dry to facilitate their effective operation.

4.6 Visitors

- 4.6.1 All visitors to the location shall receive a safety orientation that includes ERP information.
- Visitors to worksite shall review the location specific SH&E Plan or Task Hazard Analysis (THA) and attend/review and sign the applicable tailgate/toolbox meeting.
 - Visitors to offices and shop locations shall sign a Sign In/Out register as this record will be used to check and make sure all visitors are accounted for in the event of an emergency (e.g. evacuation to muster point). Refer to *S3AM-010-FM5 Office / Shop Visitor Register*.
- 4.6.2 In the event of an evacuation, visitors working directly with an AECOM host will be escorted by their host to the muster point.
- 4.6.3 For in-house meetings, safety orientations will be delivered before the meeting begins so all visitors are aware of the evacuation routes and procedures

4.7 Emergency Response

- 4.7.1 Employees responding to emergency situations should take no unnecessary risk. In the case of an emergency, the First Aid Provider will promptly provide injured workers with a level of care within the scope of the attendant's training, objectively record observed or reported signs and symptoms of injuries and exposures to contaminants, secure medical treatment for workers with injuries considered by the first aid attendant as being serious or beyond the scope of the attendant's training.
- 4.7.2 All incidents will be reported in accordance with *S3AM-004-PR1 Incident Reporting, Notifications & Investigation*.
- 4.7.3 If emergency action is required to correct a condition that constitutes an immediate threat to workers, only those qualified and properly instructed workers necessary to correct the unsafe condition may be exposed to the hazard and every possible effort will be made to control the hazard while this is being done.
- 4.7.4 In the event of an evacuation, all employees and visitors will gather together at the muster point for a roll call. Upon evacuation or dismissal, no unauthorized or nonessential personnel are allowed access to the facility or project area during an emergency.
- 4.7.5 All accident and emergency sites will be immediately secured to prevent unauthorized access or the possibility of further risk to workers, property, or the public at large.

- 4.7.6 All emergencies will be managed by the AECOM emergency management personnel identified in the ERP. This may include security personnel.
 - The Local Resilience Coordinator (LRC) shall be the key point of contact with the Region Resilience Team in order to obtain further direction following an initial emergency response.
 - Additional response via Resilience Teams shall be in alignment with *RS2-003-PR1 Disruptive Event Response Standard*.
- 4.7.7 During an emergency, AECOM Employees shall take direction from AECOM members of the emergency team, (e.g. emergency coordinator, floor wardens, etc.) and outside professional responders, as appropriate, who are in control of the situation.
- 4.7.8 Employees should render assistance in the safest possible manner, using appropriate personal protective equipment and precautions.
- 4.7.9 Other actions that may be necessary shall be included as applicable in the location's specific ERP. These include, but are not limited to:
 - Notification of local authorities.
 - Contact with appropriate AECOM security personnel for assistance.
 - Notification of client representatives and any security group having authority on the worksite.
- 4.8 Post-Emergency Follow Up
 - 4.8.1 If Regional, Geography or Enterprise Resilience Teams were convened, follow up response will be at the Team's direction.
 - 4.8.2 Prior to resuming operations, the work area will be inspected to confirm that conditions are under control and no longer pose a hazard to employees. In the case of a fire or bomb threat, this inspection is to be done by the ranking public emergency responder. Management approval to return shall then be obtained in order to return to work.
 - 4.8.3 The Emergency Response Procedure Action Checklist shall be completed (Contained in *S3AM-010-FM2 Location Specific Emergency Response Plan Template* and *S3AM-010-FM2-A Short Visit Emergency Response Plan Template*).
- 4.9 Security
 - 4.9.1 Conduct an evaluation of the worksite or location, local conditions, and contract stipulations to determine a need for:
 - Access Control
 - Vehicle Registration
 - Identification badges for employees and visitors
 - Fencing
 - Security Guards
 - Outside Lighting
 - Secure Storage Areas
 - Alarm Systems
 - 4.9.2 *S3AM-010-FM3 Site Security Checklist* may be used to evaluate a location's need for specific security and to subsequently develop appropriate measures. This form may also be used at intervals for a given location to evaluate the need for any change to the security measures in place.
 - 4.9.3 Where physical security of a location is required, management, with the assistance of SH&E personnel, will be responsible for organizing and supervising security guards. A local bonded security force may be used for this purpose. As an alternative, an in-house security organization may be established.

- 4.9.4 On many projects, identification badges or numbers are provided for employees. It may be necessary to provide a qualified security officer or team to provide the following services:
 - Orientation to the location for new hires and visitors.
 - Substance abuse testing for new hires.
 - Issuance of badges for new hires and visitors.
 - Briefing and debriefing for visitors.
 - Monitoring of location activities to prevent theft, espionage, and malicious damage.
- 4.9.5 When a security program is established, the location specific ERP, including the procedures, and fire prevention and protection programs, shall be planned and coordinated with the program's security force.
- 4.9.6 On many projects involving military installations, nuclear work, and defense contracts, it may be necessary to provide a qualified security officer or team to monitor activities to prevent espionage, theft, malicious damage, and any compromise of classified information.
- 4.9.7 Contact the Human Resources Department for assistance if personnel security clearances are required.
- 4.10 Violence
 - 4.10.1 Violence in the workplace training will be conducted where there is an elevated exposure to violence or, if required by regulation. Refer to *S3AM-003-PR1 SH&E Training*.
 - 4.10.2 A risk assessment, refer to *S3AM-010-FM3 Potential Violence Assessment Form*, will be performed in any workplace in which there exists a risk of injury to workers from violence arising out of their employment or where required by regulation.
 - 4.10.3 The risk assessment will include the consideration of:
 - Previous experience in that workplace,
 - Occupational experience in similar workplaces, and
 - The location and circumstances in which the work will take place.
 - 4.10.4 If an assessment identifies a risk of injury to workers from violence, the employer will establish procedures and work environment arrangements to eliminate or minimize the risk to workers from violence.
 - 4.10.5 Controls will be implemented and communicated to employees to address the violence hazard. Control may include, but is not limited to, working in pairs, being assisted by police or other authority, having a clear emergency response procedure, and having access to a communication device.
 - 4.10.6 Risk Assessment/Potential Violence Inspection Forms conducted for violence will be distributed to Managers and the applicable health and safety committees.
 - 4.10.7 Workplace violence may include:
 - Threatening behavior such as shaking fists, destroying property, or throwing objects.
 - Verbal or written threats—any expression of intent to inflict harm.
 - Harassment—any behavior that demeans, embarrasses, humiliates, annoys, alarms, or verbally abuses a person and that is known to be or would be expected to be unwelcome. This includes words, gestures, intimidation, bullying, or other inappropriate activities.
 - Verbal abuse—swearing, insulting, or condescending language.
 - Physical attacks—hitting, shoving, pushing, or kicking.
 - 4.10.8 The risk of violence may increase during certain times of day and location. Be sure to plan ahead and take into account time of day, what tasks will be conducted, location(s), method of travel, and who might be accompanying.

4.10.9 Be prepared. Always carry electronic communications, such as mobile phones with emergency services numbers in speed dial list. If 911 is the emergency number, confirm that both mobile signal coverage and the 911 service work from the work location(s).

4.10.10 Public Meetings or Presentations:

- Facilitate and/or provide proper instruction to project employees on this procedure and how to identify and avoid potentially violent situations in public meetings or presentations.
- Identify community and emergency contacts.
- Determine whether a community leader should accompany employees to the public meeting or presentation.
- Ask a community leader or local police if there are any homes/areas to be avoided.
- Work with community leaders to make community residents aware of the work being undertaken. If in doubt, err on the side of caution. Do not expose employees to potentially violent situations.
- Send out advance notice to area residents about the nature and purpose of the visit.

4.11 Public Visitations

4.11.1 Before entering any home or sampling site, employees shall assess the risk of violence and confirm safety of and proper protection of themselves and co-workers. If there is any doubt about individual or group safety, do not enter the premises/area.

- Where possible, work with someone from the community who is known by and knows the residents.
- Have easily visible identification available.
- Be sensitive to cultural, social, and economic differences.
- Attempt to learn about potential problems before entering the area.
- Employees may not enter premises posted with Beware of Animal signs unless the owner has confirmed employees will be safe.

4.11.2 Employees shall report all acts of violence to their Supervisor, SH&E Manager or Human Resources Manager.

4.11.3 All acts of violence will be reported by the employee to their Supervisor or Region Human Resources Manager.

- Report any physical contact or any violent threats to the local authorities immediately, and summon help.
- Any reported incidents of violence will be held in confidence and will be handled with integrity and discretion. All incidents will be handled in accordance with *S3AM-004-PR1 Incident Reporting, Notifications & Investigation* procedure. Any injuries or results of exposure to violence will be handled in accordance with AECOM policies and procedures.

5.0 Records

5.1 The Location Specific ERP will be filed in the project file.

5.2 ERPs shall be part of site SH&E audits.

5.3 Emergency Response Drill Reports, Security Checklists and Potential Violence Assessment Forms shall be maintained in the location or project safety files.

6.0 Attachments

6.1 S3AM-010-ATT1 Pandemic Planning

6.2 [S3AM-010-FM1](#) [Emergency Response Drill Report](#)

- 6.3 [S3AM-010-FM2](#) [Location Specific Emergency Response Plan Template](#)
- 6.4 S3AM-010-FM2-A Short Visit Emergency Response Plan Template
- 6.5 [S3AM-010-FM3](#) [Site Security Checklist](#)
- 6.6 [S3AM-010-FM4](#) [Potential Violence Assessment Form](#)
- 6.7 [S3AM-010-FM5](#) [Office / Shop Visitor Register](#)

Pandemic Planning

S3AM-010-ATT1

1.0 Purpose and Scope

- 1.1 Providing the requirements for preparation and planning for potential pandemic emergencies that may occur while AECOM staff are working.
- 1.2 Applies to all AECOM Americas-based staff working inside and outside an AECOM office, including location and project environments.
- 1.3 Please add any additional content as necessary.

2.0 Terms and Definitions

- 2.1 **Local Resilience Coordinator (LRC)** – A manager designated as the Office or Worksite lead for local level organizational resilience who may or may not be the emergency response coordinator. The LRC is the point of contact with the Region Resilience Team in determining further action, including notifications, following an initial emergency response. Refer to *RS2-003-PR1 Disruptive Event Response Standard*.
- 2.2 **Pandemic** – An epidemic occurring worldwide, or over a very wide area, crossing international boundaries and usually affecting a large number of people.
- 2.3 **Resilience Team (RT)** – Interdependent networks of necessary and essential business functions collaborating at the enterprise, region and/or local levels to achieve organizational resiliency. Functions include but are not limited to communications, facilities, finance, human resources (HR), information technology, legal, procurement, safety, health, and environment, and security. Refer to *RS2-003-PR1 Disruptive Event Response Standard*.

3.0 Background

- 3.1 Pandemic
 - 3.1.1 A pandemic virus emerges because of a process called antigenic shift, which causes an abrupt or sudden and major change in influenza viruses. Public health officials closely monitor the movement of influenza through avian and swine populations. The public health fear is that the virus may obtain the ability to shift and incorporate the ability to infect humans directly through human-to-human contact. At that point, the threat of a regional epidemic, or a global pandemic may be realized.
 - 3.1.2 Influenza can weaken the immune system, making the person more vulnerable to serious infections such as pneumonia, or can worsen chronic medical conditions. Public health officials watch both avian and swine flu outbreaks closely to monitor potential for an antigen shift and progression to a human transmissible disease.
 - 3.1.3 Government health agencies continually monitor influenza and other diseases worldwide. Human cases are reported and updated by the World Health Organization (WHO) and U.S. Centers for Disease Control (CDC). This information is used by responsible government agencies for planning and response actions as required to minimize the spread and effects of disease outbreaks. It is important that information provided by CDC or WHO is made available to employees when there is potential for impact on work conditions or local community health.
- 3.2 Swine Influenza
 - 3.2.1 Influenza A (H1N1) is a flu virus of swine origin that first caused illness in March and April, 2009. Influenza A (H1N1) flu spreads in the same way that regular seasonal influenza viruses spread, mainly through the coughs and sneezes of people who are sick with the virus, but it may also be spread by touching infected objects and then touching your nose or mouth. Influenza A (H1N1) is now established in human populations as a seasonal influenza virus.

3.3 Avian Influenza

- 3.3.1 Avian influenza (bird flu) occurs mainly in wild birds, but can spread to domestic birds and can cause outbreaks. Human cases are rare, but have occurred from direct close contact with infected birds and poultry or contaminated materials.

4.0 Procedure

4.1 Influenza Contingency Planning

4.1.1 Roles & Responsibilities of Governing Agencies

- Global Health Monitoring: The WHO coordinates health issues for the United Nations and provides leadership on global health matters. The WHO assists member nations with recommendations regarding global pandemics and declares global pandemic phases to help organizations to plan for the impacts. The major phases are:
 - Phase 1: No viruses circulating among animals have been reported to cause infections in humans.
 - Phase 2: An animal influenza virus circulating among domesticated or wild animals is known to have caused infection in humans, and is therefore considered a potential pandemic threat.
 - Phase 3: An animal or human-animal influenza reassortant virus has caused sporadic cases or small clusters of disease in people, but has not resulted in human-to-human transmission sufficient to sustain community-level outbreaks. Limited human-to-human transmission may occur under some circumstances, for example, when there is close contact between an infected person and an unprotected caregiver.
 - Phase 4: There is verified human-to-human transmission of an animal or human-animal influenza reassortant virus able to cause “community-level outbreaks.” The ability to cause sustained disease outbreaks in a community marks a significant upwards shift in the risk for a pandemic. Any country that suspects or has verified such an event should urgently consult with WHO so that the situation can be jointly assessed and a decision made by the affected country if implementation of a rapid pandemic containment operation is warranted. Phase 4 indicates a significant increase in risk of a pandemic but does not necessarily mean that a pandemic is a forgone conclusion.
 - Phase 5: There is human-to-human spread of the virus into at least two countries in one WHO region. While most countries will not be affected at this stage, the declaration of Phase 5 is a strong signal that a pandemic is imminent and that the time to finalize the organization, communication, and implementation of the planned mitigation measures is short.
 - Phase 6: The pandemic phase is characterized by community level outbreaks in at least one other country in a different WHO region in addition to the criteria defined in Phase 5. Designation of this phase will indicate that a global pandemic is under way.
 - Post-peak period: During the post-peak period, pandemic disease levels in most countries with adequate surveillance will have dropped below peak observed levels. The post-peak period signifies that pandemic activity appears to be decreasing; however, it is uncertain if additional waves will occur and countries will need to be prepared for a second wave.
 - Post-pandemic period: Influenza disease activity will have returned to levels normally seen for seasonal influenza. At this stage, it is important to maintain surveillance and update pandemic preparedness and response plans accordingly. An intensive phase of recovery and evaluation may be required.
- Country Specific Pandemic Plans: Most nations have developed pandemic plans that include monitoring the regional spread of disease, the recommended medical practices, and related

guidance. AECOM operations outside the US must keep abreast of country specific requirements and recommendations.

- United States: The federal government is responsible for coordinating a nationwide influenza pandemic response.
 - The U.S. Department of Homeland Security coordinates all non-medical support and response actions.
 - The Department of Health and Human Services (HHS) coordinates overall public health and medical emergency response. Under Executive Order 13295 (revised April 1, 2005), the Secretary of Health and Human Services has the authority for apprehension, detention and conditional release of individuals to prevent the spread of an influenza caused by a novel or re-emergent influenza virus that causes or has the potential to cause a pandemic. Under HHS, the CDC is responsible for controlling the introduction and spread of infectious diseases and provides information to help health care providers, public health officials and the public. CDC's Division of the Strategic National Stockpile (SNS) distributes antiviral drugs, personal protective equipment, and respiratory protection devices to all 50 states and U.S. territories to help them respond to outbreaks.
 - Under the Department of Defense (DOD) Directive 6200.3, military facilities require identification of a Public Health Emergency Officer who coordinates Military Treatment Facilities emergency response plans with local emergency planning.
- State and Local Governments: Each state has authority to manage and respond to pandemic conditions. It is important that projects and offices contact their local and state governments for emergency contact information.

4.1.2 Corporate Roles and Responsibilities

AECOM offices will be prepared to respond to either a global, national or regional pandemic condition in accordance with the Global Resilience *RS2-003-PR1 Disruptive Event Response Standard*. The standard provides the common platform to organize mission-critical, Resilience Teams (RT) to prepare for, actively navigate and / or recover from significant business disruptions. It also provides the context for plans and procedures to minimize any impact on AECOM's business in terms of severity and duration.

- Prevention and Containment
 - If a pandemic condition exists or is imminent within a local office or field location, consult the location specific Emergency Response Plan (ERP) for immediate response guidelines.
 - Upon notification from State Emergency Planning agency that a national or regional pandemic condition exists or is reasonably expected to occur, the SH&E Department will provide sufficient and accessible infection control supplies in all local affected business locations (recommendation from CDC Checklist). This may include hygienic wipes/disinfectants for office keyboards, phones and other common contact equipment (accelerated hydrogen peroxide (Oxivir), 70% ethanol alcohol, 5% Lysol or 10% bleach), disposable tissues at strategic locations, and fully lined waste disposal containers. Supervisors will actively encourage employees to use these items, as well as already available hand washing stations.
 - Face masks may be supplied, if recommended by CDC. Supplies of anti-viral medications will not be stockpiled, distributed, or administered unless specified by community health administrators.
 - Annual influenza vaccinations are encouraged.
 - As applicable, communications through email or intranet, training programs, or work place postings may be utilized to provide information concerning prevention and containment. Information may include, but is not limited to:
 - Initial symptoms of the disease, disease prevention techniques, how to respond if an individual suspects infection and when return to work is appropriate after the illness.

- Personal practices and habits for minimizing exposure, such as: frequent hand washing, avoiding exposing other employees when sick, annual flu vaccinations if appropriate, and consulting a personal physician to determine personal risk.
 - Social distancing techniques such as minimizing large group gatherings, reducing employee face-to-face meetings through the use of video / phone conferencing, and eliminating unnecessary travel during severe outbreaks.
 - Flexible worksite and flexible work hours options as applicable.
- Employees shall notify their supervisor if they are going to miss work because of illness. Information concerning sick leave and health benefits can be obtained through the employee's HR representative and by visiting AECOM Ecosystem.
- As applicable, business and meeting travel may be limited to "business essential" only.
- Management will notify any applicable clients or suppliers of potential business impacts that may be experienced as a result of a pandemic. Management will update clients/suppliers once operations are restored to full capacity.
- Anti-viral Medication
 - Media coverage of influenza outbreaks has focused on the availability of oral anti-viral medications (not vaccines). These prescription medications are approved by the FDA for treating uncomplicated influenza virus effects in limited applications. There are potential side effects of the drugs, and some viruses have shown resistance to the drug.
 - Based on this information, AECOM will not attempt to stockpile sources of anti-viral drugs to be used for employees in the event of a pandemic. Resources of these drugs are being maintained as part of the Strategic National Stockpile under direction of the U.S. Department of Health and Human Services.
 - Employees at foreign locations should consult with local government resources regarding policies for distribution of anti-viral drugs during a pandemic. All employees on foreign assignment should be current on required vaccinations.
 - Employees should contact their personal health care provider regarding recommendations for support medications that may be necessary in the event of a flu pandemic.

4.1.3 General AECOM Employee Influenza Guidelines

- Employee Illness
 - Report the illness to WorkCare and your Supervisor.
 - Employees who are ill with flu-like symptoms should stay home. If they have a fever, they should stay home until at least 24 hours after they are free of fever without the use of fever reducing medications.
 - Employees should not travel if they are ill.
 - Employees who become sick during work hours should immediately go home.
 - Employees at higher risk of complications, or who become seriously ill, should contact their health care provider immediately.
- Employee Family Member Illness
 - Employees who are well but who have a family member at home with the flu may choose to stay home, or can go to work as usual. Employees with ill family members should monitor their health daily before coming to work and stay home if they become ill.
 - Employees who choose to stay home to care for ill family members should contact their supervisor or HR representative to discuss flu-related issues such as using sick time/paid time off or if telecommuting is an option.
 - Employees should not bring an ill family member with them to the office, even for brief periods.
- Supervisors
 - If an employee calls in sick because of the flu or a flu-like illness, advise them to stay home. Expect employees to be out of work for 3-5 days (in most cases).
 - Report the employee illness to your HR or SH&E representative.

- Determine if the employee was contagious while at work (24 hours prior to symptoms) in order to evaluate if co-workers may have been exposed. Report the potential exposure of co-workers to your HR or SH&E representative.
- Important Reminder: The names of employees who are ill with the flu are CONFIDENTIAL and can only be discussed with HR representatives or company nurses.
- Do not allow employees with the flu or flu-like symptoms to remain at work. In-office quarantine (isolation) of an employee with flu-like symptoms (e.g., work in a secluded office area) is not permitted.
- HR or SH&E Representatives
 - Track cases of flu illness at your location. These numbers may require reporting to your Local Resilience Coordinator (LRC) to allow Resilience Teams (RT) to assess appropriate responses in accordance with the Global Resilience *RS2-003-PR1 Disruptive Event Response Standard*. Each state/country has specific reporting contacts.
 - Inform fellow employees if a co-worker possibly exposed them to a flu-like illness, while maintaining strict confidentiality regarding the identity of the co-worker, so that employees can self-monitor for symptoms and stay home if they become sick. Provide up-to-date CDC information regarding the applicable virus.
 - A doctor's note to validate illness and return to work (following an extended absence) may not be available because of a busy health care system. Requiring a physician's release to return to work should be considered in cases of hospitalization or medical leave of absence.
 - Address staff rumors immediately through investigation and follow-up.
- HR Representative
 - Advise employees and supervisors regarding sick time or paid time off options.
 - Discuss with supervisors if telecommuting is an option for the employee.
- Managers/SH&E Representative
 - Provide information to staff regarding good hygiene, including cough and sneeze etiquette and proper hand washing. Hold periodic meetings to discuss prevention.
 - Remind employees to check with their health care provider to determine if flu inoculations are recommended.
 - Provide tissues, disinfectant wipes, hand sanitizers and no-touch receptacles for disposal.
 - Arrange for commonly touched surfaces such as doorknobs and countertops to be cleaned frequently. Instruct office cleaning staff about different approaches or areas of emphasis.

4.2 Travel Worldwide to Areas Affected by a Pandemic

- 4.2.1 AECOM's Global Resilience Group (GRG) shall be consulted to obtain advice, approvals or restrictions, and support, for employees traveling worldwide to and returning from areas affected by a pandemic or potential pandemic. Additional information is available on the CDC and WHO web sites and this information is updated as cases and conditions are confirmed.
- 4.2.2 Persons visiting areas with reports of outbreaks of concern can reduce their risk of infection by observing the following measures:
- Before traveling to an affected area:
 - Educate yourself and others who may be traveling with you through consultation with AECOM's GRG and through resources such as the CDC and WHO.
 - Confirm applicable and routine vaccinations are current. See your doctor or health-care provider, or (for employees) contact WorkCare directly, ideally 4-6 weeks before travel, to get any additional vaccination medications or information you may need. In many cases, a medical examination may be required prior to travel.
 - Assemble a travel health kit containing basic first aid and medical supplies. Be sure to include a thermometer and alcohol-based hand gel or wipes for hand hygiene. See the Travel Health Kit page on the CDC web site.
 - Identify in-country health-care resources in advance of your trip. Employees may contact HR or WorkCare for assistance in identifying available resources.

- During travel to an affected area:
 - As with other infectious illnesses, one of the most important preventive practices is careful and frequent hand washing. Cleaning your hands often with soap and water removes potentially infectious material from your skin and helps prevent disease transmission. Waterless alcohol-based hand gels or wipes may be used when soap is not available and hands are not visibly soiled. Anti-bacterial products are not recommended by the U.S. Food and Drug Administration.
 - If you become sick with symptoms such as a fever accompanied by cough and sore throat, or difficulty breathing or if you develop any illness that requires prompt medical attention, a U.S. consular officer can assist you in locating medical services and informing your family or friends. You should defer any further travel until you are free of symptoms, unless traveling locally for medical care or instructed to evacuate by your project management, Security, or upon advice of WorkCare. AECOM employees on foreign travel should notify their HR representative of any serious illness. Local employees should contact their supervisor according to their specified call in policy.
 - In the event of a flu outbreak, avoid all direct contact with birds or swine and avoid farms and markets. There is the possibility that other animal groups may become reservoirs of the infection in the future so current information from WHO should be checked for updated guidance
- After your return:
 - Monitor your health for 10 days after return for any fever or breathing difficulties.
 - If you become ill with a fever plus a cough and sore throat, or trouble breathing during this 10-day period, consult WorkCare. Communicate the following: 1) your symptoms, 2) where you traveled, and 3) if you have had direct contact with animals, birds, or severely ill persons.
 - Do not travel while ill, unless you are seeking medical care. Limiting contact with others as much as possible can help prevent the spread of an infectious illness.

Americas

Emergency Response Drill Report

S3AM-010-FM1

Administrative Information					
Office / Location:			Type of drill (fire, earthquake, etc.):		
Date of drill:		Time of drill:		Drill report prepared by:	
Drill conducted by:			Are any environmental permits required? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Anticipated start date:		End date:		Describe:	
Drill Coordination					
Fire hall / dept. notified (name/phone #):			Client / Building supervisor notified (name/phone #):		
Date:		Time:		Contacted by:	
Drill Results					
Names of participants:					
Total # of participants:			Time taken to complete the drill:		
Notes					
Comments/concerns:					
Summarize the findings below upon completion of the drill.					
Summary and Recommendations					
Section/ Item No.	Acts / Conditions Requiring Attention	Corrective Action(s)	Priority (L/M/H)*	Action By	Completed (date)
<p>* Prioritize the concern or condition identified using a hazard classification of either Low (not an immediate SH&E hazard), Medium (must be addressed in the short term), or High (requires immediate attention).</p>					
Acknowledgement –Manager					
Print Name		Signature		Date	

Americas

Location Specific Emergency Response Plan Template

S3AM-010-FM2

Upon opening click on **Enable Editing**, then click on **Enable Content** to allow for filling of the template.

This template is to be used by all Americas offices and worksite locations to develop location specific Emergency Response Plans (ERP).

Emergency Response is an initial response which may require additional actions as detailed in *RS2-003 PR1 Disruptive Event Response Standard*.

All direction shown in fillable fields in this template will not show upon printing, to allow this document to accept handwritten content and to prevent unnecessary printed content when fields are not utilized.

The *Location Specific Emergency Response Plan Template* includes basic Emergency Response Procedures that are applicable to every office and worksite. Additional location specific Emergency Response Procedures are available as 'Quick Parts' following the basic procedures, and shall be selected and inserted as they relate to the potential emergencies the location could encounter. Each procedure maintains additional lines to communicate any additional or different location specific procedural steps.

Utilize map pages as they relate to the specific location. Unnecessary map pages may be deleted.

This page is not required to be included in the completed template.

Location Specific Emergency Response Plan

- All pages of this plan are living documents, to be updated, and signed off as circumstances change and/or reviewed monthly.
- When required to operate under a client's Emergency Response Plan, this plan will be used in conjunction with the client plan. This is to ensure emergency response and notification processes meet the requirements of both the client and AECOM.
- All pages are to be printed off and placed at every building exit and/or designated location(s) on site. They are to be taken by the Floor Marshall/Warden, Emergency Response Coordinator or designate when exiting the building or site so phone numbers, maps and procedures are at hand.

This plan is effective as of

39T

and supersedes all other plans relevant to this location in circulation.

Any questions related to this Emergency Response Plan should be directed to:

Name: 39T

Phone:

The **Local Resilience Coordinator (LRC)**
identified in the following contact list must be informed of
any executed emergency response
as soon as possible.

Location Specific Emergency Response Plan

DOCUMENT REVIEW & APPROVAL SIGN-OFF SHEET					YEAR: <input type="text"/>
REVIEW DATE	Revision Required?	REVIEWED BY		APPROVED BY	
JAN _____	<input type="checkbox"/> Yes <input type="checkbox"/> No		initial		initial
Comments					
FEB _____	<input type="checkbox"/> Yes <input type="checkbox"/> No		initial		initial
Comments					
MAR _____	<input type="checkbox"/> Yes <input type="checkbox"/> No		initial		Initial
Comments					
APR _____	<input type="checkbox"/> Yes <input type="checkbox"/> No		initial		Initial
Comments					
MAY _____	<input type="checkbox"/> Yes <input type="checkbox"/> No		initial		Initial
Comments					
JUN _____	<input type="checkbox"/> Yes <input type="checkbox"/> No		initial		Initial
Comments					
JUL _____	<input type="checkbox"/> Yes <input type="checkbox"/> No		initial		initial
Comments					
AUG _____	<input type="checkbox"/> Yes <input type="checkbox"/> No		initial		initial
Comments					
SEP _____	<input type="checkbox"/> Yes <input type="checkbox"/> No		initial		initial
Comments					
OCT _____	<input type="checkbox"/> Yes <input type="checkbox"/> No		initial		initial
Comments					
NOV _____	<input type="checkbox"/> Yes <input type="checkbox"/> No		initial		initial
Comments					
DEC _____	<input type="checkbox"/> Yes <input type="checkbox"/> No		initial		initial
Comments					

ERP PHONE LIST		
39T		
Emergency dial 911 (if office dial 9-911)		
Ambulance		
Air Medi-Vac		
Fire 39T		
Hospital 39T		
Police 39T		
Local Resilience Coordinator (LRC)		
39T		
39T		
39T		
39T		
24hr Incident Reporting Line		

ADDITIONAL PHONE NUMBERS	
Electrical Power –	
Natural Gas –	
Telephone Communications –	
Environment –	
Buried Utility Locations –	
Dangerous Goods / Disaster Services –	
Forest Fire –	
Occupational Health & Safety Regulatory Body –	
Human Resources Representative -	
Poison Control Centre	
EMPLOYEE ASSISTANCE PROGRAM (EAP) –	
Alcohol and Drug Testing –	
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EMERGENCY RESPONSE

Firefighting, medical treatment, rescue, or other emergency response activities should only be performed by properly equipped and trained emergency responders. AECOM recognizes that some of its personnel may have received training in first aid, cardiopulmonary resuscitation (CPR) and AED use, and may choose to perform these duties on injured personnel.

Method(s) of Alarm:

39T

Identification Apparel of Floor Marshall/Warden, Emergency Response Coordinator or Designate:

39T

Evacuation

1. If a situation requires an evacuation or emergency muster/assembly, the pre-determined alarm will be initiated.
2. All personnel (i.e. workers, contractors, visitors) of the area requiring evacuation or muster/assembly will immediately assemble at the designated Muster Point, Assembly Point or Shelter-in-Place as determined by the alarm or communication.
3. The Floor Marshall/Warden, Emergency Response Coordinator or designate will take action to account for all personnel, including visitors (i.e. head count, roll call).
4. The Floor Marshall/Warden, Emergency Response Coordinator or designate shall ensure the appropriate emergency response is activated.
5. Should it be determined that an individual is still within the hazard zone, establish whether a rescue can be safely attempted. Follow the 'Emergency Rescue Procedure' if properly trained and a rescue attempt will not put another individual in jeopardy.
6. Personnel shall await further instruction from the Floor Marshall/Warden, Emergency Response Coordinator or designate (i.e. all clear and re-entry or further evacuation).

Site Specific Additions

7. 39T

8. 39T

9. 39T

Medical Emergency

1. Stop the work activity.
2. Assess the cause of the injury to avoid injury to yourself (i.e. live wires, gases, hazardous materials).
3. Do not move the casualty unless they remain in danger.
4. First Aid Provider will designate an individual to call for medical assistance (i.e. 911, ambulance, site medic).
5. First Aid Provider will designate an individual to retrieve the first aid kit and blankets.
6. Request assistance from other First Aid Providers as necessary. Administer first aid:
 - a. Assess responsiveness: ask permission.
 - b. Send for medical help.
 - c. Place casualty face up.
 - d. Check Airway, Breathing and Circulation ABC's
 - e. Control severe bleeding.
7. If CPR is deemed necessary:
 - a. Begin chest compressions at a rate of at least 100 compressions per minute.
 - b. CPR shall be continued until:
 - i. until an AED is applied,
 - ii. casualty begins to respond,

- iii. another first aider takes over,
 - iv. medical help takes over, or
 - v. physically unable to continue.
- 8. If the casualty begins to breathe on their own, place them in the recovery position, monitor and treat for shock as appropriate.
- 9. Individual in communication with the designated medical assistance shall attempt to answer any questions, stay on the line until information is verified and follow instruction.
- 10. Arrange for medical transport as needed. A designated individual should be positioned to direct medical transport to the casualty.
- 11. Personnel shall await further instruction from the Floor Marshall/Warden, Emergency Response Coordinator or designate (i.e. resume activity).

Site Specific Additions

12. 39T

13. 39T

14. 39T

Fire

- 1. Alert others in the area of the fire.
- 2. Sound the alarm or ensure applicable notification system is initiated.
- 3. All personnel will vacate the building or site and proceed to the Muster Point. DO NOT use elevators.
- 4. If smoke and heat are strong stay low and close to the floor.
- 5. Floor Marshall/Warden, Emergency Response Coordinator or designate will proceed through their assigned areas ensuring all personnel have exited.
- 6. If the fire can be contained, extinguish the fire with the correct type of extinguisher. Remember PASS:
 - a. **P** – pull the pin.
 - b. **A** – aim the hose at the base of the fire.
 - c. **S** – squeeze the handle.
 - d. **S** – sweep from side to side until the fire is out or the extinguisher is empty
- 7. If the fire cannot be contained or there is any concern of an extinguished fire reigniting, call the local fire department, call **911** or notify site fire responders. Give directions to the location; stay on the line until information is verified.
- 8. The Floor Marshall/Warden, Emergency Response Coordinator or designate will take action to account for all personnel, including visitors (i.e. head count, roll call).
- 9. A designated individual should be positioned to direct the fire truck to the fire location.
- 10. Personnel shall await further instruction from the Floor Marshall/Warden, Emergency Response Coordinator or designate (i.e. all clear and re-entry or further evacuation).

Site Specific Additions

11. 39T

12. 39T

13. 39T

Spill / Leak / Release of Hazardous Materials (HAZMAT)

- 1. Identify the product and assess the risk of injury, fire or explosion.
- 2. If there is insufficient information on the product or inadequate PPE, move upwind if possible and leave the area immediately (initiate personnel evacuation if required).
- 3. Isolate the area and deny access to any unauthorized personnel.
- 4. Only if safe to do so, take measures to stop and control the spill / leak / release
- 5. Eliminate all ignition sources, if required (no smoking, flares, sparks / flames, engines running).
- 6. Designate an individual to notify the Floor Marshall/Warden, Emergency Response Coordinator or designate, or Foreman and SH&E representative.
- 7. Consult the product SDS for accidental release / handling procedures.
- 8. If it is not possible to stop / control the release, call 911 or appropriate emergency services.

9. Tend to any injured personnel (follow Medical Emergency steps).
10. Personnel shall await further instruction from the Floor Marshall/Warden, Emergency Response Coordinator or designate (i.e. further evacuation or resume activity).

Site Specific Additions

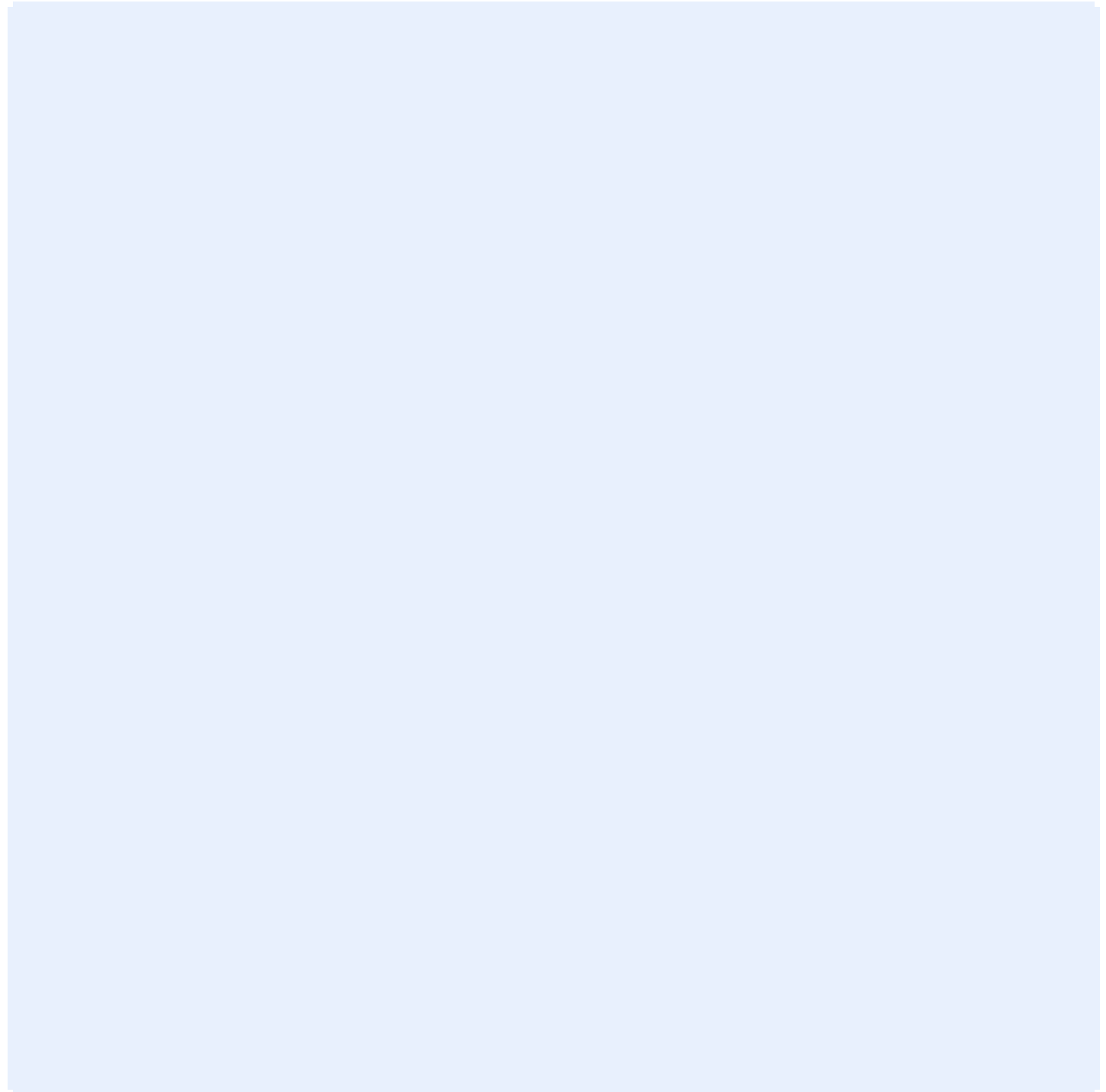
11. 39T

12. 39T

13. 39T

Insert Map(s) – Location

(include muster points, evacuation routes)



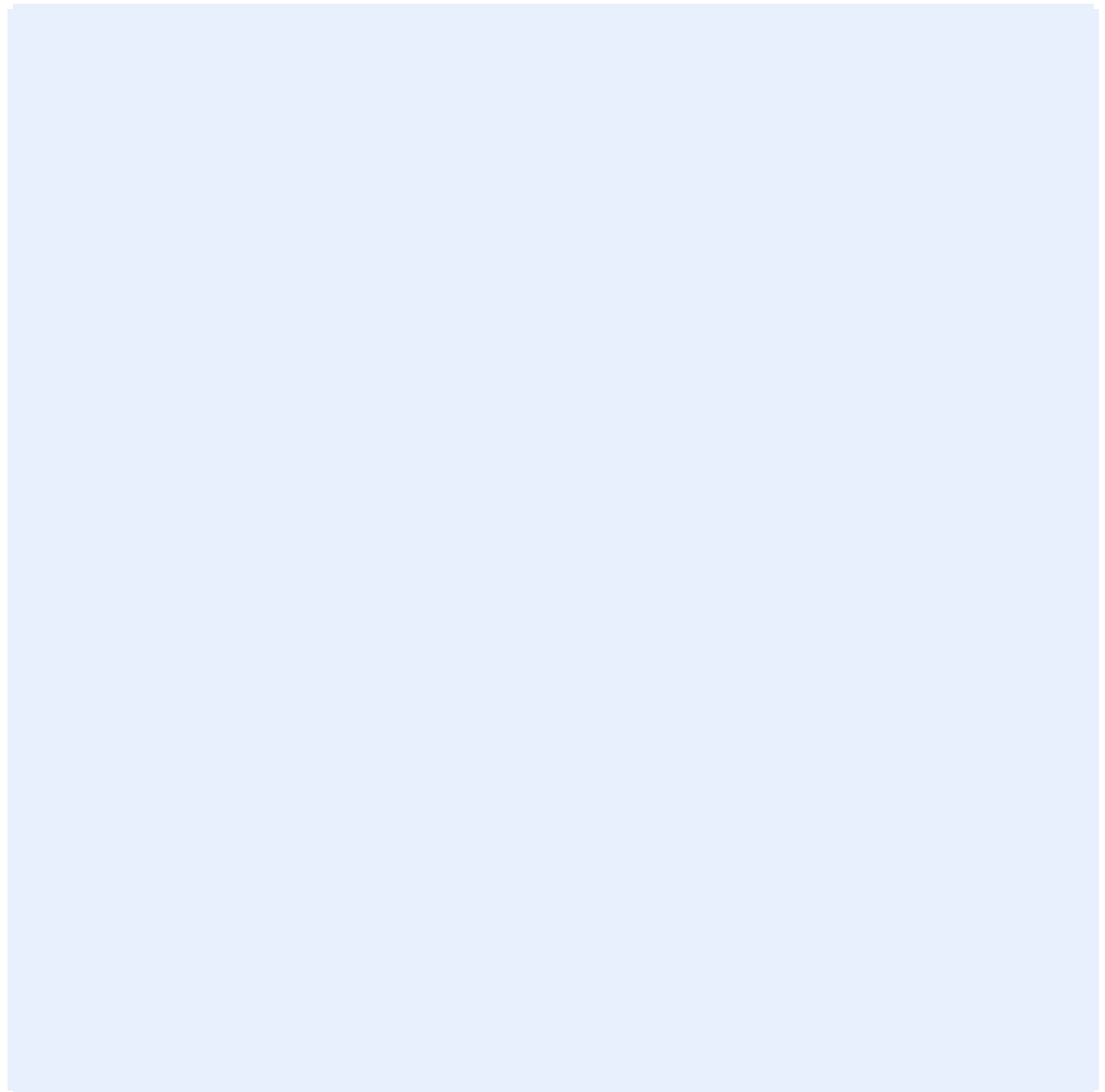
Insert Map - Directions to Location



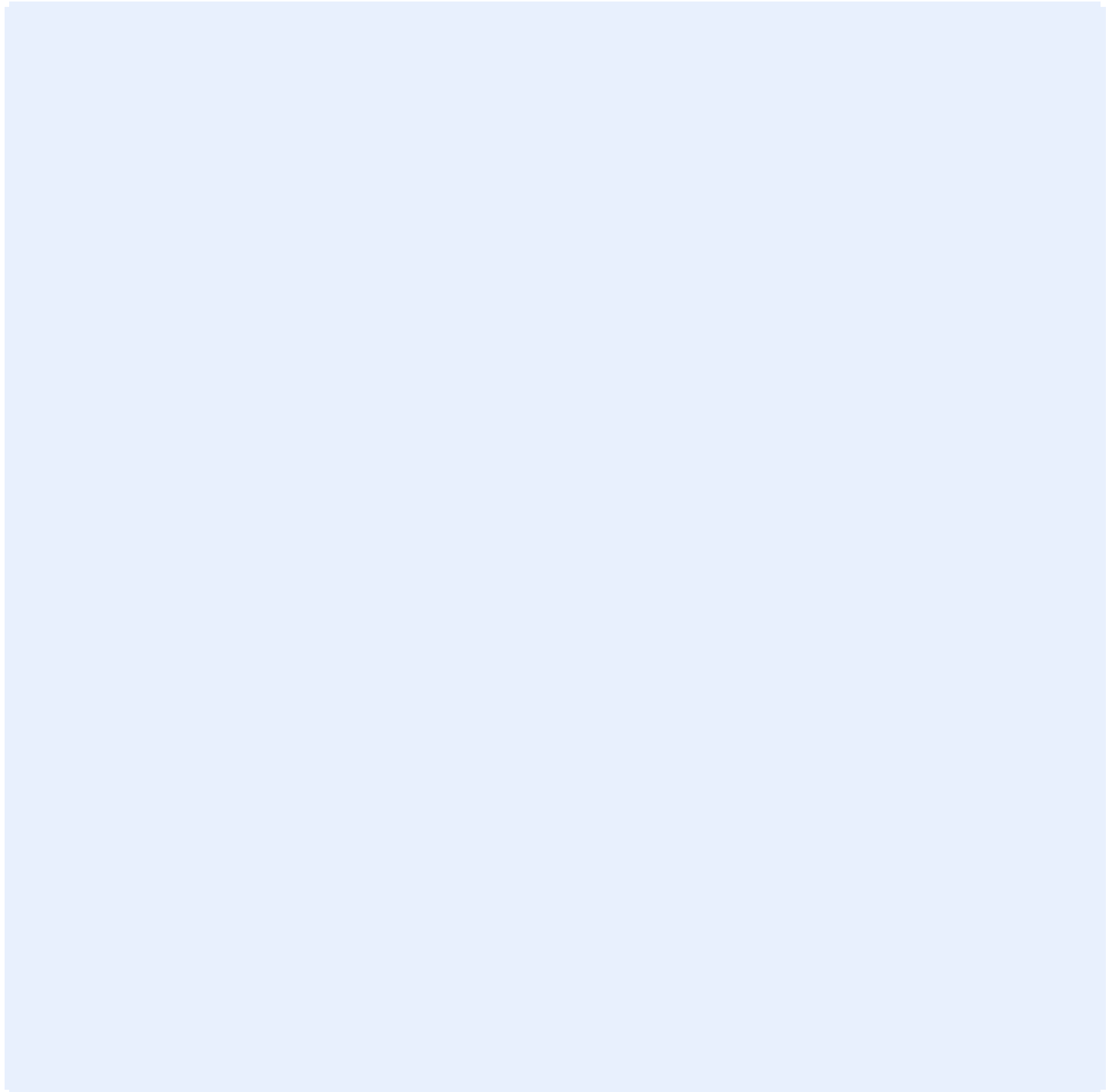
Additional Map(s)



Insert Directions to Medical Facility



Insert Floorplan (Include locations of: exits, fire extinguishers, first aid kits, AEDs, etc. and as applicable, floor warden zones)



Emergency Response Procedure Action Checklist

DATE: _____

Procedure(s) Followed

Evacuation	<input type="checkbox"/>	Gas Leak	<input type="checkbox"/>
Medical Emergency	<input type="checkbox"/>	Hurricane	<input type="checkbox"/>
Fire	<input type="checkbox"/>	Internal Violence or Intruder	<input type="checkbox"/>
Spill, Leak, Release of Hazardous Material	<input type="checkbox"/>	Lightning	<input type="checkbox"/>
AED Use	<input type="checkbox"/>	Pandemic Management	<input type="checkbox"/>
Bear Charges and Attacks	<input type="checkbox"/>	Power Outage	<input type="checkbox"/>
Civil Disturbance	<input type="checkbox"/>	Severe Winter Storm	<input type="checkbox"/>
Earthquake	<input type="checkbox"/>	Threats of Violence / Bomb Threats	<input type="checkbox"/>
Electrical Live Line Contact	<input type="checkbox"/>	Tornado	<input type="checkbox"/>
Elevator Emergency	<input type="checkbox"/>	Utility Shut-Off Before or During an Emergency	<input type="checkbox"/>
Emergency Rescue	<input type="checkbox"/>	Vehicle Incident	<input type="checkbox"/>
Explosion	<input type="checkbox"/>	Wildfire	<input type="checkbox"/>
Floods/Heavy Rain	<input type="checkbox"/>	Other Procedure: _____	<input type="checkbox"/>

Communication

	Yes	No	N/A		Yes	No	N/A
Alarm initiated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Local law enforcement agency (police) contacted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Floor Marshall/Warden or Emergency Response Coordinator contacted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Client contacted Name: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Internal emergency responders contacted (i.e. First aid Provider, onsite medic, rescue crew)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Regulatory Body contacted Name: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
External emergency services (i.e. fire department, ambulance) contacted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Local Resilience Coordinator (LRC) contacted Name: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Supervisor / Foreman contacted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	24 Hour Incident Reporting Line called	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Concurrent operations contacted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Others contacted _____			

Only take measures that will not put another's safety in jeopardy

Response

	Yes	No	N/A		Yes	No	N/A
Emergency assessed for appropriate response	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Appropriate emergency equipment accessed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Evacuation conducted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Individual designated to provide direction to emergency location for emergency services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Roll-Call conducted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Spill/Leak/Release control measures initiated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Emergency assessed for additional hazards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Firefighting equipment utilized	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rescue initiated if safety of others not compromised	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	All ignition sources controlled	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
First Aid provided	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Further evacuation conducted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Emergency area contained, barricaded or controlled	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Utilities shut off	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Equipment, machinery or processes shut down if safe to do so	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	External emergency services provided (i.e. firefighting, air ambulance)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other response: _____				Other response: _____			

Completed By: _____ Signature: _____

Reviewed By: _____ Signature: _____

Americas

Site Security Checklist

S3AM-010-FM3

Client: _____ Location: _____

Inspected By: _____ Inspection Date: _____

<u>Task</u>	<u>Satisfactory?</u>			<u>Comments</u>
On-Site Survey				
Observations of possible intruders	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	_____
Evidence of vagrants/homeless living on-site	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	_____
Lighting around facility	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	_____
Work area fenced / barricaded	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	_____
Gates / fences locked and chained	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	_____
Work area within view of facility operations	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	_____
General housekeeping practices	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	_____
Areas of retreat available	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	_____
Remote locations	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	_____
Emergency phone numbers posted	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	_____
Other	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	_____
Off-Site Survey				
Drug/prostitution areas nearby	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	_____
High crime area	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	_____
Vagrants/homeless living on adjacent properties (evidence)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	_____
General housekeeping practices	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	_____
Other	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	_____
Corrective Measures Planning Tools				
Be aware of surroundings offsite/traffic/personnel	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	_____
Increased awareness of vehicle placement	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	_____
Increased awareness of building placement	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	_____
Use Buddy System	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	_____
Hire security guards	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	_____
Check chain / locks	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	_____
Avoid leaving equipment unattended	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	_____
Carry whistle / blow horn	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	_____
Carry flashlight / extra bulbs	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	_____
Lock car doors always	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	_____
Avoid use of uncovered pick-ups truck beds	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	_____
Keep tools in trunk and locked	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	_____
Use yellow hazard lights	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	_____
Fire extinguisher	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	_____
Cell phone	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	_____
Notify local police department of presence on-site	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	_____
Perform activities during daylight hours	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	_____

General Notes:

Americas

Potential Violence Assessment Form

S3AM-010-FM4

Region:		Department:		Office:	
Prepared by:				Date:	
Report Summary and Recommendations					
Item No.	Condition	Corrective Action Required	Action By	Rectified	
				Date	By
General Remarks & Comments:					
Safety, Health and Environment Committee Comments:					
Manager The above noted items have been rectified. <input type="checkbox"/> YES <input type="checkbox"/> NO (Please comment)					
Manager Name: _____ Date: _____ Signature: _____					

Assessment Checklist

Use this checklist when conducting your workplace potential violence assessment. Go over every aspect of your workplace to identify possible hazards. ADD ITEMS as necessary for your particular workplace.

If any question is answered with YES, a mitigation strategy to eliminate or minimize this risk must be prepared and approved by the SH&E Manager or the Global Resilience Group.

Item	Yes	No	N/A
1. Parking Lot and Building Perimeter			
1. Are any entrances or exits <u>not</u> well marked?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Is there any lighting that is inadequate?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Have vehicles been broken into?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Does the building contain any graffiti?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Is the building located in a high-crime area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Does the building have any broken windows?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Is the building isolated from other buildings?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Is access to and from your building uncontrolled?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Security System			
1. Does the building <u>not</u> have a security system?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. If no to the above, are there times when the system is <u>not</u> functional?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. If the building has security guards or security walks, are there times when they are unavailable?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. If security cameras/mirrors are in place, are there any strategic locations <u>not</u> covered?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Front Reception			
1. Can visitors enter without the receptionist having a clear view of them?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Are there times when the reception area is <u>not</u> staffed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Can anyone enter the building when there is no receptionist?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Are visitors allowed to enter the building without signing in?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Does the receptionist work alone at any given time?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Could any objects in the reception area be used as a projectile or weapon?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Should there be an emergency or panic button at the reception area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Assessment Checklist			
4. Signage & Lighting			
1. Are any exits <u>not</u> signed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Are any exit signs damaged or <u>not</u> clearly visible?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Are there any restricted areas at this location?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Are there areas at this location where the lighting inside the building is inadequate?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Are any of the lights currently burned out, or do any need replacing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Stairwells & Exits			
1. Are any exit doors NOT clearly identified?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Can lights in the stairwells or at exit doors be turned off?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Do stairwell doors lock behind you?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Are exits currently blocked?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Is it possible to hide in the stairwell?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Building Configuration			
6a) General			
1. Can members of the public enter the building from side entrances?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Are there small areas or places to hide?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Are any areas isolated from other areas (basements, storage rooms)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Are there times when a call for help from these areas would <u>not</u> be heard?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Is this area isolated enough to consider installing panic buttons?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6b) Elevators			
1. Is the building elevator equipped with an emergency phone that has <u>not</u> been tested?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Should you have a dedicated procedural response for elevator emergencies?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6c) Washrooms			
1. Can public/visitors use the same washroom as staff members?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Are there any washrooms with inadequate lighting?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Can all lighting in any washroom be turned completely off?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Are any washrooms within the secure area <u>not</u> checked before everyone vacates the building?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Assessment Checklist			
6d) Meeting Rooms			
1. Are meetings and interviews conducted in a separate room?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Are people inside the room visibly concealed from outside the room?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Does the furniture arrangement obstruct an emergency exit?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Can you be trapped between the door and another individual?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6e) Offices			
1. Is the office layout congested?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Does the furniture arrangement obstruct an emergency exit?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Could any objects in offices be used as a projectile/weapon?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Emergency Numbers and Assistance			
1. Do any staff <u>not</u> have access to emergency numbers?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Are any workers <u>not</u> trained on what to do in the event of an emergency?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Are there areas where a phone is not available for emergency use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Additional Considerations			
1. Do employees leave the building alone after normal business hours?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Are there long walkways or corridors that are not well lit?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Are there areas for someone to hide within the corridor or walkway?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Are there any areas/rooms that are currently open that should be locked?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Location Specific Issues / Comments / Clarifications			

Americas

Office / Shop Visitor Register

S3AM-010-FM5

[illegible]

Housekeeping

S3AM-013-PR1

1.0 Purpose and Scope

- 1.1 This procedure provides AECOM's basic housekeeping requirements for offices and work sites, as well as establishes personal hygiene and sanitation standards for housekeeping.
- 1.2 This procedure applies to all AECOM Americas-based employees and operations.

2.0 Terms and Definitions

- 2.1 None

3.0 References

- 3.1 S3AM-208-PR1 Personal Protective Equipment

4.0 Procedure

- 4.1 Roles and Responsibilities

- 4.1.1 **Managers / Supervisors**

- Implementation of this procedure at all AECOM sites and offices.
- Confirm inspections are performed at appropriate intervals.
- Confirm the building Property Manager maintains leased facilities effectively.

- 4.1.2 **SH&E Managers**

- Monitor, assess, and report on housekeeping when visiting AECOM sites.

- 4.1.3 **Employees**

- Report any areas of concern to their Manager / Supervisor for prompt resolution.
- Maintain office locations that are free from debris, clutter, and slipping or tripping hazards.

- 4.2 General Housekeeping

- 4.2.1 All aisles, emergency exits, fire extinguishers, etc., will be kept clear (a minimum of three feet / 0.9 meters of either side) of material storage (temporary and permanent) at all times.
- 4.2.2 Areas in front of electrical panels will be kept clear and free of debris and materials storage for a minimum distance of 36 inches, or approximately 0.9 meters.
- 4.2.3 All work areas shall be kept clean to the extent that the nature of the work allows.
- 4.2.4 Spills shall be promptly cleaned up and resulting waste will be disposed of properly.
- 4.2.5 Storage areas will be maintained in an orderly manner at all times. When supplies are received, the supplies will be stored properly.
- 4.2.6 At all times, work areas will be kept free of debris and unused materials, tools and equipment that may affect the safety of employees and visitors.
- 4.2.7 All sharps, and sharp objects, shall be stored and/or guarded in a manner that prevents injury.
- 4.2.8 Recyclable material, debris and trash will be collected and stored in appropriate containers (e.g., recycle bins, plastic trash bags, garbage cans, roll-off bins) prior to disposal or recycling.

- 4.2.9 Containers maintained outdoors shall be provided with lids that are kept closed. Contents shall be removed at appropriate intervals (e.g. garbage weekly, garbage daily in areas with wildlife, monthly recyclable cardboard, etc.).
- 4.2.10 Take positive control measures for protection against vermin, insects, and rodents.
- 4.3 Smoking, Eating, and Drinking
 - 4.3.1 Eating and drinking will be permitted in designated areas. These areas shall be located away from the work zone.
 - 4.3.2 Operate and maintain food dispensing facilities established by AECOM in compliance with applicable health and sanitation regulations.
 - 4.3.3 Buildings housing food dispensing facilities shall be floored completely, painted, well lighted, heated, ventilated, fly proof, and sanitary. Equip doors and windows with screens.
 - 4.3.4 Microwave ovens shall be used for food only.
 - 4.3.5 Use refrigerators designated for food storage for food only (i.e., no chemical or samples storage).
 - 4.3.6 Hand washing stations shall be available nearby for employees entering the eating and smoking areas.
 - 4.3.7 Smoking will be permitted only in areas:
 - Designated in compliance with applicable local laws, regulations, legislation and ordinances;
 - Not in the immediate vicinity of work-related activities or designated eating and drinking areas.
 - Free of fire hazard;
 - That will not contaminate indoor areas and HVAC systems. Specifically, there shall be no smoking within 5 metres (16 feet) around doorways, windows, air vents, and HVAC intakes and equipment; and
 - Supervisors will designate each smoking area giving primary consideration to those employees who do not smoke.
 - 4.3.8 Employees involved in the performance of certain activities will not be permitted to smoke, eat, drink, or use smokeless tobacco, except during breaks (e.g., HAZWOPER-controlled work areas).
 - 4.3.9 Site employees will first wash hands and face after completing work activities which involve potential exposure or contact with hazardous substances and prior to eating or drinking.
- 4.4 Water Supply
 - 4.4.1 Water will be available for use on all AECOM sites and will comply with the following requirements:
 - Potable Water:
 - An adequate supply of drinking water will be available for site staff consumption.
 - Potable water can be provided in the form of approved well or city water, bottled water, or drinking fountains.
 - Water coolers and water dispensers shall be maintained in a sanitary condition and filled only with potable water.
 - Where drinking fountains are not available, individual use cups will be provided as well as adequate disposal containers. Do not use common drinking cups.
 - Potable water containers will be properly identified in order to distinguish them from non-potable water sources.
 - Laboratory-test drinking water obtained from streams, wells, or other temporary sources in accordance with applicable regulations, or often enough to ensure it is suitable for consumption. Maintain records of testing reports and results.

- Non-potable Water:
 - Non-potable water will not be used for drinking purposes.
 - Non-potable water may not be used for hand washing or other personal hygiene activities but may be used for other types of cleaning activities.
 - All containers/supplies of non-potable water used will be properly identified and labelled as such.

4.5 Toilet Facilities

- 4.5.1 Clean and sanitary toilet facilities in good repair will be available for site and office staff and visitors. For locations without flush toilets readily available, one of the following shall be provided:
- Chemical toilets.
 - Combustion toilets.
 - Recirculation toilets.
- 4.5.2 A minimum of one toilet will be provided for every 20 site staff, with separate toilets maintained for each sex, except where there are less than five total staff on site or in an office.
- 4.5.3 Where toilet facilities will not be used by women, urinals may be provided instead of water closets in accordance with jurisdictional regulations.
- 4.5.4 Provisions for toilet facilities shall be considered as being met when mobile crews or employees working at normally unattended work locations have transportation immediately available (within 4 minutes travel time) to nearby toilet facilities.
- 4.5.5 Toilets shall be constructed so that the interior is lighted, by artificial or natural light, adequate ventilation is provided, and all windows and vents are screened.
- 4.5.6 A means for washing hands shall be provided next to or near toilet areas.
- 4.5.7 Release sanitary sewage into sanitary sewer lines or to other proper disposal channels.

4.6 Washing Facilities

- 4.6.1 Hand and Face: Site staff will wash hands and face after completing work activities and prior to breaks, lunch, or completion of workday.
- 4.6.2 Personal Cleaning Supplies: Cleaning supplies at all AECOM sites will consist of soap, water, and disposable paper towels or items of equal use/application (e.g., anti-bacterial gels, wipes, etc.).

4.7 Work Areas

- 4.7.1 Worksites which store chemical or environmental samples in refrigerators will clearly label the refrigerators that no food or beverages permitted and will locate refrigerators and sample coolers used for temporary sample storage, away from any food areas.
- 4.7.2 Every work area shall be maintained, so far as practicable, in a dry condition. Where wet processes are used, drainage shall be maintained and platforms, mats, or other dry standing places shall be provided, where practicable, or appropriate waterproof footwear shall be provided.
- 4.7.3 Protruding objects or placement of materials on paths or foot traffic areas creates the risk of slips, trips, falls, and puncture wounds. Employees shall eliminate slip, trip, and fall hazards where reasonably practicable.
- 4.7.4 At no time will debris or trash be intermingled with waste PPE or contaminated materials.

4.8 Break Areas and Lunchrooms

Site staff will observe the following requirements when using break areas and lunchrooms at AECOM sites:

- 4.8.1 All food and drink items will be properly stored when not in use.

- 4.8.2 Food items will not be stored in personal lockers for extended periods in order to prevent the potential for vermin infestation.
- 4.8.3 Perishable foods will be refrigerated whenever possible.
- 4.8.4 All waste food containers will be discarded in trash receptacles.
- 4.8.5 All tables, chairs, counters, sinks, and similar surfaces will be kept clean and free of dirt, waste food, and food containers at all times.
- 4.8.6 All ice dispensing machines for beverages shall be hands free/touchless design to prevent bacterial contamination (no ice scoops or ice bins permitted, closed beverage containers can be stored in portable ice coolers but the ice may not be used in the beverage).
- 4.8.7 Refrigerators used to store food items will be maintained at 40 degrees Fahrenheit (4 degrees Celsius) and emptied of all unclaimed food items weekly. Refrigerators used to store food will be labelled as such so that only food and drinks are stored within the refrigerator.
- 4.8.8 Routine cleaning of refrigerators will also be performed on a regular basis.
- 4.9 Change Rooms and Sleeping Facilities
 - 4.9.1 Heated and ventilated change rooms shall be provided for changing, hanging, and/or drying clothing for operations subjecting employees to prolonged wetting or contact with hazardous materials.
 - 4.9.2 Temporary sleeping quarters shall be heated, ventilated, lighted, and clean with all doors and windows screened.
 - 4.9.3 Keep clean and sanitary, and periodically disinfect bunkhouses, bedding, and furniture.
- 4.10 Office Areas

Office areas are to be kept neat and orderly. The following general rules apply to prevent injuries and to maintain a professional workplace appearance.

 - 4.10.1 All waste receptacles shall be lined with a plastic trash bag to avoid direct contact with waste during disposal. Employees shall use gloves when handling waste and may use a compaction bar to compress waste when necessary.
 - 4.10.2 Keep file and desk drawers closed when not in use to avoid injuries. Open only one file drawer at a time to prevent tipping of file cabinets. Nothing should be stored on top of high filing cabinets without adequate support.
 - 4.10.3 Telephone cords, electrical cords, wastebaskets, open file cabinets, and other ground-level hazards shall be managed in a manner that protects employees from tripping and obstruction hazards.
 - Electrical cords and computer/phone cables will be bundled and stored.
 - Cord covers should be used to protect temporary extension cords (used for presentations etc.) where they could be a tripping hazard.
 - Small electrical appliances shall not be plugged into portable extension cords.
 - Multiple appliances amperage should not exceed the circuit load limits.
 - 4.10.4 Electrical appliances shall not be used in wet areas unless the circuit is equipped with ground fault circuit interrupters (GFCI).
 - 4.10.5 File cabinets, desk drawers, safes, and other doors shall be fitted with handles or other hardware to protect employees from pinch points.
 - 4.10.6 All materials shall be stored in a manner that prevents tipping of storage furniture (e.g. book shelves, file cabinets) and inadvertent falling of overhead material.

- 4.10.7 Do not stack excessive amounts of papers or other material on shelves to reduce possibility of shelf overload or falling items.
- 4.10.8 Workstations should be tidied, as a minimum, at the end of each day.
- Paperwork that is not currently needed should be filed appropriately
 - Refrain from storing items on the floor as they may become falling or tripping hazards.
- 4.10.9 In public areas of the office:
- Maintain chairs in good repair.
 - Keep rugs clean, in good repair, and free of tripping hazards.
 - Clean up spills immediately.
 - Pick up objects that may have been left on the floor by others.
 - Report loose carpeting, damaged flooring, or other obstructions that are present in walkways.
- 4.10.10 Broken or damaged office furniture and equipment shall be removed from service. Office equipment shall be repaired and serviced by qualified personnel or contractors.

5.0 Records

- 5.1 None

6.0 Attachments

- 6.1 [S3AM-013-FM1](#) [Housekeeping Inspection](#)

Americas

Housekeeping Inspection

S3AM-013-FM1

Building or Location: _____

Inspection Conducted by: _____ **Date:** _____

Check Yes, No, or NA for Not Applicable.

General Site Housekeeping

- | | | | |
|---|------------------------------|-----------------------------|-----------------------------|
| 1. Exits, emergency equipment, and electrical panels unblocked? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 2. Equipment, materials, supplies properly stored and, as applicable, secured (e.g. chocked)? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 3. Drawers closed when not in use? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 4. Equipment, including desks and chairs, in good repair? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 5. Storage areas free from the accumulation of materials that constitute trip hazards? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 6. Recyclable material, debris and trash collected and stored in appropriate containers? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 7. Scrap materials and other debris removed from work area? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 8. Combustible scrap and debris removed by safe means at regular intervals? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 9. Oily rags removed at the end of the day and stored in metal cans with tight fitting lids? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |

Visibility

- | | | | |
|--|------------------------------|-----------------------------|-----------------------------|
| 10. Worksite and, as applicable, halls, stairways and walkways are well lit? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 11. Well-designed light switches are present in areas where walkways are not always lighted? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 12. Dust, smoke or steam does not create poor visibility? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 13. Glare from floodlights or windows does not create poor visibility in work areas? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |

Stairs

- | | | | |
|---|------------------------------|-----------------------------|-----------------------------|
| 14. Handrails are tight and at the proper level? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 15. Handrails extend past the top and bottom step? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 16. White or yellow strips are painted on the first and last step for better visibility? (recommendation only). | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 17. Steps are not rough or defective? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 18. Stair treads are wide enough and risers consistently spaced? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 19. Stairs are free of obstructions? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |

Floor Conditions

- | | | | |
|---|------------------------------|-----------------------------|-----------------------------|
| 20. Floors of every workroom are clean, and so far as possible, in a dry condition? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 21. Floors are not oily, overly waxed, or polished. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 22. Where wet floors or processes are present, proper drainage and false floors, mats, or other dry standing places are provided? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 23. Floor surfaces finished with non-slip coatings where spills are likely? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 24. Floors and passageways are free from protruding nails, splinters, holes, or loose boards? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 25. Floors are free of holes and depressions? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 26. Aisles or pathways are wide enough for easy passage and for carrying objects (48 inches is recommended)? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 27. Ramps are covered with non-slip surfaces or matting? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |

28. Carpets or rugs free from loose or frayed edges that may catch boots or shoes? ☐ Yes ☐ No ☐ NA
29. Extension cords, air hoses and cables removed from walkways, or otherwise managed to prevent trip hazards? ☐ Yes ☐ No ☐ NA
30. Pathways free from boxes, containers, machine parts, or other tripping hazards? ☐ Yes ☐ No ☐ NA

Ground Conditions

31. Trip hazards are not present? ☐ Yes ☐ No ☐ NA
32. Fall hazards are not present? ☐ Yes ☐ No ☐ NA
33. Holes or changes in ground elevation are either filled or guarded? ☐ Yes ☐ No ☐ NA
34. Muddy or icy walkways are provided with traction material (e.g. sand, gravel) to reduce slipping? ☐ Yes ☐ No ☐ NA

Equipment

35. Vehicle steps are free from debris or obstructions and of adequate size, and surface placement for safe dismounting? ☐ Yes ☐ No ☐ NA
36. Hand grips or ladders are free from debris or obstructions and adequate for getting into and out of equipment? ☐ Yes ☐ No ☐ NA
37. Ladders have been checked for damage and removed from service if found unsafe? ☐ Yes ☐ No ☐ NA

Chemicals

38. Chemicals are properly stored to minimize a potential spill? ☐ Yes ☐ No ☐ NA
39. Spill cleanup materials are available and appropriate for the type of potential spill? ☐ Yes ☐ No ☐ NA

Smoking, Eating and Drinking

40. Smoking permitted in designated areas only? ☐ Yes ☐ No ☐ NA
41. Designated smoking area appropriately placed? ☐ Yes ☐ No ☐ NA
42. Appropriate and clean eating and drinking areas designated away from work areas? ☐ Yes ☐ No ☐ NA
43. Food and drink items properly stored? ☐ Yes ☐ No ☐ NA
44. Potable water identified and readily available? ☐ Yes ☐ No ☐ NA

Sanitation

45. Appropriate cleaning supplies available and properly stored? ☐ Yes ☐ No ☐ NA
46. Hand and face washing facilities available and maintained with adequate supplies? ☐ Yes ☐ No ☐ NA
47. Adequate toilet facilities available and maintained with sufficient supplies? ☐ Yes ☐ No ☐ NA

Identify areas that need attention and describe the corrective actions to be implemented:

I certify that the above inspection was performed to the best of my knowledge and ability, based on the conditions present.

Signature

Date

Substance Abuse Prevention

S3AM-019-PR1

1.0 Purpose and Scope

- 1.1 This policy and procedure applies to all Americas - based employees and operations and is consistent with the U.S. Drug-Free Workplace Act of 1988 and in accordance with federal, state / provincial / territorial, and local laws and regulations. It sets out practices for a drug-free, healthy, productive, safe and secure workplace and provides guidance for employees and supervisors with respect to their responsibilities. Drug and alcohol abuse pose a serious threat to the health and safety of employees, clients, and the general public as well as the security of our job sites, equipment and facilities. The Company is committed to the elimination of illegal drug use and alcohol abuse in its workplace and regards any misuse of drugs or alcohol by employees to be unacceptable.
- 1.2 AECOM prohibits the use, possession, presence in the body, distribution, manufacture, concealment, transportation, promotion or sale of the following items or substances on company premises:
- Illegal drugs (or their metabolites), designer and synthetic drugs, mood or mind altering substances and drug use related paraphernalia unless authorized for administering currently prescribed medication;
 - Controlled substances that are not used in accordance with physician instructions or non-prescribed controlled substances;
 - Alcoholic beverages while at work or while on any customer or AECOM controlled property. This prohibition on alcohol applies whenever an employee is on-duty, including during meal or break periods, while on Company premises, or while representing AECOM. AECOM may make exceptions and permit the consumption of alcohol beverages at work-related events, such as Company-sponsored or approved business meals, conferences, or holiday events. Employees who choose to consume alcohol on approved occasions are expected to exercise good judgment and to refrain from becoming intoxicated or impaired. If an employee has consumed alcohol and needs transportation home, the Company will reimburse the cost of a taxicab or other reasonable costs of transportation so that the employee may avoid driving.
 - This policy does not prohibit lawful use and possession of current medication prescribed in the employees name or over-the-counter medications. Employees must consult with their health care provider about any prescribed medication's effect on their ability to perform work safely. An employee who has work restrictions due to his or her consumption of a prescribed medication must disclose these restrictions to their supervisor.
- 1.3 Substance abuse testing procedures shall meet requirements of various U.S. regulatory agencies and / or those of the applicable jurisdiction, with regard to testing employees for the possession and use of illegal drugs (and their metabolites), mood or mind altering substances, synthetic and designer drugs, unauthorized use of prescription drugs and the unauthorized use of alcohol on AECOM or client premises or during working hours. The procedures will also comply with applicable laws and regulations by federal, state and local law. If the law of a particular location differs from the practices expressed in this policy and procedure, AECOM will implement this policy and procedure in accordance with applicable law.
- 1.4 Although some states may pass laws legalizing medical or recreational marijuana use, the use, sale, distribution and possession of marijuana are violations of federal law. Similarly, the use sale, distribution, presence in the body and possession of marijuana or the presence of marijuana on company premises or while on duty including during lunch and breaks violates the *S3AM-019-ATT1 Substance Abuse Policy Statement* (policy), and will subject an employee to disciplinary action up to and including termination in accordance with controlling law.

- 1.5 This policy and procedure has been developed to provide employees, managers, supervisors and administrative support personnel with guidelines and procedures for the implementation, administration, and enforcement of this policy and procedure. The company policy statement for substance abuse prevention is included as Attachment 1 of this document and a copy of the included policy statement shall be posted on employee information boards. New employees shall receive and sign *S3AM-019-FM1 Acknowledgement and Consent Form* upon hire or transfer between sites or clients as acknowledgement of the program requirements. A signed or electronic copy of this form should be kept as part of the employee personnel file.
- 1.6 This policy and procedure does not prohibit employees from the lawful use and possession of current prescribed or over-the-counter medications. Employees must consult with their health care providers about any prescribed medication's effect on their ability to perform work safely. Employees must disclose any relevant work duty restrictions to their supervisor. Employees are required only to provide information necessary for the Company to make an informed decision regarding the ability to perform required work safely, and to evaluate whether the employee may be entitled to a reasonable accommodation. Employees who must bring current prescribed medications to work must carry the medication in the original packaging bearing a current label from a licensed pharmacist for the person in possession of the drugs.
- 1.7 Compliance with this policy is a condition of initial and continued employment. Failure to comply with these requirements will be grounds for disciplinary action, up to and including termination of employment.
- 1.8 This procedure will be administered by the Corporate Substance Abuse Program Manager in conjunction with Safety, Health & Environment (SH&E) and Human Resources (HR).

2.0 Terms and Definitions

- 2.1 **Adulterated Sample** – A urine sample provided by an applicant, employee or contractor that has been intentionally altered to mask the analysis for illegal substance use. Any applicant or employee who knowingly provides a false sample or attempts to adulterate a sample will be terminated or disqualified from employment.
- 2.2 **Breath test for alcohol (BrAC)** – A method of measuring the breath alcohol concentration (BrAC) of an individual using an approved analyzer performed by a certified analyst using test protocol described in the SAP Procedures.
- 2.3 **Confidentiality** – The principle in medical ethics that the information a patient reveals to a health care provider is private and has limits on how and when it can be disclosed to a third party.
- 2.4 **Employees/Applicants** – The SAP program will apply to all individuals who may be: regular full-time, part-time, probationary, temporary, craft (direct hires), casual, contract or leased employees, and applicants of employment as permitted by applicable laws
- 2.5 **Employee Assistance Program (EAP)** – All salaried employees and their immediate family members are eligible for the EAP assistance limited to five paid counselling sessions per calendar or benefit year. Hourly employees may be eligible on projects, plants and mines or in offices where a substance abuse testing program is implemented. Separate EAP brochures and telephone cards are available through the HR Department. Check with your HR manager for eligibility for EAP.
- 2.6 **Illegal Drugs, Controlled Substances and Unauthorized Items** – Illegal drugs, designer and synthetic drugs, substances that impair job performance or safety and drug-related paraphernalia: Controlled substances such as medications when usage is abused; Unauthorized alcoholic beverages
- 2.7 **Medical Review Officer (MRO)** – The MRO is a designated Medical Doctor (MD) with experience and certification in the interpretation of urinalysis test results for drug testing. The MRO examines the positive test results with consideration of whether there is a legitimate medical reason for the result. This is accomplished by telephone interviews with the donor and also with their prescribing physician or pharmacist when prescription or over the counter medications are possibly involved.

- 2.8 **Negative Drug Test** – A personal sample (urine, blood, hair, breath, swab or other permitted by law) that indicates a concentration(s) of any drug on the panel which is below the cut-off limit and also meets all quality control requirements (e.g., temperature, pH) and no evidence of adulterants.
- 2.9 **Positive Test Result** – A personal sample (urine, blood, hair, breath, swab or other permitted by law) that indicates a concentration(s) of any drug on the panel which is above the cut-off limit and/or the GCMS confirmation level of that applicable regulation or requirement.
- 2.10 **Prohibited Substances** – Illegal or unprescribed drugs (or their metabolites), controlled substances and mood or mind-altering substances (i.e. any synthetic derivative/product that produces a marijuana-type high and any herbal products not intended for human consumption); or any prescribed drugs used in a manner inconsistent with the prescription, and alcoholic beverages.
- 2.11 **Reasonable Suspicion** – Suspicion based upon the observation of objective facts or specific and articulable behavior. May also be warranted based on search or disclosure of evidence obtained on a work site or company controlled property. Supervisor should complete a Reasonable Suspicion training course and document the process and observations.
- 2.12 **Refusal to Test** – Refusing to provide a sample or refusing to accept and sign the testing consent form, is considered a breach of company policy and subject to disciplinary action up to termination of employment.
- 2.13 **Safety Sensitive** – A task or position is designated as safety sensitive when the task or position is such that an action would endanger the lives of others. AECOM business groups may further define safety sensitive as it applies to their applicable line of work. Examples, but not a complete list, of positions that may be designated “safety-sensitive” by regulations include:
- Drivers of Commercial Motor Vehicles (CMV)
 - Workers on pipelines carrying fuels or toxic or corrosive substances
 - Workers at nuclear power plants
 - Employees that operate Nuclear Regulatory Commission -regulated devices (nuclear density gauges)
 - Operators of industrial mobile equipment, including: cranes of more than 6,000-pound capacity, forklifts, loaders, etc.
 - Laboratory technicians working with hazardous substances.
- 2.14 **Swab Alcohol Test** – A swab test may be required by a client instead of the Breath test for alcohol (BrAC).

3.0 References

- 3.1 None

4.0 Procedure

- 4.1 Roles and Responsibilities

4.1.1 Supervisors and Managers

- Observe and document employee behavior which appears to violate this policy and procedure and refer employees for drug and alcohol testing as required.
- Ensure all employees have been orientated to this procedure and are knowledgeable about, and in compliance with this procedure, associated policy and applicable programs.
- Make appropriate referrals for a drug and/or alcohol test as per this procedure as well as any client contractual agreements or governmental regulation.
- Be current with the Employee and Supervisor Training and education programs so as to be knowledgeable about the use of alcohol and drugs and be able to recognize the signs and effects of alcohol and drug uses.

- Alert and involve Human Resources (HR), the Corporate Safety, Health and Environment (SH&E) Occupational Health Manager and the Substance Abuse Program Administrator when an employee is believed to be unfit for duty due to drugs or alcohol use in violation of this policy and/or if an employee is tested for a reasonable suspicion use of drugs or alcohol.
- If any illegal drugs or drug paraphernalia are located on company premises, do not handle the items and immediately notify the following as necessary: HR, Resilience Group, the police department and the Corporate Substance Abuse Program Manager.
- Guide employees who voluntarily seek assistance for a personal substance abuse problem to appropriate resources such as the EAP or other local resource.

4.1.2 Employees

- Commit to a safe and drug-free workplace by complying with this policy and procedure and understanding their responsibilities.
- Read and understand the *S3AM-019-ATT1 Substance Abuse Policy Statement* detailing the Company's commitment to a drug free workplace. The signed *S3AM-019-FM1 Acknowledgement and Consent Form* attests that they have reviewed and are familiar with this procedure and understand that compliance is a condition of employment. Any questions should be directed to the Substance Abuse Administrator or HR.
- Follow the instructions of their supervisor or Substance Abuse Administrator when informed that they have been chosen for a random or client drug test as allowed by federal, state or local law and regulations. Failure to do so may result in discipline up to and including termination.
- Participate in substance abuse training programs as directed.
- Report for work Fit for Duty and remain Fit for Duty while on Company premises and worksites and adhere to the standards set out in this procedure and any applicable program.
- Notify your supervisor, HR or SH&E representative if you believe another employee or subcontractor is not Fit for Duty or exhibits conduct suggesting substance abuse.
- If having a valid driver's license is a condition of employment, report any loss of license related to drug or alcohol use immediately (no later than 24 hours after losing the license) to your supervisor.
- Consult with health care provider about any prescribed medication's effect on the ability to perform work safely and disclose work restrictions due to consumption of prescribed medications to their supervisor to determine if reasonable accommodation is needed.
- Bring legally prescribed medicine in the original packaging bearing a current label in the employee's name from a licensed pharmacist if the employee carries more than a single day of prescribed medications to work.
- An employee who has been convicted of a felony under a criminal drug statute for a violation occurring on Company property or during the employee's working hours must notify Human Resources no later than five (5) calendar days after the felony conviction becomes final under the law.

4.2 Types of Testing

- 4.2.1 Employees undertaking Safety-Sensitive tasks or in a Safety Sensitive position may be required to undergo drug and alcohol testing.
- 4.2.2 Pre-employment Testing - Applicants extended a conditional offer of employment may be required to take, and pass, a pre-hire drug test before beginning work. Individuals who test positive or refuse the test will not be hired and will be ineligible to reapply for a period of six months. Employees who transfer from one company business group or project to another are not required to take a pre-employment drug test if their employment is without interruption, they are not subject to client

testing or safety sensitive testing requirements, and they would have been expected to have taken a pre-hire or client mandated drug test.

4.2.3 Random and Annual Testing - Employees may be subject to random drug and/or alcohol testing in accordance with federal, state and local laws. In addition, employees may be subject to random or annual drug tests to meet contract requirements.

- Selections for random testing will be made by the Substance Abuse Program Administer or a Certified Third Party Administrator using employee identification numbers and a random selection process. They will be unannounced and once selected for testing, an individual may not be waived from the testing process.
- Employees will be notified to report for random tests at a time when they should be able to stop working and report immediately to the collection site. Failure to report for a test promptly when instructed to do so may be considered a refusal to test.
- Employees who may be required to submit to random or annual tests will be so notified at the time that they are hired into a covered position, when they transfer into such a position, or when random or scheduled testing becomes applicable to their position.

4.2.4 Reasonable Suspicion Testing - Employees are subject to drug and/or alcohol testing whenever AECOM supervision has reason to believe that the employee has violated this policy and procedure. Requests for tests will be based upon contemporaneous, articulable observations from supervisors suggesting that the employee may be under the influence of illegal drugs, controlled substances, or alcohol.

- Examples of observations that may lead to a test can include the employee's appearance, behavior, speech, body odors, absenteeism, job performance, tardiness, etc. Whenever possible, observations will be documented and reviewed by HR before the individual is asked to submit to a test.
- An employee asked to take a drug and/or alcohol test will be suspended without pay until test results are received. They may use Paid Time Off (PTO) time during this period. An employee who has negative test results will be returned to work status and the employee will then be paid or have their PTO restored for any lost time during that period.

4.2.5 Post Incident/Accident Testing - Employees may be subject to drug and alcohol testing in accordance with federal, state, and local law whenever:

- An employee is subject to post-incident testing in accordance with applicable regulations or laws that contain specific requirements for testing (e.g., Department of Transportation, state workers' compensation laws).
- If an employee sustained or potentially caused an injury requiring off-site medical treatment beyond first aid, and the employees' drug or alcohol use is likely to have contributed to the incident, testing may occur to identify impairment caused by drug or alcohol. Employees will not be tested post-incident if management determines that potential drug and/or alcohol use likely did not contribute to the incident such as in the cases of animal or insect bites, repetitive strain injury, poison ivy, etc;
- An employee may have caused or contributed to an incident that results in property damage estimated (including to Company vehicles or equipment) of \$2,500 or more (a lower cost of damage requiring testing may be identified in Business Group specific programs);

In either of these instances, the investigation and substance abuse testing must take place immediately following the incident, except that no investigation or request for test will delay the provision of urgent medical care to any person in need of assistance. Employees will not be allowed to return to work until a negative drug/alcohol test result is received.

4.2.6 Return-to-Work and Follow-up Testing - Employees who test positive for drugs or alcohol or who have otherwise violated this Policy and Procedure are subject to discipline, up to and including discharge. Depending on the circumstances, the Company may offer an employee who violates this Policy and Procedure the opportunity to seek assistance in lieu of termination through the

Employee Assistance Program (“EAP”) or another approved counseling program. Employees offered this opportunity will be required to be evaluated by a substance abuse professional, and to complete any course of education or treatment prescribed before returning to work. In addition, employees must have a negative drug/alcohol test prior to their return to work and follow-up drug and/or alcohol testing may be required as a condition of continued employment, for a period of up to two years following the return to work. If subject to a client-specific substance abuse policy, employees who have had a positive test result will not be permitted to return to work on the client site or facility. Return-to-Work Agreements will be tailored to the individual's circumstances and job responsibilities.

4.3 Collection and Testing

- 4.3.1 Consent and Refusals to Test: No sample will be collected, or test conducted on any sample, without the consent of the person being tested. However, a refusal to submit to a test will be treated as an admission of a policy violation and will usually result in termination of employment. Job applicants who refuse a test will have their job offers withdrawn.
- Attempts to tamper with, substitute, adulterate, dilute or otherwise falsify a test sample are considered refusals to submit to a test, as is a refusal to accept transportation to the testing facility, failure to appear at the testing location promptly after being asked to submit to a test, or other conduct that has the effect of frustrating the testing process. AECOM will pay the costs of all drug and/or alcohol tests it requires.
- 4.3.2 Test Methods: Drug test samples may include urine, hair, swab or saliva (oral fluids). All drug test samples will be screened and all presumptive positive drug tests will be confirmed using gas chromatography/ mass spectrometry (GC/MS) (or an equally accurate methodology). Drug tests will be performed by a laboratory certified by the U.S. Substance Abuse and Mental Health Services Administration for federal workplace testing, or as required by the applicable jurisdiction. Breath, blood, swab or urine tests may be used to detect the presence of alcohol. An alcohol test will be considered positive if it shows the presence of .04 percent or more alcohol in a person's system.
- Dilute or invalid results will require a recollection, and the Company may require the individual to provide an alternative test specimen as may be available and consistent with the underlying purpose of the test.
- 4.3.3 Collection and Chain-of-Custody: Persons being tested will be asked to provide a test sample to a trained collector. Procedures for the collection of specimens will allow for reasonable individual privacy. Urine specimens will be tested for temperature, and may be subject to other validation procedures as appropriate. The collector and the person being tested will follow chain-of-custody procedures for specimens at all times. Tests will seek only information about the presence of drugs and alcohol in an individual's specimen, and will not test for any medical condition.
- 4.3.4 Notification and Medical Review: Any individual whose test sample is confirmed positive for a drug or drugs will be contacted by a Medical Review Officer (“MRO”) (a medical professional with an expertise in toxicology) and offered an opportunity to explain in confidence any legitimate reasons he or she may have that would explain the positive test (such as, for example, evidence that the individual holds a prescription for the substance detected). The MRO may also review suspected adulterated, substituted, and dilute specimens and make determinations about their validity.
- If the individual provides an explanation acceptable to the MRO that a drug test result is due to factors other than the consumption of illegal drugs, the MRO will order the positive test result to be disregarded and will report the test as negative to AECOM. Otherwise, the MRO will verify the test as positive and report that test result.
- 4.3.5 Right to Explain and Retest: Within three working days after notice of a verified positive drug or alcohol test result on a confirmatory test conducted under this Policy, the tested individual may submit information to the MRO to explain the positive result. An individual who tests positive for drugs also may ask to have his or her remaining or split test sample sent to an independent

certified laboratory for a second confirmatory test, at the individual's expense, and provided that a written request is made within five business days of the date the individual of the positive test result. AECOM will notify the original testing laboratory that the employee or applicant has requested that the laboratory conduct a confirmatory retest or arrange for transfer of the sample to the laboratory selected by the individual to perform the confirmatory retest. Tested individuals will be required to pay the testing laboratory for any confirmatory retest they request. AECOM may suspend, transfer, or take other appropriate employment action against an employee pending the results of any such re-test. However, if the re-test fails to confirm as positive the individual will be reimbursed for the cost of the re-test and the prior test results disregarded.

- 4.3.6 The Company will provide drug and alcohol tests results to candidates and employees automatically, where state law so requires, and otherwise upon written request as may be required by law.
- 4.4 Inspections
 - 4.4.1 The Company reserves the right to inspect and search all portions of its premises for drugs and other contraband. All employees, contract workers, and visitors may be asked to cooperate in inspections of their persons, work areas, and property brought on site in connection with an inspection. Employees who refuse to cooperate in any such inspections are subject to discipline, up to and including discharge.
- 4.5 Confidentiality
 - 4.5.1 Information and records relating to drug screen test results, drug and alcohol dependencies and medical information shared with the Company in the course of administering this Policy and Procedure shall be treated as confidential and shared with HR and managers on a need-to-know basis. Information will not be released to third parties except with the consent of the individual or where relevant to a grievance, charge, claim, or other legal proceeding initiated by or on behalf of an employee or applicant, or as may be required by law or legal process.
- 4.6 Employee Assistance Program and Drug Free Awareness
 - 4.6.1 Illegal drug use and alcohol misuse result in a number of adverse health and safety consequences. Information about those consequences and source of help for drug/alcohol problems is available from HR representatives who can also refer employees to the EAP for assistance with drug/alcohol related problems. Information about the EAP program is available on the Company intranet.
 - 4.6.2 The Company will provide support to employees who voluntarily seek help for drug or alcohol problems. Depending upon the circumstances, the employee may be referred for evaluation and allowed to use accrued paid time off or be placed on leave as may be necessary to complete any prescribed education and/or treatment. Employees also may be required to document that they are successfully following a prescribed education and/or treatment plan and pass return to duty and follow-up drug and/or alcohol testing. A request for assistance will be considered voluntary only if made before the employee becomes subject to disciplinary action for violating this or another Company policy, and cannot excuse substandard performance, so AECOM encourages employees who may need assistance to seek it promptly:
 - 4.6.3 In conjunction with the EAP, the Company will promote a drug-free awareness program to inform employees about:
 - The dangers of substance abuse in the workplace.
 - Available counseling, rehabilitation, and EAPs (both for self-referral or supervisory referral).
 - The penalties that may be imposed for violations of this procedure.
 - The Company's commitment to promoting a drug-free workplace.

5.0 Records

- 5.1 None.

6.0 Attachments

- 6.1 [S3AM-019-ATT1 Substance Abuse Policy Statement](#)
- 6.2 [S3AM-019-FM1 Acknowledgement & Consent Form](#)

Substance Abuse Policy Statement

S3AM-019-ATT1

POST ON EMPLOYEE BULLETIN BOARD

A. PURPOSE

AECOM is committed to the establishment and maintenance of a safe and efficient work environment for all employees free from the effects of alcohol, illegal drugs, other controlled substances and prohibited items such as drug paraphernalia. This policy and procedure applies to all Americas - based employees and operations and is consistent with the Drug-Free Workplace Act of 1988 and in accordance with federal, state / provincial / territorial, and local laws and regulations.

B. POLICY

1. This policy prohibits the use, possession, presence in the body, manufacture, concealment, transportation, promotion or sale of the following items or substances on company premises.

Company premises refer to all property, offices, facilities, land, buildings, structures, fixtures, installations, aircraft, automobiles, vessels, trucks and all other vehicles and equipment - whether owned, leased or used.

- Illegal drugs (or their metabolites), designer and synthetic drugs, mood or mind altering substances, and drug use related paraphernalia unless authorized for administering currently prescribed medication;
 - Controlled substances that are not used in accordance with physician instructions or non-prescribed controlled substances;
 - Alcoholic beverages while at work or while on any customer- or AECOM-controlled property. This prohibition on alcohol applies whenever an employee is on-duty, including during meal or break periods, while on Company premises, or while representing AECOM. AECOM may make exceptions and permit the consumption of alcohol beverages at work-related events, such as Company-sponsored or approved business meals, conferences, or holiday events. Employees who choose to consume alcohol on approved occasions are expected to exercise good judgment and to refrain from becoming intoxicated or impaired. If an employee has consumed alcohol and needs transportation home, the Company will reimburse the cost of a taxicab or other reasonable costs of transportation so that the employee may avoid driving.
2. Employees who violate this policy or the established Substance Abuse Prevention program will be subject to disciplinary action up to and including termination.
 3. AECOM reserves the right to establish drug and/or alcohol search and screening procedures consistent with applicable local, state, and national laws.
 4. The Substance Abuse Program Manager shall be responsible for the development, implementation and administration of the substance abuse prevention program. Employees will comply with testing as directed by this policy.
 5. Substance abuse awareness and control is a responsibility of all employees. Managers and supervisors are to be properly trained in abuse recognition and have authority and responsibility to deal with impaired personnel.
 6. Projects will participate in and fully comply with any client-imposed substance abuse prevention program when such programs are a contractual condition.
 7. Project and site labor agreements may include specific requirements for testing and reporting of results which will apply to affiliated employees.

Americas

Acknowledgement and Consent Form

S3AM-019-FM1

SUBSTANCE ABUSE PREVENTION

This acknowledgement and consent form applies to all Americas based employees and operations and is consistent with the Drug-Free Workplace Act of 1988 and in accordance with federal, state / provincial / territorial, and local laws and regulations. AECOM has established a policy regarding the prohibition of illegal drugs, abuse of prescription medications, use of any substances that impair job performance or safety and the unauthorized consumption of alcoholic beverages on company premises while in the course of employment, pay status, or on business. Company premises refers to all company property or company controlled property including offices, facilities, job sites or work locations, land, buildings, structures, fixtures, installations, aircraft, automobiles, trucks, boats, or vessels and all other vehicles and equipment (whether owned or leased or used by the company). This policy will be administered in accordance with applicable federal, state and local laws and regulations.

AECOM prohibits the use, possession, presence in the body, manufacture, concealment, transportation, promotion or sale of the following items or substances on company premises:

- Illegal drugs (or their metabolites), designer and synthetic drugs, mood or mind altering substances and drug use related paraphernalia unless authorized for administering currently prescribed medication;
- Controlled substances that are not used in accordance with physician instructions or non-prescribed controlled substances;
- Alcoholic beverages while at work or while on any customer or AECOM controlled property. This prohibition on alcohol applies whenever an employee is on-duty, including during meal or break periods, while on Company premises, or while representing AECOM. AECOM may make exceptions and permit the consumption of alcohol beverages at work-related events, such as Company-sponsored or approved business meals, conferences, or holiday events. Employees who choose to consume alcohol on approved occasions are expected to exercise good judgment and to refrain from becoming intoxicated or impaired. If an employee has consumed alcohol and needs transportation home, the Company will reimburse the cost of a taxicab or other reasonable costs of transportation so that the employee may avoid driving.

This policy does not prohibit lawful use and possession of current medication prescribed in the employees name or over-the-counter medications. Employees must consult with their health care provider about any prescribed medication's effect on their ability to perform work safely. An employee who has work restrictions due to his or her consumption of a prescribed medication must disclose these restrictions to their supervisor.

Although some states may pass laws legalizing medical or recreational marijuana use, the use, sale, distribution and possession of marijuana are violations of federal law. Similarly, the use, sale, distribution and possession of marijuana or the presence of marijuana in one's system on company premises including during lunch or other breaks violates this policy, and will subject an employee to disciplinary action up to and including termination consistent with controlling law.

By signing this agreement, you agree to allow the company to search and inspect your personal effects that you bring onto company premises in accordance with applicable law. You also acknowledge that you may be subject to drug and alcohol testing according to the guidelines explained in the *S3AM-019-PR1 Substance Abuse Prevention* procedure and *S3AM-019-ATT1 Substance Abuse Policy Statement*. In situations where post-accident testing is required and the employee is unable to sign a consent form following the incident, this signed *S3AM-019-FM1 Acknowledgement and Consent Form* will serve as the employee's permission to perform post-accident testing which will be conducted as a condition of employment and continued employment by using approved sample collection methods and analysis.

Employees who violate AECOM's Substance Abuse Policy are subject to discipline, up to and including termination. Depending on the circumstances, the company may offer disciplinary action to include the offering of a referral to the Employee Assistance Program or an approved medical or counselling program. This action may include an indefinite suspension of regular employment until the completion of a substance abuse and/or alcohol treatment or counselling program and the satisfactory passing of a return-to-work drug and/or alcohol test.

- I understand the requirements of the AECOM's Substance Abuse Prevention Policy and Procedure and agree to comply with all of its requirements as a condition of my employment. This includes searches, drug screening and alcohol testing as necessary and legally permitted.
- I acknowledge that the use and abuse of illegal drugs, substances that impair job performance or safety or alcohol is in violation of this Policy and that I am subject to disciplinary action if I am in violation.
- An employee who has been convicted of a felony under a criminal drug statute for a violation occurring on Company property or during the employee's working hours must notify Human Resources no later than five (5) calendar days after the felony conviction becomes final under the law.

Employee Signature

Date

Printed Name

Toxic & Hazardous Substances

S3AM-110-PR1

1.0 Purpose and Scope

- 1.1 The purpose of this procedure is to provide guidance to control occupational exposures to toxic or hazardous substances to the lowest level practicable, including those specified under applicable jurisdictional legislation.
- 1.2 This procedure applies to all AECOM Americas based employees and operations.
- 1.3 While this procedure contains specific requirements related to Benzene, Cadmium, Chromium (VI), Hydrogen Sulfide, Lead and Silica, it also includes general requirements applicable to these substances as well as any other toxic or hazardous substances that may be encountered by AECOM employees.
- 1.4 Refer to *S3AM-109-PR1 Asbestos* for Asbestos specific requirements.

2.0 Terms and Definitions

- 2.1 **Action Level (AL)** – An airborne concentration of a potentially toxic or hazardous substance, measured in parts per million by volume (ppm), microgram per cubic meter ($\mu\text{g}/\text{m}^3$) milligram per cubic meter (mg/m^3) or fibres per cubic centimetre (f/cc), that triggers certain provisions as required by the applicable jurisdictional legislation. In many cases the action level is 50% of the established exposure limit.
- 2.2 **Demolition** – The wrecking or taking out of any load-supporting structural members and any related razing, removing, or stripping of any fixed building or structure or any part thereof.
- 2.3 **Established Exposure Limit** – The maximum regulatory exposure concentration to which an individual may be exposed to for an 8- hour time weighted average (TWA).
 - This limit is referred to by different terminology depending upon the given jurisdiction (e.g. Permissible Exposure Limit (PEL), Contamination Limit, Occupational Exposure Limit (OEL), Threshold Limit Value (TLV), etc.).
 - Acceptable methods of adjusting this limit to correspond to a different exposure period (e.g. 10 hours) vary by jurisdiction and substance.
- 2.4 **Established Exposure Limit: Ceiling Value** – The maximum exposure concentration during any part of the working exposure assuming direct reading instruments are used. Ceiling exposure limits "C", shall at no time exceed the exposure limit given for that substance. If instantaneous monitoring is not feasible, then the ceiling shall be assessed as a 15-minute time weighted average exposure which shall not be exceeded at any time during the working day.
- 2.5 **Exposure Mitigation Plan** – A comprehensive document which describes the controls necessary to mitigate the risk for exposure to a specified toxic or hazardous substance. This plan is referred to by different terminology depending upon the given jurisdiction (e.g. Compliance Program, Exposure Control Plan, etc.).
- 2.6 **HAZWOPER (Hazardous Waste Operations and Emergency Response)** – Any onsite contamination investigation, hazardous waste clean-up activities, hazardous substance emergency response and hazardous waste treatment, storage and disposal (TSD) is subject to the operational requirements of *S3AM-117-PR1 Hazardous Waste Operations*.
- 2.7 **SH&E Plan** – A document prepared for a specific project that details the hazards, precautions, emergency planning, medical, and training requirements for that project.
- 2.8 **Regulated Area** – Any area where concentrations of airborne toxic or hazardous substances exceed or can reasonably be expected to exceed, the allowable employee exposure limits, either the 8-hour time-weighted average exposure limit or the short-term exposure limit as averaged over a sampling period of 15 minutes.

- 2.9 **Renovation** – The modifying of any building component that does not impact structural supports.
- 2.10 **Short-term Exposure Limit (STEL)** – The maximum regulatory exposure concentration to which a worker may be exposed during any one 15-minute period, even if the 8-hour TWA established exposure limit has not been exceeded.

3.0 References

- 3.1 S3AM-003-PR1 SH&E Training
- 3.2 S3AM-004-PR1 Incident Reporting, Notifications & Investigation
- 3.3 S3AM-010-PR1 Emergency Response Planning
- 3.4 S3AM-115-PR1 Hazardous Materials Communication
- 3.5 S3AM-117-PR1 Hazardous Waste Operations
- 3.6 S3AM-123-PR1 Respiratory Protection
- 3.7 S3AM-127-PR1 Exposure Monitoring
- 3.8 S3AM-128-PR1 Medical Screening & Surveillance
- 3.9 S3AM-208-PR1 Personal Protective Equipment
- 3.10 S3AM-209-PR1 Risk Assessment & Management
- 3.11 S3AM-301-PR1 Confined Spaces

4.0 Procedure

4.1 Roles and Responsibilities

4.1.1 SH&E Manager

- Provide technical assistance in the identification and evaluation of toxic and hazardous substance exposure hazards as requested by management personnel.
- Review and approve all exposure hazard assessments applicable to the identified toxic or hazardous substance(s) prior to the start of work activities.
- Review and approve all planning documentation, including exposure mitigation plans, and exposure monitoring activities applicable to the identified toxic or hazardous substance(s) to confirm compliance with federal, provincial, territorial, state, and/or local regulations. Plans should be updated if significant changes have occurred.
- Monitor compliance with the various aspects of this procedure and provide technical assistance regarding implementation of the requirements set forth in this procedure.
- Maintain records and notify employees of the results of any required exposure monitoring, in accordance with *S3AM-127-PR1 Exposure Monitoring*.

4.1.2 Manager

- Confirm the presence of toxic or hazardous substance exposure hazards at AECOM work sites are identified (where reasonably possible) and evaluated prior to commencing activities.
- Confirm that planning documentation, including exposure hazard assessments and any necessary exposure mitigation plans, applicable to the identified toxic or hazardous substance(s) are developed and approved by the SH&E Manager prior to the start of work activities.
- Confirm the applicable SDSs are made available to Employees.

- As required by the applicable jurisdiction, confirm notification(s) of the appropriate agencies or governing bodies is provided within the required timeframe prior to commencing the associated work activities.
- Confirm that the applicable requirements are observed for each task where the toxic or hazardous substance exposure assessment indicates airborne concentrations can exceed the Action Level (AL) or when other significant toxic or hazardous exposure hazards are present.
- Confirm that employees assigned to perform any work activities involving toxic or hazardous substances have been trained in the job-specific hazards of exposure, associated control measures, monitoring methods, emergency response, proper procedures, applicable client requirements and are trained and properly fit tested in the use of any designated respiratory protection devices. Refer to *S3AM-003-PR1 SH&E Training*.
- As required, confirm employees assigned to perform any work activities involving toxic or hazardous substances participate in provided exposure monitoring and applicable medical surveillance.
- Confirm that employees developing work procedures and/or conducting work activities involving toxic or hazardous substances possess any required jurisdictional specific registrations or certifications.
- Confirm employee training, registration and/or certifications are up to date.
- Notify SH&E Manager if any significant changes have occurred, including the presence or suspected presence of previously unidentified toxic or hazardous substances in the workplace.
- Confirm appropriate emergency response resources and procedures are in place. Refer to *S3AM-010-PR1 Emergency Response Planning*.
- If a toxic or hazardous substance is detected above the AL and/or direct reading instrumentation alarms, stop work, evacuate Employees from the affected area, and assess the work area in order to implement engineering or administrative controls, or to don personal protective equipment.
- Investigate and implement corrective actions to all incidents and reports of non-conformance with this procedure and legislation. Refer to *S3AM-004-PR1 Incident Reporting, Notifications & Investigation*.

4.1.3 Employee

- Maintain training appropriate to the toxic or hazardous substance exposure and the applicable tasks, and competency in the associated procedures (e.g. communication, rescue, etc.) and use of the necessary personal protective equipment (PPE) for entry and rescue. Refer to *S3AM-003-PR1 SH&E Training*.
- As appropriate to the anticipated or encountered toxic or hazardous substance exposure(s) and as addressed in the applicable planning documentation, utilize appropriate personal protective equipment (PPE) and applicable training in the job-specific hazards of the toxic or hazardous substance(s) exposure and associated procedures.
- Participate in applicable personal monitoring and medical surveillance, and perform appropriate respirator fit testing.
- Immediately notify the Manager of the presence or suspected presence of previously unidentified toxic or hazardous substances in the workplace, and cease all work activities involving disturbance or contact with the materials or substances until further direction is received.
- Evacuate the area when directed by the Manager or supervisor, or when a toxic or hazardous substance is detected above the AL and/or direct reading instrumentation alarms.

4.2 Requirements - General

- 4.2.1 This section applies to all toxic or hazardous substances AECOM employees may come in contact with, and also includes the toxic or hazardous substances detailed within this document with substance-specific requirements.
- 4.2.2 As required by the applicable jurisdiction, notify the appropriate agencies or governing bodies within the required timeframe prior to commencing the work activities associated with the toxic or hazardous substance(s).
- 4.2.3 Incorporate proper housekeeping to minimize the potential for toxic or hazardous substances (e.g. lead, silica, etc.) to accumulate on tables and lateral surfaces to protect workers.
- 4.2.4 All confined space entries will assess the potential of toxic or hazardous substance exposures and will be conducted according to *S3AM-301-PR1 Confined Spaces*.
- 4.2.5 Review project documents and SDSs to identify materials, operations or tasks that have a potential of exposing Employees to toxic or hazardous substances.
- 4.2.6 AECOM Employees in the vicinity of concurrent toxic or hazardous substance related activities shall be protected from exposure. Inadequate toxic or hazardous substance containment may require an initial exposure assessment or removal of Employees from the affected area until the exposure hazard has been adequately controlled.
- 4.2.7 HAZWOPER (US) or Hazardous Waste Activities
 - Toxic or hazardous substances may be present as a soil or groundwater contaminant, in wastes stored or processed at the site, and as a building material.
- 4.2.8 Other Activities
 - Various activities undertaken by AECOM personnel (e.g., construction, maintenance, demolition, renovation, production, etc.) may present potential toxic or hazardous substance exposure hazards. These exposures may be a result of materials disturbed, products handled or by-products of activities performed (e.g., welding, drilling, grinding, etc.).
- 4.2.9 If the presence of toxic or hazardous substances is identified or suspected at any work location and there is potential for Employee exposure during planned work activities the following requirements will be observed:
 - Contact SH&E Manager and/or Manager to determine whether historical air monitoring data are available that accurately represents exposure conditions for the initial determination of the location's hazards.
 - Thorough inspection and sampling / testing will be completed as necessary to identify the presence of any toxic or hazardous substances as part of the hazard assessment process.
 - The hazard assessment and site-specific SH&E Plan will provide a specific analysis of the toxic or hazardous substance exposure hazard(s) for each task identified as having a potential exposure hazard. Refer to *S3AM-209-PR1 Risk Assessment & Management*. The hazard assessment and SH&E Plan will be reviewed and approved by the SH&E Manager.
 - Prior to the commencement of work activities that may result in exposure and where possible, the toxic or hazardous substance shall be removed. Investigate materials substitution and process changes to avoid the use of products containing toxic or hazardous substances.
 - If any potential is identified for worker toxic or hazardous substance exposures to exceed the applicable AL (or if applicable, established exposure limit) or as defined by the applicable jurisdiction, specific exposure control and monitoring procedures will be developed for the substance, and included in the SH&E Plan as an exposure mitigation plan. Exposure mitigation plans may include:
 - Location description.
 - Responsibilities.

- Description of associated environmental conditions and proposed work activity.
- Engineering controls, including instruction on setup and operation (e.g. ventilation, containment, etc.).
- Air monitoring practices (include specific jurisdictional requirements) and data (initial and ongoing). Refer to *S3AM-127-PR1 Exposure Monitoring*.
- Administrative controls, including scheduling requirements, and crew sizes.
- Work practices (e.g. specific PPE, housekeeping requirements, inspection requirements, hygiene practices, etc.).
- Procedures to be followed in regulated areas where the chemical hazards are present (e.g., restricted access, signage and instruction, contamination control, emergency response procedures).
- As applicable, location of required hygiene facilities, emergency equipment / supplies, change rooms, etc.
- Maintenance and decontamination practices to be followed for servicing and cleaning equipment and disposing of waste.
- Reporting and recordkeeping requirements.
- Methods of communication to inform affected Employees of potential exposures, including contractors on multi-contractor sites.
- Medical surveillance program requirements. Refer to *S3AM-128-PR1 Medical Screening & Surveillance*.
- As applicable, the name of the Competent Person who will be responsible for performing regular inspections of the job site, materials, and equipment during the job. Refer to *S3AM-202-PR1 Competent Person Designation*.
- Exposure mitigation plans will be reviewed and approved by the SH&E Manager prior to implementation.
- SH&E Plan and mitigation plan content, including any air monitoring results, will be communicated and made available to affected Employees.
- The site specific emergency response plan shall include emergency procedures applicable to the toxic or hazardous substances workers may be exposed to. Appropriate emergency equipment or supplies shall be available.
- Applicable engineering controls are to be in place prior to work commencing.
- If there is a change in conditions the SH&E Plan and, as applicable, exposure mitigation plan may require revision, SH&E Manager review, approval and communication thereof to affected Employees.
- If Employees may potentially be exposed in excess of a toxic or hazardous substance AL, they shall complete applicable training (refer to *S3AM-003-PR1 SH&E Training*) and may be required to complete baseline medical surveillance in accordance with jurisdictional requirements.
- Disposal of toxic or hazardous substance containing materials must meet federal, provincial, territorial, state, and local regulatory requirements. The Manager is required to address this in the applicable work plan.

4.3 Worker Exposure Control Program - General

This section applies to all toxic or hazardous substances AECOM employees may come in contact with, and also includes the toxic or hazardous substances detailed within this document with substance-specific requirements.

The following requirements pertain to all workers performing tasks where the associated toxic or hazardous substance exposure assessment indicates the potential for exposures to exceed the AL (or if applicable, established exposure limit).

4.3.1 Exposure Monitoring

- Operations involving the potential airborne exposure to toxic or hazardous substances shall be required to conduct initial and, as applicable, ongoing personal air monitoring or sampling to represent Employee exposure. Refer to *S3AM-127-PR1 Exposure Monitoring*.
- Establish the testing protocols and select the appropriate equipment to measure the potential hazards.
- Personnel trained in accordance with this procedure and with manufacturer's procedures for the given equipment shall perform verification of equipment as follows:
 - Conduct or confirm calibration of combustible gas meters, as applicable, using appropriate span gas for the detectors to be used. (This span gas calibration shall be performed at frequencies determined by the manufacturer).
 - Conduct alarm checks (field or bump checks) using the appropriate span gas for the detectors to be used each time the instrument is turned on.
 - Check detector tube pumps for leakage using the manufacturer's procedures.
 - Calibrate photo ionization detectors (PID) using isobutylene or other material in accordance with the manufacturer's directions.
 - Calibrate any other instrumentation to be used in accordance with manufacturer's directions.
- Determine the acceptable values for the toxic or hazardous substances being measured, based on the equipment in use and the AL (or if applicable, established exposure limit).
- As applicable, use air samplers that indicate the toxic or hazardous substance concentration in the affected Employees' breathing zone.
- Quarterly, biannual, and baseline sampling may be required depending upon the toxic or hazardous substance, exposure levels, jurisdictional requirements and client specifications.
- Air sampling results shall be accessible to all potentially affected Employees at each applicable site.
- Ongoing personal monitors used to warn workers of potentially hazardous levels of a toxic or hazardous substance should be set to provide both a visible and audible alarm.

4.3.2 Medical Surveillance Requirements

- As defined by AECOM's Medical Provider and in accordance with the applicable jurisdictional requirements, Employees will complete a medical baseline evaluation prior to commencing work where toxic or hazardous exposure may exceed the AL (or if applicable, established exposure limit). Refer to *S3AM-128-PR1 Medical Screening & Surveillance*.
- Ongoing medical surveillance may be required as determined by the exposure(s), jurisdictional requirements and medical direction.

4.3.3 Medical Removal

- AECOM will temporarily remove an Employee from work where there has been an excessive exposure to a toxic or hazardous substance based on biological or medical monitoring results as determined by a physician's medical examination.
- The physician's determination to remove an Employee from such work may be based on monitoring results, the Employee's inability to wear a respirator, evidence of illness, other signs or symptoms of toxic or hazardous substance-related dysfunction or disease, or any other reason deemed medically sufficient by the physician.

4.3.4 Training

- Employees who have potential or are exposed at or above the AL are required to complete and maintain appropriate training related to the particular toxic or hazardous substance in accordance with the jurisdictional legislation and any applicable client requirements. Refer to *S3AM-003-PR1 SH&E Training*.
- Training will be provided prior to or at the time of initial assignment, upon any substantial changes to the operation covered, and at intervals determined by the applicable jurisdiction thereafter (e.g. U.S. annual Lead Awareness refresher).
- Training will be documented and provided at no cost to the Employees.
- Content of the training may include, but not be limited to:
 - Employee's specific duties and responsibilities (e.g., spill reporting, decontamination, etc.).
 - Exposure limits and other regulatory requirements specific to the toxic or hazardous substance.
 - Job-specific toxic or hazardous exposure hazards (including local and systemic toxicity) and exposure prevention measures.
 - The health hazards and symptoms associated with specific toxic or hazardous substance exposure.
 - Recognition and evaluation of potential hazardous situations.
 - The proper procedures and use of specific equipment for atmospheric testing and personal monitoring as applicable to the task and responsibility.
 - The purpose and a description of any required exposure monitoring.
 - The quantity, location, manner of use, release, and storage of specific toxic or hazardous substance in the workplace and the specific nature of operations that could result in exposure, especially exposures above the established exposure limit.
 - The job-specific engineering controls and work practices associated with the employee's job assignment. As applicable, review of the applicable Exposure Mitigation Plan.
 - Regulated areas: authorizations, entrance restrictions, signs and warnings.
 - Container contents identification.
 - The measures Employees can take to protect themselves from exposure to the toxic or hazardous substance(s), including modification of such habits as smoking and personal hygiene.
 - Specific procedures that AECOM has implemented to protect Employees from exposure to the toxic or hazardous substance, such as appropriate decontamination procedures, hygiene practices, warning signs and labels, and the provision of personal protective equipment.
 - As applicable, client requirements.
 - The purpose, proper selection, fitting, proper use, and limitations of respirators and protective clothing.
 - Substance technical guidelines for the toxic or hazardous substance, applicable substance safety data sheet (SDS) information.
 - Emergency (including first aid) practices and procedures, and identification of Employee's specific role.
 - The purpose, description and requirements of the medical surveillance program. This may include self-examination.

- The Employee's rights of access to records, such as monitoring results and medical records.
- Employees shall complete any additional training related to the potential toxic or hazardous substance exposure (e.g., confined space, respiratory protection, etc.) prior to or at the time of initial assignment, upon any substantial changes to the operation covered, and at intervals determined by the applicable jurisdiction thereafter.

4.3.5 Respiratory Protection

- Respiratory protection is required for those operations in which engineering controls or work practice controls are not feasible to reduce toxic or hazardous substance exposure at or below the AL (or if applicable, established exposure limit).
- Where respiratory protection is specified for use in controlling worker exposures to toxic or hazardous substances refer to *S3AM-123-PR1 Respiratory Protection* for requirements. Each Employee will:
 - Be medically cleared for use of the specified respiratory protection.
 - Complete respirator training and fit testing.
 - Be assigned an appropriate and approved respirator for use during applicable operations.
 - Use and maintain the respirator in accordance with *S3AM-123-PR1 Respiratory Protection*.
- Escape-only respirators have a single function: to allow a person working in a normally safe environment sufficient time to escape from suddenly occurring respiratory hazards. Selection should include consideration of factors such as maximum expected concentration, escape time (i.e., exposure duration), breathing rate, respirator service life, and eye irritation.

4.3.6 Personal Protective Equipment (PPE) and Hygiene Facilities

- In any operation where workers may experience airborne toxic or hazardous substance concentrations above the AL, or where the possibility of skin or eye irritation exists, and where exposure cannot be controlled by other means, Employees shall be provided with appropriate personal protective equipment that prevents contamination of the Employee and the Employee's garments, refer to *S3AM-208-PR1 Personal Protective Equipment*. Requirements may include, but are not limited to:
 - Respiratory protection.
 - Chemical or particulate protective coveralls or similar full-body work clothing.
 - Gloves, head protection / hoods, and boots or disposable work-boot coverlets.
 - Face shields, splash-proof goggles, chemical aprons or other appropriate protective equipment necessary for safe job performance.
 - Clean change rooms equipped with separate storage facilities to prevent cross contamination from protective work clothing and equipment to street clothes.
 - Shower and/or hand and face washing facilities.
 - All protective clothing shall be cleaned, laundered, properly disposed of, and repaired or replaced as necessary.
 - AECOM will provide all necessary PPE that is incidental to the work at no cost to the Employee.

4.3.7 Regulated Area

- A regulated area may be established where the concentration of an airborne toxic or hazardous substance exceeds or can reasonably be expected to exceed the AL (or if applicable, established exposure limit).

- Access to regulated areas will be limited to authorized persons. Rosters may be maintained of all persons entering such areas.
- Regulated areas will be demarcated from the rest of the workplace in any manner that minimizes the number of Employees exposed to the associated toxic or hazardous substance within the regulated area.
- Where regulated areas are required, signs will be posted at entrances to regulated areas appropriate to the associated toxic or hazardous substance. Clean and illuminate signs as necessary for visibility.
- No food or beverages shall be present or consumed in the regulated area.
- No tobacco products shall be present or used and cosmetics shall not be applied in the regulated area.
- Employees shall not enter or remain in regulated areas when any of the required safety systems such as ventilation or containment are not functional.
- Contaminated protective equipment, such as respirators, airline hoses, etc., shall not be removed from the regulated area until it has been cleaned.

4.3.8 Containers

- Toxic or hazardous substances in containers in the workplace shall be appropriately labelled in order to identify the product and provide suitable warnings. Refer to *S3AM-115-PR1 Hazardous Materials Communication*.

4.3.9 Emergency Preparedness

- The site specific emergency response shall include relevant procedures to the potential emergencies presented by the toxic or hazardous substances.
- Appropriate emergency equipment shall be available (e.g., rescue equipment, spill containment, neutralizers, etc.).
- Employees shall be trained in the use of the fire extinguishers, the emergency notification provisions of the SH&E Plan, and evacuation routes and muster points.
- As applicable, determine the local wind direction and identify the appropriate emergency egress route taking Employees out of the toxic or hazardous substance exposure area via a cross wind direction.

4.4 Asbestos – Specific Requirements

4.4.1 Please refer to *S3AM-109-PR1 Asbestos* for Asbestos specific requirements.

4.5 Benzene – Specific Requirements

4.5.1 The following substance-specific requirements supplement the *Requirements – General and Worker Exposure Control Program – General* sections as contained in this document.

4.5.2 Benzene is a naturally occurring organic compound that has become a major industrial chemical. As a pure chemical, it is a clear, colorless liquid with an aromatic odor.

- Other characteristics of benzene are low vapor pressure, high flammability, and vapors heavier than air.
- Benzene has solubility in water in the range of 700 mg/Liter, and liquid benzene is lighter than water.
- Benzene evaporates very quickly and inhalation is the most likely route of exposure.
 - Brief exposure to high concentrations of benzene can cause drowsiness, dizziness, and headaches.
 - Long-term exposures to benzene can affect normal blood production, resulting in leukemia, and can impair the body's immune system. Benzene is a known human carcinogen.

- Benzene is considered a skin hazard and requires precautions to reduce or preclude direct skin contact.
 - Chemical gloves and boots may be required and only polyvinyl alcohol (PVA) or Viton coated gloves (or other materials approved by the manufacturer for use with benzene containing products) should be used.
 - Do NOT use rubber, neoprene or nitrile gloves or boots.
- 4.5.3 Benzene is typically encountered by AECOM as an environmental contaminant, where it is usually a constituent of petroleum fuels or other refined petroleum products that have been released. Benzene can be found in retail gas stations, refineries natural gas processing systems, oil & gas production fields, chemical manufacturing plants, and in products used by Employees such as gasoline and solvent systems
- 4.5.4 Benzene Action Level (AL) – An airborne benzene concentration of 0.5 parts per million (ppm) by volume (ppm) (or more stringent as required by the country / provincial / territorial / state legislation), calculated as an 8- hour time weighted average (TWA).
- 4.5.5 Established Exposure Limit – The established exposure limits for benzene vary by jurisdiction. The applicable SH&E Plan shall identify the appropriate AL and established exposure limit. Refer to *S3AM-110-ATT1 Established Exposure Limits*.
- 4.5.6 Regulated Area – As specified by the applicable jurisdiction, any area where concentrations of airborne benzene exceed or can reasonably be expected to exceed, the AL (or if applicable, established exposure limit).
 - Where benzene regulated areas are required, signs will be posted at entrances to regulated areas with the following legend:

DANGER
BENZENE
MAY CAUSE CANCER
HIGHLY FLAMMABLE LIQUID AND VAPOR
DO NOT SMOKE
WEAR RESPIRATORY PROTECTION IN THIS AREA
AUTHORIZED PERSONNEL ONLY
- 4.5.7 Short term Exposure Limit (STEL) – A regulatory concentration that should not be exceeded during any one 15-minute period, even if the established exposure limit 8-hour TWA is not exceeded. The STEL for benzene is 2.5 ppm (or more stringent as required by the country / provincial / territorial / state legislation). Refer to *S3AM-110-ATT1 Established Exposure Limits*.
- 4.5.8 Exposure Monitoring
 - Determinations of Employee exposure to Benzene shall be made from representative breathing zone air samples. Representative 8-hour TWA Employee exposures shall be determined on the basis of one full shift exposure sample in the work area.
 - Determinations of STEL compliance shall be made from 15-minute Employee breathing zone samples. These samples shall be taken at work areas where it is reasonable to expect higher Benzene concentrations, such as:
 - Where tanks are opened, filled unloaded or gauged;
 - Where containers or process equipment are opened, and
 - Where Benzene is used for cleaning or as a solvent in an uncontrolled environment.
 - The remaining elements of monitoring, such as minimum time frames for initial and periodic monitoring and Employee notification shall meet jurisdictional requirements.

4.5.9 Benzene - Work Practices

- Only use air purifying respirators with chemical cartridges approved for the benzene concentration expected and only for the length of time calculated for expected time of useable life.
- Workers shall be provided with potable water for washing exposed skin prior to leaving the project area, eating, drinking, and/or smoking.
- When draining equipment containing Benzene materials, draining must be performed in a closed system.
- Equipment containing Benzene materials must be cleaned by appropriate method prior to opening.
- Use Benzene-free purchased products when possible. Types of products, which may contain Benzene, include paints, thinners, degreasers, cleaners, etc. Under no circumstances are aerosol products containing Benzene allowed to be used. Consult the Safety Data Sheet (SDS) to determine if the product is Benzene-free.
- Fire extinguishers shall be available at project sites where liquid benzene or benzene vapors might be present.

4.6 Cadmium-Containing Material -

4.6.1 The following substance-specific requirements supplement the *Requirements – General and Worker Exposure Control Program – General* sections as contained in this document.

4.6.2 Cadmium containing material

- Paint or other surface coatings that contain cadmium equal to or in excess of 0.1 milligram per centimeter squared (1.0 mg/cm²) or 0.05% by weight; or
- Bulk materials containing cadmium in excess of 0.01%, or for soils any cadmium-in-soil concentration in excess of 100 mg/kg.
- Airborne cadmium may be encountered as a result of burning fossil fuels, smelting of zinc, copper or lead and may be released in welding fumes (cadmium coatings are often used to prevent rust on steel pipe).

4.6.3 The health effects of cadmium exposure vary due to duration and level of exposure.

- Acute or short term exposures to high levels of cadmium may cause effects such as chills, fever and muscle pain. Acute exposure may also cause lung damage.
- Chronic or long term cadmium exposure may cause effects such as lung, kidney or bone disease.
- Cadmium is identified as carcinogenic to humans.

4.6.4 Cadmium Action Level (AL) – An airborne cadmium concentration of 0.002 mg/m³ (2.0 µg/m³) or more stringent as required by the local regulations (e.g. 50% of established exposure limit), calculated as an 8-hour time weighted average (TWA), irrespective of mitigation provided by any respiratory protection that might be used.

4.6.5 Established Exposure Limit – The established exposure limits for cadmium vary by jurisdiction. The applicable SH&E Plan shall identify the appropriate AL and established exposure limit. Refer to *S3AM-110-ATT1 Established Exposure Limits*.

- In each work area where the AL is exceeded, the following warning sign shall be posted:

DANGER
CADMIUM
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS AND KIDNEYS
WEAR RESPIRATORY PROTECTION IN THIS AREA
AUTHORIZED PERSONNEL ONLY

- Disposable equipment such as protective clothing and hoods, waste scrape and debris shall be disposed of in containers labelled as follows:

DANGER
CONTAINS CADMIUM
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS AND KIDNEYS
AVOID CREATING DUST

- Employees exiting cadmium regulated areas shall wash their hands and face with soap and water, and may be required to shower. Refer to the *S3AM-117-PR1 Hazardous Waste Operations*.
- Removal of cadmium from protective clothing or equipment by blowing, shaking, or any other means which could disperse cadmium into the air is prohibited.
- No food, tobacco, or beverages shall be present or consumed in the regulated area.
- During the operation, all Employees shall be required to wash their hands and face prior to eating, drinking, smoking, or applying cosmetics.
- Whenever possible, wet methods shall be used when handling or processing cadmium compounds. Water spray, fogging, or water collection systems, etc., shall be used. (e.g., cadmium-contaminated soil shall be thoroughly wetted for excavation operations.)
- Dry sweeping of cadmium or cadmium-contaminated materials is prohibited. When wet methods cannot be used, HEPA filter vacuum cleaners shall be required. Filters will be checked periodically as needed.

4.7 Chromium (VI) – Specific Requirements

- 4.7.1 The following substance-specific requirements supplement the *Requirements – General and Worker Exposure Control Program – General* sections as contained in this document.
- 4.7.2 Exposures to Chromium (VI), (or hexavalent chromium) could result from the application and removal of paint containing Chromium (VI), welding, cutting, grinding and chrome plating.
- 4.7.3 Direct skin contact with concrete and concrete products (as Chromium (VI) may be present in portland cement) may result in skin irritation and ulceration. Suitable gloves and boots should be used when handling dry powder or wet concrete materials. Eye protection is also required when mixing concrete materials.
- 4.7.4 AL and established exposure limits for Chromium (VI) vary considerably by jurisdiction. The applicable SH&E Plan shall identify the appropriate AL and established exposure limit.
- 4.7.5 As applicable, utilize the associated SDS to determine if Chromium (VI) is a material constituent. For example, if chromium trioxide, chromic acid, chromate, dichromate, polychromate, chrome VI, chromium 6, chromium (VI), Cr VI, Cr (VI), chromium anhydride, or hexavalent chromium is listed on an SDS, the material will be treated as containing Chromium (VI).
- 4.7.6 Complete baseline assessments for Chromium (VI) levels at each applicable site as soon as reasonably possible after the start of work involving Chromium (VI) materials.
- 4.7.7 Until demonstrated otherwise, assume that paint on military vehicles, aircraft, vessels, and other equipment contains Chromium (VI).
- 4.7.8 Changes in the work activities, methods, or materials may indicate the need for a new Chromium (VI) baseline. For example, a change in the ventilation system where work is performed, or a change in the type of military vehicle serviced may elevate the Chromium (VI) levels and require a new baseline.
- 4.7.9 Affected areas will be decontaminated to prevent Chromium (VI) ingestion at the site, contamination of other work areas, and contamination of the Employee's home.

- 4.7.10 Action Level (AL) – An airborne concentration of 50% of the applicable jurisdiction's established exposure limit of Chromium (VI), calculated as an 8-hour time weighted average (TWA), irrespective of mitigation provided by any respiratory protection that might be used.
- 4.7.11 Established Exposure Limit – The established exposure limits for Chromium (VI) vary by jurisdiction. The applicable SH&E Plan shall identify the appropriate AL and established exposure limit. Refer to *S3AM-110-ATT1 Established Exposure Limits*.
- 4.7.12 Regulated Area – Any area where concentrations of Chromium (VI) exceed or can reasonably be expected to exceed, the AL.
- 4.7.13 A respirator is the PPE appropriate for reducing inhalation exposures to Chromium (VI).
- If there is any potential for hexavalent chromium exposure, involved workers must wear gloves and a half-face respirator with a P100 HEPA cartridge / filter as a minimum.
 - Various operations may require use of respiratory protection providing a greater protection factor.
 - Respirator selection shall be included in the applicable SH&E Plan.
- 4.7.14 Where protective clothing is required, change rooms shall be provided with separate storage areas for street clothes and protective clothing.
- 4.7.15 Where skin contact with Chromium (VI) is anticipated, washing facilities will be provided with hot and cold running water, cleanser, and individual hand towels. Soap and water is not adequate thus a cleanser or wipe designed specifically to remove heavy metals is required.
- 4.8 Hydrogen Sulfide (H₂S) – Specific Requirements
- 4.8.1 The following substance-specific requirements supplement the *Requirements – General* and *Worker Exposure Control Program – General* sections as contained in this document.
- 4.8.2 Synonyms: Hydrosulfuric acid, Sewer gas, Sulfuretted hydrogen.
- 4.8.3 H₂S is a colorless, flammable, extremely hazardous gas with a “rotten egg” smell. Sense of smell becomes rapidly fatigued at low levels of H₂S and cannot be relied upon to warn of the continuous presence of H₂S.
- 4.8.4 H₂S is shipped as a liquefied compressed gas and is soluble in water. Its boiling point is -77 degrees F (-60 degrees C). The flammable limits in air are 4% - 44%. H₂S is a flammable gas. H₂S is heavier than air and may accumulate in low-lying areas.
- 4.8.5 H₂S often results from the bacterial breakdown of organic matter in the absence of oxygen, such as in swamps and sewers; this process is commonly known as anaerobic digestion.
- 4.8.6 H₂S is also found in petroleum drilling and refineries as well as natural gas extraction and processing.
- 4.8.7 Established Exposure Limit – The established exposure limits for H₂S vary by jurisdiction. The applicable SH&E Plan shall identify the appropriate AL and established exposure limit. Refer to *S3AM-110-ATT1 Established Exposure Limits*.
- 4.8.8 Immediately Dangerous to Life and Health (IDLH) - An atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from a dangerous atmosphere. Atmospheres containing high concentrations (greater than 100 ppm) of H₂S are considered IDLH.
- 4.8.9 The health effects of exposure to H₂S are provided by the United States Department of Labor (Occupational Safety and Health Administration) and described in the table below:

Concentration (ppm)	Symptoms/Effects
0.00011-0.00033	Typical background concentrations
0.01-1.5	Odor threshold (when rotten egg smell is first noticeable to some). Odor becomes more offensive at 3-5 ppm. Above 30 ppm, odor is described as sweet or sickeningly sweet.
2-5	Prolonged exposure may cause nausea, tearing of the eyes, headaches or loss of sleep. May cause airway problems (bronchial constriction) in some asthma patients.
20	Possible fatigue, loss of appetite, headache, irritability, poor memory, dizziness.
50-100	Slight conjunctivitis ("gas eye") and respiratory tract irritation after 1 hour. May cause digestive upset and loss of appetite.
100	Coughing, eye irritation, loss of smell after 2-15 minutes (olfactory fatigue). Altered breathing, drowsiness after 15-30 minutes. Throat irritation after 1 hour. Gradual increase in severity of symptoms over several hours. Death may occur after 48 hours.
100-150	Loss of smell (olfactory fatigue or paralysis).
200-300	Marked conjunctivitis and respiratory tract irritation after 1 hour. Pulmonary edema may occur from prolonged exposure.
500-700	Staggering, collapse in 5 minutes. Serious damage to the eyes in 30 minutes. Death after 30-60 minutes.
700-1,000	Rapid unconsciousness, "knockdown" or immediate collapse within 1 to 2 breaths, breathing stops, death within minutes.
1,000-2,000	Nearly instant death.

4.8.10 The Manager will assume H₂S is present for specific activities including, but not limited to:

- Oil and gas due diligence, remedial investigation, or other defined activities planned in a sour well field, compressor facility, or downstream refining or storage facility;
- Sanitary sewer projects requiring entry into confined spaces;
- Confined space entry into any chemical process vessels, tanks, pits, etc.;
- Entry into client-designated H₂S areas at wastewater treatment plants; and
- Subsurface investigation/disturbance activities at municipal or other potential H₂S -generating landfills.

4.8.11 The following sign may be posted near area where H₂S is present.

WARNING HAZARDOUS AREA
HYDROGEN SULFIDE
EXTREME HEALTH HAZARD
FATAL OR HARMFUL IF INHALED

4.8.12 All ignition sources must be controlled when H₂S is present.

4.8.13 All personal H₂S detectors will be set to alarm at the AL (e.g. 10 ppm) or lower as dictated by jurisdictional and/or client requirements.

4.8.14 Appropriate respiratory protection used in an H₂S environment shall be determined according to the exposure hazard, the applicable jurisdictional requirements and any client specifications and included in the SH&E Plan. Refer to *S3AM-123-PR1 Respiratory Protection*.

- Air purifying respirators should not be used in concentrations above 50 ppm without an industrial hygienist's approval. It is important to calculate cartridge life limits of air purifying respirators.
- Workers without respiratory protection should never be exposed to concentrations above the applicable established exposure limit.

- Supplied air or self-contained breathing apparatus respirators are often required for H₂S conditions.

4.9 Lead – Specific Requirements

- 4.9.1 The following substance-specific requirements supplement the *Requirements – General* and *Worker Exposure Control Program – General* sections as contained in this document.
- 4.9.2 Determine whether any surface to be disturbed or altered contains lead or has a surface coating that contains lead.
- 4.9.3 Lead Containing Material -
- Structural or decorative components containing lead in excess of 1% by weight.
 - Paint or other surface coatings that contain lead equal to or in excess of 1.0 milligram per centimeter squared (1.0 ug/cm²).
 - Bulk materials containing lead in excess of 0.1% or for soils any lead-in-soil concentration in excess of 1,000 mg/kg.
 - "Lead" means metallic lead, all inorganic lead compounds, and organic lead soaps. Excluded from this definition are all other organic lead compounds.
 - Demolition and renovation activities may reveal lead containing materials such as pipes, leaded paints, leaded solders, etc. Lead may be present at HAZWOPER sites as a soil or groundwater contaminant or as a building material.
- 4.9.4 The health effects of lead exposure vary due to duration and level of exposure.
- Acute or short term exposures to high levels of lead may cause such effects as irritability, headaches, weakness, fatigue, constipation, vomiting, abdominal pain, sleep loss, loss of appetite, memory loss, muscle aches or tingling and even anemia, kidney damage or brain damage. Extremely high lead exposure can be fatal.
 - Chronic or long term lead exposure may cause effects such as irritability, depression, forgetfulness, distractedness, constipation, abdominal pain, nausea, and vomiting. Prolonged exposure may also result in systemic damage; reproductive, urinary, nervous and blood-forming systems.
- 4.9.5 Established Exposure Limit – The maximum exposure concentration to which an individual may be exposed to for an 8-hour time weighted average (TWA) without experiencing adverse health effects. For normal work shifts (8 hours or less), the established exposure limit for lead is 0.05mg/m³ (50 µg/m³), or more stringent as per local regulations.
- 4.9.6 Action Level (USA) – Employee exposure, without regard to the use of respirators, to an airborne concentration of lead of 0.03mg/m³ (30µg/m³) calculated as an 8-hour time-weighted average (TWA).
- 4.9.7 Action Level (Canada) – Employee exposure, without regard to the use of respirators, to an airborne concentration of lead of 0.025mg/m³ (25µg/m³) calculated as an 8-hour time-weighted average (TWA). (50% of the established exposure limit or 50µg/m³)
- 4.9.8 Whenever possible, Employees shall not disturb lead containing materials.
- 4.9.9 Until the initial exposure assessment can be conducted, the following respiratory protection must be in place:
- Provide half face air purifying respirators with high efficiency cartridges where lead coatings or paint is present and any of the following activities will occur:
 - Manual demolition of structures.
 - Manual scraping.
 - Manual sanding.
 - Heat gun applications.

- Power tool cleaning with dust collection applications.
 - Spray painting with lead paint
 - Provide full face air purifying or powered air purifying respirators with high efficiency filters, or full face supplied air respirator operated in a demand mode when performing tasks involving:
 - Lead-containing mortar.
 - Lead burning.
 - Rivet busting.
 - Power tool cleaning without dust collection systems.
 - Cleanup activities where dry expendable abrasives are used.
 - Abrasive blasting enclosure movement and removal.
 - Provide full face supplied air respirators operated in pressure demand or other positive pressure when performing tasks involving:
 - Abrasive blasting.
 - Welding.
 - Cutting.
 - Torch burning.
- 4.9.10 If initial air monitoring indicates levels of lead above the action level, monitoring shall be conducted every six months, at a minimum, until two consecutive monitoring results are recorded below the action level.
- 4.9.11 Employees shall wash hands and face if contact has been made with lead containing materials.
- 4.9.12 Regulated Area – Any area where the lead AL is exceeded.
- Where lead regulated areas are required, the following warning sign shall be posted:

DANGER
LEAD WORK AREA
POISON
MAY DAMAGE FERTILITY OR THE UNBORN CHILD
CAUSES DAMAGE TO THE CENTRAL NERVOUS SYSTEM
DO NOT EAT, DRINK OR SMOKE IN THIS AREA
 - Contaminated protective equipment such as respirators, airline hoses, etc., shall not be removed from the regulated area until it has been cleaned.
 - Employees shall not be permitted to exit the regulated area until:
 - Contaminated equipment and clothing have been removed in accordance with the preceding bullets; and,
 - As determined by jurisdictional requirements, Employees have showered and/or washed their hands and face with soap and water.
 - Removal of lead from protective clothing or equipment by blowing, shaking, or any other means which could disperse lead into the air is prohibited.
 - No food or beverages shall be present or consumed in the regulated area.
 - No tobacco products shall be present or used and cosmetics shall not be applied in the regulated area.
 - During the operation, all Employees shall be required to wash their hands and face prior to eating, drinking, smoking, or applying cosmetics.

- Whenever possible, wet methods shall be used when handling or processing lead compounds. Water spray, fogging, or water collection systems, etc., shall be used (e.g., lead contaminated soil shall be thoroughly wetted for excavation operations).
- Dry sweeping of lead or lead-contaminated materials is prohibited. When wet methods cannot be used, HEPA filter vacuum cleaners shall be required.
- Containers of contaminated protective clothing and equipment are to be labelled as follows:

CAUTION: CLOTHING CONTAMINATED WITH LEAD. DO NOT REMOVE
DUST BY BLOWING OR SHAKING. DISPOSE OF LEAD
CONTAMINATED WASH WATER IN ACCORDANCE WITH
APPLICABLE LOCAL, STATE OR FEDERAL REGULATIONS

- A Competent Person will be appointed who is responsible for performing regular inspections of the job site, materials, and equipment during the job. Refer to *S3AM-202-PR1 Competent Person*.
- The Competent Person is to inspect the job site at least daily on those days when lead operations are performed.

4.10 Silica – Specific Requirements

- 4.10.1 The following substance-specific requirements supplement the *Requirements – General and Worker Exposure Control Program – General* sections as contained in this document.
- 4.10.2 Respirable crystalline silica – Airborne particles that contain quartz, cristobalite, and/or tridymite and whose measurement is determined by a sampling device designed to meet the characteristics for respirable-particle-size-selective samplers specified in the International Organization for Standardization (ISO) 7708:1995: Air Quality—Particle Size Fraction Definitions for Health-Related Sampling. Crystalline Silica is considered by the International Agency for Research on Cancer (IARC) to be a human carcinogen when inhaled.
- 4.10.3 Exposure to airborne silica may occur as a result of work activities that disturb silica and silica containing materials (e.g. concrete, blasting, grinding, rock drilling, etc.). When silica is undisturbed, it does not pose an inhalation risk.
- 4.10.4 Methods incorporated to assess silica exposure hazards vary given the operations to be conducted, materials and regulatory requirements.
 - Assessment may take the form of monitoring of coal dust and analyzing the percentage of quartz content as a determination of crystalline silica exposures (requirement of coal mining operations in U.S.).
 - Other monitoring is conducted using industrial hygiene techniques for respirable particulate along with laboratory analysis of the dust for crystalline silica content.
- 4.10.5 Silicosis – A form of disease resulting from silica exposure.
 - Silicosis can be chronic or acute, depending on the exposure dose and duration. Symptoms often develop later in a person's working career.
 - Silicosis is most commonly the result of chronic (long-term) exposure and is classified by symptoms of reduced lung function, such as shortness of breath, cough and respiratory failure.
- 4.10.6 Established Exposure Limit – The established exposure limits for silica vary by jurisdiction. The applicable SH&E Plan shall identify the appropriate AL and established exposure limit. Refer to *S3AM-110-ATT1 Established Exposure Limits*.
- 4.10.7 Silica - Isolation
 - Work shall be enclosed, when practicable, so that all dust is contained within the enclosure and all Employees are outside.
 - As practicable, a perimeter shall be established around the source of the airborne dust to restrict access and limit exposures.

4.10.8 Silica - Ventilation

- As is practicable, local exhaust ventilation (LEV) or a vacuum tool system that removes fugitive airborne dust shall be implemented.
- High Efficiency Particulate Air (HEPA) filter vacuums shall be used.

4.10.9 Silica - Work Practices

- Facility and equipment are maintained to reduce atmospheric silica contamination.
- Work with silica-content materials in a way that minimizes the generation of airborne dust.
- When practicable, sweeping shall be conducted using wet methods (e.g. using water or a sweeping compound).
- Wet silica-content materials before disturbing, unless that creates significant muscular skeletal strain, slip or other safety hazards.
- Use a water mist to suppress airborne silica dust.
- Avoid working with silica-content materials dry.
- Avoid using compressed air to clean dust from surfaces, equipment or the body.

4.10.10 Silica - Atmospheric Monitoring

- If a qualitative assessment indicates that there is a high risk for silica exposure, then silica exposure monitoring may be conducted to support assessment and control strategies at the direction of the SH&E Manager. Samples taken in order to monitor exposure to atmospheric contaminants must be collected using the methods outlined in the applicable regulatory standards and *S3AM-127-PR1 Exposure Monitoring*.

5.0 Records

- 5.1 Medical surveillance, Employee monitoring, and training records shall be maintained as specified by *S3AM-003-PR1 SH&E Training*, *S3AM-127-PR1 Exposure Monitoring* and *S3AM-128-PR1 Medical Screening & Surveillance*.

6.0 Attachments

- 6.1 [S3AM-110-ATT1 Established Exposure Limits](#)
- 6.2 [S3AM-110-FM1 Toxic & Hazardous Substance Checklist](#)

Americas

Established Exposure Limits

S3AM-110-ATT1

	8hr TWA	15 min or ceiling
Silica, Crystalline		
OSHA - PEL (respirable fraction) = $10 \div [\% \text{quartz} + (\% \text{cristobalite} \times 2) + (\% \text{tridymite} \times 2) + 2]$		
ACGIH	0.025 mg/m3	N/A
Alberta	0.025 mg/m3	N/A
British Columbia	0.025 mg/m3	N/A
Manitoba	0.025 mg/m3	N/A
New Brunswick	ACGIH 1997	ACGIH 1997
Newfoundland	0.025 mg/m3	N/A
Northwest Territories	0.05 mg/m3	N/A
Nova Scotia	0.025 mg/m3	N/A
Nunavut	0.05 mg/m3	N/A
Ontario	0.05 mg/m3	N/A
Prince Edward Island	0.025 mg/m3	N/A
Quebec	0.05 mg/m3	N/A
Saskatchewan	0.05 mg/m3	N/A
Yukon	300 particles/mL	N/A

	8hr TWA	15 min or ceiling
Inorganic Lead		
OSHA	0.05 mg/m3	N/A
ACGIH	0.05 mg/m3	N/A
Alberta	0.05 mg/m3	N/A
British Columbia	0.05 mg/m3	N/A
Manitoba	0.05 mg/m3	N/A
New Brunswick	ACGIH 1997	ACGIH 1997
Newfoundland	0.05 mg/m3	N/A
Northwest Territories	0.05 mg/m3	0.15 mg/m3
Nova Scotia	0.05 mg/m3	N/A
Nunavut	0.15 mg/m3	0.45 mg/m3
Ontario	0.05 mg/m3	N/A
Prince Edward Island	0.05 mg/m3	N/A
Quebec	0.05 mg/m3	N/A
Saskatchewan	0.05 mg/m3	0.15 mg/m3
Yukon	0.15 mg/m3	0.45 mg/m3

	8hr TWA	15 min or ceiling
Hydrogen Sulfide		
OSHA - General Ind.	N/A	20 ppm
OSHA - Construction	10 ppm	15 ppm
ACGIH	1 ppm	5 ppm
Alberta	10 ppm 14 mg/m3	15 ppm (C) 21 mg/m3 (C)
British Columbia	N/A	10 ppm (C)
Manitoba	1 ppm	5 ppm
New Brunswick	ACGIH 1997	ACGIH 1997
Newfoundland	1 ppm	5 ppm
Northwest Territories	10 ppm	15 ppm
Nova Scotia	1 ppm	5 ppm
Nunavut	10 ppm 14 mg/m3	15 ppm (C) 21 mg/m3 (C)
Ontario	10 ppm	15 ppm
Prince Edward Island	1 ppm	5 ppm
Quebec	10 ppm 14 mg/m3	15 ppm (C) 21 mg/m3 (C)
Saskatchewan	10 ppm	15 ppm
Yukon	10 ppm 15 mg/m3	15 ppm (C) 27 mg/m3 (C)

	8hr TWA	15 min or ceiling
Benzene		
OSHA - General Ind.	10 ppm	25 ppm
OSHA - Construction	1 ppm	5 ppm
ACGIH	0.5 ppm	2.5 ppm
Alberta	0.5 ppm 1.6 mg/m3	2.5 ppm 8 mg/m3
British Columbia	0.5 ppm	2.5 ppm
Manitoba	0.5 ppm	2.5 ppm
New Brunswick	ACGIH 1997	ACGIH 1997
Newfoundland	0.5 ppm	2.5 ppm
Northwest Territories	N/A	N/A
Nova Scotia	0.5 ppm	2.5 ppm
Nunavut	N/A	N/A
Ontario	0.5 ppm	2.5 ppm
Prince Edward Island	0.5 ppm	2.5 ppm
Quebec	1 ppm 3 mg/m3	5 ppm 15.5 mg/m3
Saskatchewan	N/A	N/A
Yukon	C10	32 mg/m3

	8hr TWA	15 min or ceiling		8hr TWA	15 min or ceiling
Elemental Cadmium			Cadmium , Respirable		
OSHA - General Ind.	0.2 mg/m3	0.6 mg/m3		0.1 mg/m3	0.3 mg/m3
OSHA - Construction	N/A	N/A		0.005mg/m3	N/A
ACGIH	0.01 mg/m3	N/A		0.002 mg/m3	N/A
Alberta	0.01 mg/m3	N/A		0.002mg/m3	N/A
British Columbia	0.01 mg/m3	N/A		0.002mg/m3	N/A
Manitoba	0.01 mg/m3	N/A		0.002 mg/m3	N/A
New Brunswick	ACGIH 1997	ACGIH 1997		N/A	N/A
Newfoundland	0.01 mg/m3	N/A		0.002 mg/m3	N/A
Northwest Territories	0.01 mg/m3	0.03 mg/m3		0.002 mg/m3	0.006 mg/m3
Nova Scotia	0.01 mg/m3	N/A		0.002 mg/m3	N/A
Nunavut	0.05 mg/m3	0.2 mg/m3		N/A	N/A
Ontario	0.01 mg/m3	N/A		0.002 mg/m3	N/A
Prince Edward Island	0.01 mg/m3	N/A		0.002 mg/m3	N/A
Quebec	0.025 mg/m3	N/A		N/A	N/A
Saskatchewan	0.01 mg/m3	0.03 mg/m3		0.002mg/m3	0.006 mg/m3
Yukon	0.05 mg/m3	0.15 mg/m3		N/A	N/A

	8hr TWA	15 min or ceiling		8hr TWA	15 min or ceiling
Chromium (VI) - water soluble			Chromium (VI) - insoluble		
OSHA - Construction	0.005 mg/m3	N/A		0.005 mg/m3	N/A
ACGIH	0.05 mg/m3	N/A		0.01 mg/m3	N/A
Alberta	0.05 mg/m3	N/A		0.01mg/m3	N/A
British Columbia	0.025 mg/m3	0.1 mg/m3(C)		0.01mg/m3	N/A
Manitoba	0.05 mg/m3	N/A		0.01 mg/m3	N/A
New Brunswick	ACGIH 1997	ACGIH 1997		N/A	N/A
Newfoundland	0.05 mg/m3	N/A		0.01 mg/m3	N/A
Northwest Territories	0.05 mg/m3	0.15 mg/m3		0.01 mg/m3	0.03 mg/m3
Nova Scotia	0.05 mg/m3	N/A		0.01 mg/m3	N/A
Nunavut	0.05 mg/m3	0.15 mg/m3		0.05 mg/m3	0.15 mg/m3
Ontario	0.05 mg/m3	N/A		0.01 mg/m3	N/A
Prince Edward Island	0.05 mg/m3	N/A		0.01 mg/m3	N/A
Quebec	0.05 mg/m3	N/A		0.01 mg/m3	N/A
Saskatchewan	0.05 mg/m3	0.15 mg/m3		0.01mg/m3	0.03 mg/m3
Yukon	N/A	N/A		N/A	N/A

The charts above are intended to provide basic established exposure limits (PEL, OEL, TLV, etc.) by jurisdiction. It is not comprehensive. Please consult the applicable jurisdictional legislation to obtain further information and to verify accuracy.

Americas

Toxic & Hazardous Substances Checklist

S3NA-110-FM1

1. Have toxic or hazardous substances present in the workplace been identified?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
2. Is there a potential for employee exposure above an action level (or as applicable, established exposure limit)?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
3. List hazardous substances identified:			

4. If the response to Question 2 is "Yes," have you completed a SH&E Plan, including exposure mitigation plan or developed guidelines to address the following compliance concerns, where applicable, for each identified hazardous substance?			
• Responsibilities	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
• Action Level Exposure Limits	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
• Established Exposure Limits	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
• Engineering Controls (e.g. ventilation, purging, containment, etc.)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
• Administrative Controls (e.g. scheduling, crew size, etc.)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
• Exposure Monitoring and Obtained Data	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
• Regulated Areas/Signs	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
• Specific Procedures and Practices	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
• Respiratory Protection	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
• Protective Clothing	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
• Hygiene	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
• Hazard Communication	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
• Training Program	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
• Housekeeping	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
• Medical Surveillance / Medical Removal	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
• Reporting	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
• Contamination/Waste disposal	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
• Emergency Response	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
• Record Keeping Requirements	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
Comments:			

Attach all program and/or guidance material for items checked "Yes" to this checklist (or indicate where the information can be found in the facility or site health and safety plan).

Prepared by: _____ Date: _____

Reviewed by: _____ Date: _____

Approved by: _____ Date: _____

Bloodborne Pathogens

S3AM-111-PR1

1.0 Purpose and Scope

- 1.1 Define the AECOM procedures for eliminating and/or controlling occupational exposure to Bloodborne Pathogens on AECOM projects and activities.
- 1.2 A written Exposure Control Plan shall be developed and implemented during all AECOM operations where there is a reasonable potential for occupational exposure of AECOM employees and/or subcontractors to bloodborne pathogens as a regulated waste.
- 1.3 This procedures requirements apply to all AECOM Americas employees and operations. Any jurisdictional requirements exceeding those identified in this procedure shall be met when conduction work in the given jurisdiction.

2.0 Terms and Definitions

- 2.1 **Blood** – Human whole blood; human blood components such as plasma or platelets; and human blood products such as clotting factors.
- 2.2 **Bloodborne Pathogens (BBP)** – Pathogenic microorganisms that are present in human blood and that can infect and cause disease in persons who are exposed to blood containing these pathogens including but not limited to hepatitis B virus (HBV), human immunodeficiency virus (HIV), hepatitis C, malaria, syphilis, babesiosis, brucellosis, leptospirosis, arboviral infections, relapsing fever, human T-lymphotrophic virus Type I, and viral hemorrhagic fever (Ebola).
- 2.3 **Exposure Control Plan (S3AM-111-ATT1)** – A plan that addresses the requirements applicable to specific AECOM projects and activities designed to eliminate or minimize employee exposure. The Exposure Control Plan shall be incorporated into the location specific SH&E Plan and shall be accessible to all employees. The Exposure Control Plan shall include:
 - Exposure determination.
 - The schedule and method of implementation for:
 - Methods of compliance;
 - Hepatitis B Vaccination;
 - Post exposure Evaluation;
 - Communications of Hazards to employees; and
 - Record Keeping.
 - Documentation methods for exposure incidents, to include:
 - Routes of exposure; and
 - The circumstances for which and exposure incident occurred.

Note: In the State of California this plan shall also address exposures to airborne pathogens.
- 2.4 **SH&E Plan** – A document prepared for a specific project or program that details the hazards, precautions, emergency planning, medical, and training requirements for that project or program.
- 2.5 **Occupational Exposure (Exposed)** – Reasonably anticipated skin, eye mucous membrane, or parenteral contact with blood or other potentially infectious materials that may result from the performance of an employee's duties. Employees will be considered to be potentially exposed, even though they are using the universal precautions specified for the project or program.

- 2.6 **Other Potentially Infectious Materials (OPIM)** – Body fluids and tissues including: semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, peritoneal fluid, pericardial fluid, amniotic fluid, saliva, and any other body fluid that is visibly contaminated with blood. When it is difficult or impossible to differentiate between body fluids, all body fluids should be treated as if they are potentially infectious.
- Note: In the State of California airborne pathogens are also considered infectious materials.*
- 2.7 **Regulated Waste** – (1) liquid or semi-liquid blood or other potentially infectious materials; (2) contaminated items that would release blood or other potentially infectious materials in a liquid or semi-liquid state if compressed; (3) items that are caked with dried blood or other potentially infectious materials and are capable of being released during handling; (4) objects contaminated with blood that can pierce the skin; and (5) pathological and microbiological wastes containing blood or other potentially infectious materials.
- 2.8 **Source Individual** – An individual, typically one who has been injured, whose blood or saliva has come in contact with another individual, typically one who has rendered first aid or Cardio Pulmonary Resuscitation (CPR) to the injured party.
- 2.9 **Universal Precautions** – All body fluids and materials potentially contaminated by body fluids will be considered to be infectious unless the fluids were from the person performing the clean up or decontamination activities. All employees coming in contact with another person's body fluids shall assume that the fluids are infectious and shall wear prescribed Personal Protective Equipment.

3.0 References

- 3.1 S3AM-003-PR1 SH&E Training
- 3.2 S3AM-004-PR1 Incident Reporting, Notifications & Investigation
- 3.3 S3AM-017-PR1 Injury & Illness Recordkeeping
- 3.4 S3AM-128-PR1 Medical Screening & Surveillance
- 3.5 S3AM-208-PR1 Personal Protective Equipment
- 3.6 S3AM-209-PR1 Risk Assessment & Management

4.0 Procedure

4.1 Roles and Responsibilities

4.1.1 Occupational Health Manager

- Will review and maintain all medical records generated as a result of post-exposure follow-up and maintain all medical records related to the follow-up.
- Will, where appropriate, consult with AECOM's local medical providers about follow-up recommendations.

4.1.2 SH&E Manager

- Will review project / program-specific Exposure Control Plans (normally part of the SH&E Plan) prior to the initial mobilization, at least annually for continuing projects or programs, and whenever necessary to reflect modified tasks or procedures that affect occupational exposure to bloodborne pathogens.
- Will consult with the Occupational Health Manager regarding all bloodborne pathogens exposure incidents.
- Will maintain training records and post-exposure follow-up information.
- Will confirm that site-specific training is conducted for all employees working at sites where regulated wastes were disposed or for employees who may be occupationally exposed while working at a facility that handles regulated wastes.

- Will confirm the Hepatitis B vaccine is made available to all employees with a potential occupational exposure (e.g. paramedic, medical laboratory employee, etc.).
- Will review all incident reports and arrange for post-exposure follow-up with AECOM's local medical provider.
- Will offer recommendations on how to prevent an incident from recurring.

4.1.3 **Manager**

- See that all recommendations made by the SH&E Manager are implemented.
- Support the SH&E Manager in their efforts to prevent occupational and non-occupational exposures to bloodborne pathogens.

4.1.4 **Employee**

- Use all PPE and universal precautions required to prevent exposure to infectious materials.
- Follow the exposure control methods outlined in their Exposure Control Plan.
- Report potential exposure incidents to their Supervisor or Manager immediately.

4.2 Potential Exposure Situations

4.2.1 There are a few activities within AECOM where potential occupational exposures to blood or other potentially infectious materials are of concern. These activities may include:

- Investigations of properties that received regulated wastes.
- Site visits or audits at Treatment Storage and Disposal facilities where medical waste is handled.
- Site visits or audits at medical or health care facilities.
- The provision of first-aid or cardiopulmonary resuscitation (CPR) to AECOM, subcontractor, or client personnel (if the action is part of the employee's occupations duties [e.g. paramedic] and not provided as a voluntary action).

4.2.2 Although AECOM does offer first-aid and CPR training to its employees on a regular basis, providing such aid is often on a voluntary basis and not directed by AECOM. As such, potential exposures may not be considered occupational exposures within the context of the OSHA Bloodborne Pathogens Standard. Site-specific Exposure Control Plans shall differentiate voluntary first-aid duties from occupational exposures as a component of the exposure determination. Refer to *S3AM-209-PR1 Risk Assessment & Management*.

4.3 Unforeseen Exposure Situations

4.3.1 Occasionally, potentially infectious material is encountered during a activity where none was expected; when this happens, the work shall be stopped, employee training conducted, and an exposure control plan prepared prior to resuming activities with potential exposures.

4.4 Employee Training

4.4.1 All personnel who will work on projects or programs which involve potential contact with regulated wastes will be required to attend a training class prior to the start of the project or program and annually for continuing projects or programs. Refer to *S3AM-003-PR1 SH&E Training*. The specific requirements and provisions of the written Exposure Control Plan shall be provided to each AECOM Employee and subcontractor assigned to work at the program / project.

4.4.2 Either of the following two sources of employee training will be used by AECOM to educate Employees on the hazards of exposure to bloodborne pathogens:

- The local chapter of the American Red Cross or other recognized training provider.
- AECOM's in-house training program.

4.4.3 Training sessions will review the following:

- Requirements of OSHA's Bloodborne Pathogens Standard or equivalent, applicable jurisdictional requirements.
- Review of AECOM's Bloodborne Pathogen Procedure (this document).
- Situations within AECOM that may involve exposure to bloodborne pathogens.
- Bloodborne diseases and symptoms of disease.
- Means of transmission.
- Work practice controls to reduce risk.
- Use of personal protective equipment to reduce risk.
- Incident reporting.
- AECOM's Post-Exposure Medical Follow-Up Procedures:

4.4.4 When contracting for CPR and first-aid training sessions, AECOM will request that each session include a section on the hazards associated with exposure to bloodborne pathogens and protective measures that shall be followed when administering first aid, CPR, or other emergency medical care. At the end of the session, Employees will be provided with a copy of this procedure. This procedure will be reviewed and a question-and-answer session will be conducted at the end of the presentation.

4.4.5 If the training provider cannot provide such training, AECOM will conduct a Blood Borne Pathogen training session prior to the start of the first aid or CPR class.

4.4.6 AECOM has and will have little control over employees who have not received AECOM provided first aid or CPR training, but who choose to perform Good Samaritan acts. Any Employee who does perform a Good Samaritan act that results in exposure to blood or other potentially infectious materials will, however, be provided with post-exposure medical follow-up as described in this procedure.

4.5 Personal Protective Equipment

4.5.1 All body fluids and materials potentially contaminated by body fluids will be considered to be infectious. All Employees coming in contact with another person's body fluids shall assume that the fluids are infectious and shall wear prescribed personal protective equipment (PPE), refer to *S3AM-208-PR1 Personal Protective Equipment*.

4.5.2 The use of PPE to prevent exposure is more appropriate for the types of occupational and non-occupational exposures Employees might encounter than is the use of engineering or work practice controls that are more effectively instituted in medical care or laboratory facilities where employees are actually handling blood and other potentially infectious materials.

4.5.3 PPE such as Tyvek coveralls, shoe covers, and gloves will be provided to all field team members involved in site activities where regulated wastes may be present. Site-specific PPE requirements will be identified in the written Exposure Control Plan. The same type of PPE will also be available, if it is deemed necessary, for Employees involved with activities at TSD facilities that handle regulated wastes.

4.5.4 PPE will be provided to affected Employees at no cost.

4.6 Universal Precautions Kits

4.6.1 In those work areas where there is the potential for exposure to infectious materials, a universal precaution kit shall be readily available. The kit shall permit the clean-up, neutralization, transportation, and disposal of up to 1 litre of blood or body fluids. The kit shall contain the following items at a minimum:

- Safety shield/mask combination
- Liquid proof apron
- Medical-grade vinyl/nitrile gloves
- Liquid solidifier/deodorizer
- Pickup scoop with scraper
- Red biohazard waste bag with tie
- Germicidal solution with dry wipe
- Antimicrobial hand wipe
- ID tag
- Instructions for use

4.7 Personal Hygiene

- 4.7.1 Special provisions will be made so that hand washing facilities are available on-site for sites that are known to be contaminated with regulated wastes. Alcohol wipes will be available in the event that hand washing facilities are not immediately available.
- 4.7.2 To reduce the potential for infection, if skin contact with blood or other potentially infectious materials occurs, the exposed area should be washed with non-abrasive soap and water as soon as possible. Hand washing will also help to prevent the transfer of contamination from the hands to other areas of the body or other surfaces that may be contacted later. Even when protective gloves are worn, hands should be washed with non-abrasive soap and running water as soon as possible after the gloves are removed.
- 4.7.3 The use of an alcohol wipes should not be relied upon as the primary means of personal hygiene. Hands should be thoroughly washed with soap and running water as soon as possible.
- 4.7.4 If mucous membranes, such as the eyes, come in direct contact with blood or other potentially infectious materials, the area should be washed or flushed with water as soon as possible and reported immediately.

4.8 Reporting Exposure Incidents

- 4.8.1 All incidents in which an employee has been exposed to blood or other potentially infectious materials shall be reported to the employee's Supervisor and to the SH&E Manager immediately. An IndustrySafe on-line report shall be completed in accordance with *S3AM-004-PR1 Incident Reporting, Notifications & Investigation*. After reviewing the report, the SH&E Manager will provide recommendations, when appropriate, for preventing recurrence of the incident.

4.9 Medical Follow-Up to Exposure Incidents

- 4.9.1 Once notified, the SH&E Manager will in turn discuss the incident with AECOM's Occupational Health Manager and/or medical provider and make arrangements for an evaluation, refer to *S3AM-128-PR1 Medical Screening & Surveillance*. Prompt medical attention is important in the event of an exposure incident. If the incident occurs in the field, the Employee will either be asked to visit the local hospital or, if he/she chooses, return immediately to the office to visit AECOM's local medical provider.
- 4.9.2 An attempt will be made to test the affected employee, and if applicable, the source individual's blood, for bloodborne pathogens. No testing will be performed without the written consent of the exposed Employee or the source individual. If initially, the exposed Employee or the source individual does not consent to HIV serological testing, but does consent to HBV serological testing, AECOM will make provisions with the local medical provider to preserve the blood sample for at least 90 days in the event that after counselling efforts, the Employee voluntarily consents to HIV testing.

- 4.9.3 AECOM will rely on the professional judgment of its Occupational Health Manager and/or local medical providers in the event of an exposure incident. Evaluations and follow-up procedures will be provided according to the recommendations of the United States Public Health Service (USPHS), World Health Organization, or other Public Health organization in Canada and other countries in the Americas current at the time these evaluations and procedures take place. Minimally, a post-exposure evaluation and follow-up will include the following elements:
- Documentation of the route(s) of exposure
 - Circumstances under which the exposure incident occurred
 - Identification and documentation of the source individual in the case of first aid or emergency medical treatments
 - Collection and testing of source individuals and exposed employee's blood for HBV and HIV serological status as soon as feasible and upon consent
 - Post-exposure vaccination when medically indicated, as recommended by the USPHS
 - Counselling, if necessary
 - Evaluation of reported illnesses
- 4.9.4 Any and all follow-up recommendations offered by the physician will be immediately instituted by the SH&E Manager with the guidance of the Occupational Health Manager and/or the local medical provider and at no cost to the affected Employee. Repeat testing, counselling, and follow-up, if recommended, will also be provided at no cost to the Employee. AECOM will rely on the Occupational Health Manager and/or the local medical provider to provide counselling to Employees concerning infection status, including results of and interpretation of medical tests and advising the Employee about the protection of personal contacts.
- 4.9.5 All medical providers shall submit to AECOM's Occupational Health Manager and the affected Employee a written opinion of the post-exposure evaluation within 15 days of the completion of the evaluation.
- 4.9.6 All medical records generated as a result of the post-exposure evaluation will be retained in the office of the Occupational Health Manager, and as applicable AECOM's medical services provider, under lock and key and will be maintained with the strictest confidentiality. Refer to *S3AM-017-PR1 Injury & Illness Recordkeeping*.
- 4.10 Hepatitis Vaccination
- 4.10.1 Prior to performing site visits or field investigations where regulated wastes are stored, processed, or known to have been disposed of, AECOM will consult with the Occupational Health Manager and/or the local medical providers to determine if a hepatitis A or B vaccination is appropriate given the site conditions and the proposed scope of work. Where possible the first Hepatitis B vaccinations will be given prior to working at sites with known, potential occupational exposures.
- 4.10.2 Although AECOM does offer first-aid and CPR training to its Employees on a regular basis, providing such aid is often voluntary and not as a specified job duty of an Employee. As such, potential exposures may not be considered occupational within the context of the government Bloodborne Pathogens Standard. Pre-exposure hepatitis vaccinations will not typically be offered for voluntary roles.
- 4.10.3 Post-exposure hepatitis vaccination will be offered to Employees involved in an exposure incident within 24 hours of possible exposure.
- 4.10.4 The vaccinations discussed above shall be provided to Employees at no cost if required by the exposure determination.

4.11 Housekeeping

- 4.11.1 Other than through the provision of first aid or CPR, there is no potential for occupational exposure to blood or other potentially infectious materials within any of the AECOM offices. Therefore, the housekeeping requirements and requirements for warning signs and labels contained in the OSHA Bloodborne Pathogens standard are not applicable to our office operations.
- 4.11.2 When working at a site where regulated wastes have been disposed of, the specific housekeeping and warning sign requirements will be prescribed by the client and/or in the site-specific HASP.
- 4.11.3 When working at a client's facility, AECOM will review the facilities plan for compliance with all the requirements of the Bloodborne Pathogens Standard and will observe all housekeeping requirements, wear required PPE, and acknowledge all warning signs and labels as specified in the client's plan. If the client does not have an effective plan, AECOM will prepare a plan as part of the written Exposure Control Plan.

4.12 Regulated Waste Generated by AECOM

- 4.12.1 Any regulated waste generated by AECOM as a result of first aid activities or clean-up of potentially infectious material will be collected in sealed, watertight containers and disposed of according to the Host Employer's BBP program or disposed of through a permitted regulated waste facility.
- 4.12.2 Disposal manifests shall be maintained in accordance with local or governmental regulations.

4.13 Material Decontamination

- 4.13.1 Any areas or equipment that are contaminated by potentially infectious material will be decontaminated using a 10% solution of household bleach. Utilize appropriate personal protective equipment to control exposure to the bleach (e.g. safety goggles, gloves, etc.). Refer to *S3AM-208-PR1 Personal Protective Equipment*.

4.14 Procedure and Plan Review

- 4.14.1 All Exposure Control Plans for projects or programs extending over one year shall be reviewed annually by the SH&E Manager and affected Employees.

5.0 Records

- 5.1 Each SH&E Manager will maintain records and provide copies of the records to the Occupational Health Manager, related to bloodborne pathogens in accordance with the provisions of the standard and *S3AM-017-PR1 Injury & Illness Recordkeeping*.
- 5.2 Records maintained in accordance will include bloodborne pathogens exposure incidents, post-exposure follow-up, vaccination status, and training for all Employees with potential occupational exposure.
- 5.3 Employee medical and training records required by this procedure shall be provided upon request for examination and copying to the Employee, to anyone having written consent of the subject employee, or to State, Province, or Federal Occupational Safety and Health regulatory agencies.

6.0 Attachments

- 6.1 [S3AM-111-ATT1 Bloodborne Pathogens Exposure Control Plan](#)
- 6.2 [S3AM-111-FM1 Hepatitis B Vaccination Declination](#)

Bloodborne Pathogens Exposure Control Plan

S3AM-111-ATT1

1.0 Introduction

Employees are at risk for exposure to and possible transmission of infectious diseases each time they are in contact with blood or body fluids. Bloodborne pathogens are microorganisms present in human blood and other body fluids that can cause serious disease in humans and include, but are not limited to Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), and Human Immunodeficiency Virus (HIV). Therefore, this exposure control plan (ECP) has been established to ensure that employees are effectively informed concerning potential workplace health hazards, and that protective measures necessary to eliminate or minimize bloodborne exposure incidents are used whenever possible.

2.0 Exposure Determination

2.1 The Medical Screening Evaluation form will be used to evaluate which employees may incur occupational exposure to blood or other potentially infectious materials when performing routine tasks and procedures. Refer to *S3AM- 128-PR1 Medical Screening & Surveillance*. These exposure determinations will be made without regard to the use of personal protective equipment, and regardless of exposure frequency.

2.1.1 The employees in the following job classifications may have occupational exposure to bloodborne pathogens, and are covered by this program:

- Occupational health nurse
- Paramedics
- Registered nurses
- Designated first aid providers (providing first aid identified as part of the employee's occupational duties and not a voluntary action)
- Medical laboratory employees
- Janitorial workers in medical facilities and clinics.

2.1.2 Tasks and procedures that may expose the above employees to bloodborne pathogens include:

- Treating cuts, abrasions, and burns
- Cleaning contaminated environmental surfaces
- Administering cardiopulmonary resuscitation (CPR).

3.0 Exposure Control

3.1 "Universal precautions" are a required method of control to prevent exposure to blood and body fluids. This term refers to the concept that all human blood and certain human body fluids are treated as if known to be infectious for HIV, HBV, HCV, and other bloodborne pathogens, regardless of the perceived risk status of another individual. Universal precautions apply to blood, other body fluids containing visible blood, semen, and vaginal fluids. Universal precautions do not apply to feces, nasal secretions, saliva, sweat, tears, sputum, urine, and vomitus unless they contain visible blood. Although these fluids have an extremely low or nonexistent risk for bloodborne pathogens, they are a potential source for other infectious diseases, and precautions shall also be followed when these body fluids are present.

3.2 Engineering and Work Practice Controls

3.2.1 The following engineering controls will be in place in all areas of occupational exposure:

- Containers for disposable contaminated sharps shall be puncture-resistant, labeled a biohazard, leak-proof, and have a closable top.

- Containers for storage, transport, or shipment of blood or other potentially infectious materials, regulated waste, and contaminated laundry will be labeled with the biohazard symbol and site address, and have a securely closing lid.
- Engineering controls will be reviewed and maintained on a regular basis to ensure effectiveness.

3.2.2 The following work practice controls (administrative and personal protective equipment) shall be strictly followed to minimize exposure, and isolate or remove bloodborne pathogens from the workplace:

- Accessible handwashing facilities. If soap and running water are not available, an antiseptic hand cleaner in conjunction with clean paper towels or antiseptic towelettes are acceptable temporary alternatives to running water. When this alternative method is used, employees shall wash their hands with soap and running water as soon as feasible.
- Personal protective equipment (PPE) will be provided at no cost to the employee, and will be chosen based on the anticipated exposure to blood. PPE is considered appropriate if it does not permit blood or other potentially infectious materials to reach or pass through clothes, skin, or mucous membranes of the eyes or mouth under normal conditions of use, and for the duration of time the equipment will be used. PPE shall be readily accessible and will be removed prior to leaving the work area.
- Disposable single-use gloves shall be used as a protective barrier in all situations in which contact with body fluids is anticipated. Gloves of the correct size will be provided. Disposable gloves will not be washed or disinfected for reuse, and will be replaced between employees, and if they become torn or punctured. Gloves are especially important if the employee has cuts, abraded skin, chapped hands, or dermatitis.
- Liquid-impermeable gowns, boots, and masks, in combination with eye-protective devices such as goggles and shatterproof glasses with solid-side shields or chin-length face shields, shall be worn whenever splashing, spraying, or spattering of blood droplets or body fluids can be reasonably anticipated.
- Disposable pocket mask ventilation devices shall be provided in all first aid kits and used to avoid mouth-to-mouth contact during emergency cardiopulmonary resuscitation.
- Examples of Recommended PPE (depending on task, more PPE may be needed).

<u>Task</u>	<u>Gloves</u>	<u>Gown</u>	<u>Mask</u>	<u>Goggles</u>
Bleeding control w/ minimal bleeding	Yes	No	No	No
Bleeding control w /spurting blood	Yes	Yes	Yes	Yes
Cardiopulmonary resuscitation	No	No	Yes	No
Decontamination/clean-up	Yes	No	No	No
Medical laboratory activities	Yes	Yes	Yes	Yes

3.2.3 Eating, drinking, smoking, applying cosmetics, and handling of contact lenses is prohibited in work areas where there is a reasonable likelihood of occupational exposure. Food and drink cannot be kept in refrigerators, freezers, shelves, cabinets, or on counter tops where blood or body fluids are present.

3.2.4 Contaminated needles and other sharps shall not be bent or recapped unless a one-handed technique is used. They shall be disposed of in an appropriate sharps container.

3.2.5 All regulated biohazardous waste will be placed in a waste receptacle that has designated red biohazard bags and a closable top controlled by a foot peddle. When full, the bags shall be removed with gloved hands, tied off, and placed in a biohazard shipping carton, to be held for pick-

up. If any biohazard bag appears to be leaking, it shall be double-bagged. The waste will be incinerated per federal, provincial/territorial/state regulations.

3.3 Housekeeping

- 3.3.1 Universal precautions shall be used when cleaning or decontaminating any surface or equipment that may be contaminated. Appropriate PPE shall be used for protection during decontamination.
- 3.3.2 All contaminated environmental work surfaces such as countertops or floors will be cleaned according to regulatory requirements or with a household bleach solution diluted 1:10 with water directly following contamination with blood or body fluids.
- 3.3.3 Instruments such as tweezers, bandage scissors, and thermometers shall be disposable rather than reusable equipment, and shall be disposed of in an appropriate manner.
- 3.3.4 Broken, contaminated glassware shall not be picked up directly with the hands. It shall be cleaned up using a mechanical means such as a brush and dustpan or tongs.

4.0 Hepatitis B Vaccination

- 4.1 Within 10 working days of placement, all employees assigned to tasks with potential occupational exposure to bloodborne pathogens shall be offered the Hepatitis B vaccination at no cost to the employee, unless the employee has had a previous Hepatitis B vaccination series, antibody testing reveals the employee is immune, or the vaccine is contraindicated for medical reasons. Further, this vaccination series shall be made immediately available to employees who have an occupational exposure, whether as a result of their assigned tasks, or occurring from an incidental contact.
- 4.2 The local occupational medical facility used for routine medical surveillance will administer the vaccinations.
- 4.3 Employees who decline the Hepatitis B vaccine shall sign a copy of the waiver form located at the end of this Work Instruction. The signed waiver will be stored in the employee's medical record with the Occupational Health Manager. Employees may initially decline the vaccination, but may decide to take them at a later date, while still covered under this plan. The vaccinations will be made available to the employee at that time.
- 4.4 Employees choosing to take the vaccination series will sign a consent form at the occupational clinic prior to receiving the injections, and are advised to read the package insert regarding the efficacy, safety, method of administration, and benefits of the vaccine. Employees may also ask questions directly of the Medical Service Provider or local occupational physician. Employees are not required to participate in a prescreening program (to determine immunity) before receiving the vaccinations. If a routine booster of Hepatitis B vaccine is recommended by the U.S. Public Health Service at a future date, such booster dose(s) will be made available to affected employees.

5.0 Post-Exposure Incident Evaluation And Follow-Up

- 5.1 All occupational bloodborne pathogen exposures shall be reported to the HSE representative and Occupational Health Manager immediately after initial decontamination first aid is accomplished. Following the report of an exposure incident, a confidential medical evaluation with an occupational physician will be arranged as soon as possible, ideally no later than 1 to 2 hours after the incident has occurred. In some jurisdictions, depending on applicable workers' compensation law, employees may choose treatment from their personal physician. A copy of the OSHA Bloodborne Pathogen Standard, if applicable to the jurisdiction, will be provided if the physician does not have a copy. A written incident report shall be completed as soon as possible, fully describing the incident.
- 5.2 First aid protocol for treatment immediately after an exposure incident:
 - 5.2.1 Lacerations, punctures, and abrasions should be washed under cool running water for at least 5 minutes, allowing free bleeding. Cleanse area well with soap or iodine solution. Apply sterile dressing as needed. Give tetanus booster if indicated (7 to 10 years since last booster).

- 5.2.2 Ocular exposure requires irrigation of the eye with water or sterile normal saline solution for 15 minutes.
- 5.2.3 Mucous membrane exposure requires rinsing mouth with ½ strength 3 percent hydrogen peroxide for 30 seconds, four separate and consecutive times.
- 5.3 Confidential Medical Evaluation
 - 5.3.1 The treating occupational physician will receive documentation of the routes of exposure, the circumstances surrounding the incident, and identification of the source individual (the individual the employee was exposed to). The blood of the source individual will be tested if possible, and after consent is obtained. When legally permissible, results of the source individual's tests will be made available to the exposed employee, with the exposed employee informed about the applicable laws and regulations concerning the disclosure of the identity and infectivity of the source individual.
 - 5.3.2 Testing of the exposed employee's blood, if consented to (the employee may consent to baseline blood collection, but may request that the sample not be tested for HIV for up to 90 days, if at all), is recommended.
 - 5.3.3 Post-exposure medical treatment will be offered in accordance with the current recommendations of the U.S. Public Health Services. This may include, but is not limited to:
 - A series of HIV post-exposure blood tests
 - Hepatitis B vaccination and/or Hepatitis B immune globulin
 - HIV post-exposure prophylactic medications
 - Evaluation of acute febrile illnesses following exposure
 - Employee counseling concerning precautions to take during the period after the exposure incident, and information on signs and symptoms of potential illnesses.
- 5.4 Healthcare Professional's Written Opinion
 - 5.4.1 The Occupational Health Manager shall obtain and provide the employee with a copy of the evaluating physician's written opinion within 15 days of the completion of the medical evaluation. A copy will be maintained in the employee's confidential medical record. The written opinion shall be in accordance with the requirements of the OSHA Bloodborne Pathogens Standard indicating that the employee has been informed of any medical conditions resulting from exposure that require further evaluation or treatment. All other findings or diagnoses shall remain confidential and will not be included in the report.

6.0 Hazard Communication

- 6.1 Fluorescent red or orange-red warning labels bearing the universal biohazard symbol and the legend BIOHAZARD shall be firmly affixed to all containers (e.g., waste cans, sharps containers, and refrigerators) used for the storage or shipment of blood or other potentially infectious materials.
- 6.2 All employees designated to perform tasks involving occupational exposure shall receive bloodborne pathogens training at the time of initial assignment to the job. This training will be given during working hours and at no cost to employees. Refresher courses will be provided annually (within 1 year of previous training), and if new tasks or procedures are implemented. Material appropriate in content and vocabulary to education level, literacy, and language of the employees shall be used for all required training.
- 6.3 Training will include: making accessible a copy of the regulatory text of the standard and explanation of its contents, general discussion on bloodborne diseases and their transmission, exposure control plan, engineering and work practice controls, personal protective equipment, Hepatitis B vaccine, response to emergencies involving blood, how to handle exposure incidents, the post-exposure evaluation and follow-up program, signs/labels/color-coding, and question and answer time with the trainer.

7.0 Exposure Incident Investigation

- 7.1 The SH&E Manager will review the circumstances of any exposure incident to determine corrective actions. The incident report will include:
- 7.1.1 Engineering controls in use at the time
 - 7.1.2 Work practices followed
 - 7.1.3 A description of any equipment being used
 - 7.1.4 A description of the work being performed
 - 7.1.5 PPE that was used at the time of the incident
 - 7.1.6 Date, time, and location of the incident
 - 7.1.7 Employee's training.
- 7.2 An incident report shall be completed within four hours of the incident and entered into AECOM's on-line incident reporting system (e.g., IndustrySafe) in accordance with *S3AM-004-PR1 Incident Reporting, Notifications & Investigations*. A copy of this incident report will be forwarded to the Occupational Health Manager, who will evaluate what follow-up actions should be addressed, including if revisions need to be made to the Exposure Control Plan.

8.0 Recordkeeping

- 8.1 The Occupational Health Manager will be responsible for establishing and maintaining accurate, confidential workers' compensation medical records for each employee with occupational exposure for the duration of employment plus 30 years, in accordance with OSHA 29 CFR 1910.1020 – Access to Employee Exposure and Medical Records.
- 8.2 The SH&E Manager will be responsible for maintaining the bloodborne pathogens training class records for at least 3 years from the date of training. The records will include the date of the training class, a summary of the class contents, the names of the qualified instructors, and the names and job titles of personnel attending the training.
- 8.3 Employee medical records shall be made available to employees (or their designated representative) with written consent by the employee within 15 working days of request.
- 8.4 An exposure incident will be evaluated by the Occupational Health Manager and SH&E Manager to determine if the case meets OSHA's Recordkeeping Requirements (29 CFR 1904).

Americas

Hepatitis B Vaccination Declination

S3AM-111-FM1

I understand that due to my occupational exposure to blood or other potentially infectious materials, I may be at risk of acquiring Hepatitis B virus (HBV) infection.

I have been given the opportunity to be vaccinated with Hepatitis B vaccine, at no charge to myself; however, I decline Hepatitis B vaccination at this time. I understand that by declining this vaccine, I continue to be at risk of acquiring Hepatitis B, a serious disease.

If, in the future, I continue to have occupational exposure to blood or other potentially infectious materials and I want to be vaccinated with the Hepatitis B vaccine, I can receive the vaccine series at no cost to me.

Name:

Date:

Witness:

Date:

Cold Stress

S3AM-112-PR1

1.0 Purpose and Scope

- 1.1 To protect employees from the severest effects of cold stress (hypothermia) and cold injury and to identify exposures to cold working conditions under which it is believed nearly all employees can be repeatedly exposed without adverse health effects.
- 1.2 This procedure applies to all AECOM Americas based employees and operations working outdoors in damp and cool (below 50 degrees Fahrenheit [°F] or 10 degrees Celsius [°C]) conditions or anytime temperatures are below 32°F or 0°C.

2.0 Terms and Definitions

- 2.1 **Cold Stress** – The production of physiological effects due to cold temperatures and/or wind chill.
- 2.2 **Equivalent Chill Temperature (ECT)** – Also known as Wind Chill (see below).
- 2.3 **Frostnip** – Superficial cooling of tissues without cellular destruction.
- 2.4 **Frostbite** – Freezing of tissue, resulting in tissue destruction.
- 2.5 **Hypothermia** – Condition of reduced core body temperature to 95°F (35°C) resulting in loss of dexterity, loss of mental alertness, collapse, and possible death.
- 2.6 **Wind Chill** – The combined effect of air temperature and wind. Also expressed as "equivalent chill temperature" (ECT), wind chill is defined as heat loss resulting from the effects of air temperature and wind velocity upon exposed skin.

3.0 References

- 3.1 S3AM-003-PR1 SH&E Training
- 3.2 S3AM-128-PR1 Medical Screening & Surveillance Program
- 3.3 S3AM-208-PR1 Personal Protective Equipment
- 3.4 S3AM-314-PR1 Working Alone
- 3.5 S3AM-315-PR1 Working On or Near Water
- 3.6 S3AM-333-PR1 Marine Safety & Vessel Operations

4.0 Procedure

4.1 Roles and Responsibilities

4.1.1 Manager

- Ensuring the safety of employees on their project sites, consistent with regulatory standards.
- Implement cold stress prevention measures as applicable at each work site.
- Develop/coordinate a work-warning regimen, as applicable.
- Confirm cold stress hazard assessments/evaluations were completed for the planned activities.
- Assign employees physically capable of performing the assigned tasks. Consider acclimation to cold weather when evaluating employee capability.
- Confirm employees are properly trained to recognize the symptoms of cold stress.

4.1.2 **Safety, Health and Environment (SH&E) Manager**

- Conduct/support cold stress assessments/evaluations.
- Conduct/support incident investigations related to potential cold stress-related illnesses.
- Assist project teams develop appropriate work-warming regimens.
- Provide cold stress awareness training.

4.1.3 **Supervisor**

- Identify the tasks that may be most impacted by cold stress and communicate the hazard to the assigned employees.
- Confirm that employees have been trained on the recognition of cold stress-related illnesses.
- Confirm that adequate supplies of warm fluids/drinks are readily available to employees.
- Confirm that a warm/sheltered rest area is available, as applicable.
- Conduct cold stress monitoring, as applicable.
- Implement the work-warming regimen.
- Confirm that first aid measures are implemented once cold stress symptoms are identified.
- Confirm that employees are physically capable of performing the assigned tasks and are not in a physically compromised condition.

4.1.4 **Employee**

- Observe each other for the early symptoms of cold stress-related illnesses.
- Maintain an adequate intake of available fluids.
- Report to work in a properly rested condition.
- Report all suspected cold stress-related illnesses.

4.2 **Requirements**

- 4.2.1 Carefully plan work anticipated to be performed in cool or cold conditions. If possible, heavy work should be scheduled during the warmer parts of the day or when the wind is most calm. Include costs in project budgets for specialized equipment and supplies needed to complete the field activities.
- 4.2.2 Staff working in extreme cold (wind chill or ECT below 10°F or -12°C) shall not work alone. The Buddy System shall be utilized to keep an eye on each other and to watch for signs of cold stress. Refer to *S3AM-314-PR1 Working Alone*. Watch for symptoms and signs of hypothermia.
- 4.2.3 Monitor weather forecasts and weather conditions such as ambient temperature, wind speed, and precipitation. Use observations prior to entering and while in the field to ensure appropriate protections are in place:
- If possible, move the work to a warm location.
 - If possible and as applicable, erect shelters or screens around the work area.
 - If possible, heat the work area.
 - If possible, adjust schedule according to the cold conditions, work level and worker acclimatization.
 - Implement a work-warming regimen by taking breaks out of the cold. As applicable, consult *S3AM-112 ATT1 Temperature Thresholds* to determine wind chill and work-warming schedule.
 - Take frequent short breaks in warm dry shelters to allow your body to warm up. Limit time of exposure to the cold. If shelter is not readily available, consider supplying temporary shelters.

- Provide assistance to prevent body heat loss, such as:
 - Providing appropriate sources of heat (e.g. warm packs, portable heaters, etc.).
 - Use of insulating materials on equipment handles when temperatures drop below 30°F (-1°C).

4.2.4 All staff working in extreme cold or snow conditions should understand the following guidelines for preventing and detecting hypothermia and frostbite; refer to *S3AM-112-ATT2 Symptoms & Treatment*.

- Ensure appropriate PPE requirements are established and adhered to.
- Avoid exhaustion or fatigue because energy is needed to keep muscles warm.
- Because prolonged exposure to cold air or to immersion in cold water at temperatures even well above freezing can lead to dangerous hypothermia, whole-body protection shall be used.
- Eat high calorie snacks to help maintain body metabolism.
- Confirm extra blankets or sleeping bags are on-site.
- Drink plenty of warm liquids. It is easy to become dehydrated in cold weather.
- Avoid caffeine and alcohol, which can act as diuretics. Alcohol consumption, depending upon quantity, can dilate blood vessels enhancing body heat loss or constrict blood vessels decreasing heat delivery to extremities.
- NEVER IGNORE SHIVERING. Persistent or violent shivering is a clear warning that you are on the verge of hypothermia.
- If you experience frost bite or hypothermia, find shelter and warmth and contact a medical practitioner if symptoms persist, refer to *S3AM-128-PR1 Medical Screening & Surveillance*.

4.3 Training

Before they begin work in a cold environment, employees that might be exposed to cold stress will be informed of the potential for cold stress and how to prevent cold stress. Employees that have not had the training within the twelve prior months shall repeat the training before exposure to cold stress, refer to *S3AM-003-PR1 SH&E Training*. Employees potentially exposed to cold stress will receive training including, but not limited to:

- 4.3.1 Sources of cold stress, the influence of protective clothing, and the importance of acclimatization.
- 4.3.2 How the body loses heat.
- 4.3.3 Recognition of cold-related illness symptoms.
- 4.3.4 Cold stress preventative/corrective measures including, but not limited to:
 - Weather monitoring.
 - Proper eating and drinking practices.
 - Work-warming schedules and proper re-warming techniques.
 - Buddy system.
 - Safe cold work practices appropriate to the work that is to be performed.
 - Proper use of cold environment personal protective clothing.
- 4.3.5 The harmful effects of excessive alcohol consumption in a cold stress environment.
- 4.3.6 The hazards associated with unstable snow or ice build ups.
- 4.3.7 First aid procedures for symptoms related to cold stress.

4.4 Personal Protective Equipment (PPE)

Wearing the right clothing is crucial to avoiding cold stress. The type of fabric also makes a difference. Cotton loses its insulation value when it becomes wet. Wool, on the other hand, retains its insulation even when wet. Adequate insulating dry clothing will be required in air or wind chill temperatures below 40 °F (4.4°C)

All PPE will comply with the requirements of *S3AM-208-PR1 Personal Protective Equipment* and consider the following requirements:

- 4.4.1 Wear at least 3 layers of clothing to help prevent cold stress. It is important to preserve the air space between the body and the outer layer of clothing to retain body heat.
 - Wear a middle layer of down, wool, or similar materials to provide insulation.
 - Avoid cotton, especially blue jeans.
 - Wear an outer layer to break the wind and allow some ventilation (e.g., Gortex® or nylon)
 - Do not wear tight clothing. Loose clothing allows better ventilation.
- 4.4.2 Wear proper clothing, including head coverings and gloves or mittens for cold, wet, and windy conditions.
- 4.4.3 Wear a hat or hardhat liner. Up to 40 percent of body heat can be lost when the head is left exposed.
- 4.4.4 Use insulated footwear with adequate traction to prevent slips and falls.
- 4.4.5 Wear insulated boots or other insulated footwear, and insulated gloves to help reduce the chance of frostbite.
- 4.4.6 Keep a change of dry clothing available in case work clothes become wet.
- 4.4.7 Eye and face protection for employees employed outdoors in a snow and/or ice-covered terrain should be supplied.
 - Sunglasses (with UVA and UVB protection) and sunscreen should be used when there is a persistent combination of snow and direct sun.
 - Special safety goggles to protect against blowing ice crystals and ultraviolet light and glare (which can produce temporary conjunctivitis and/or temporary loss of vision) should be required when there is an expanse of snow coverage causing a potential eye exposure hazard.
 - Ensure face guards are used to protect skin in cold, windy conditions, including riding on an unshielded vehicle.

4.5 General Cold Stress Prevention Measures

- 4.5.1 In order to prevent hypothermia:
 - Wear appropriate clothing and PPE as determined by the weather conditions.
 - When active, ventilate excess heat by opening or removing outer layers of clothing to avoid sweating.
 - Start with the mitten or gloves, unless protection from ice, snow, or cold metal surfaces is needed.
 - Next remove head gear and neck wrappings.
 - Then coats/parkas should be opened at the waist and sleeves.
 - Finally, layers of clothing should be taken off.
 - When resting or tired, or colder conditions are encountered, add additional layers of clothing/ close outer layers in the reverse of the above order, or get out of the cold. Have a sweet drink but do not indulge in heavy eating.

- Garments worn to keep out rain and spray should also allow water vapor to escape.
- Take advantage of heat from the sun and stay out of the wind as much as possible.
- Have available emergency shelter providing protection from wind and rain and insulation from the ground.
- Replace wet clothing. If wet clothing cannot be replaced, then cover it with a layer of non-breathing material to prevent evaporation. Place an insulation layer over this non-breathing material.
- Get adequate rest; conserve energy.
- Get adequate nutrition to replenish energy stores; rest after meals.
- Drink adequate fluids to avoid dehydration.
- If any project / location staff member shows signs of hypothermia, stop and treat him/her.

4.5.2 In order to prevent frost bite:

- Dress to prevent hypothermia and protect the feet and hands.
- Avoid obstruction of circulation by, for example, tight boots or tightly fitting clothing.
- Avoid nicotine (particularly cigarettes) and do not consume alcohol.
- Keep ears and nose covered and out of the wind.
- Frostbite of the corneas of the eyes can be prevented by protective goggles.
- Adopt a "buddy system" of constantly watching the faces of others in the party for white skin tissue, which is evidence of frostbite (frostnip).
- Practice constant personal vigilance for signs of trouble in one's own fingers and toes; when in doubt, investigate thoroughly before it is too late.

4.5.3 Adequate, insulating dry clothing that will help maintain core temperatures above 96.8°F (37°C) shall be provided to employees if work is performed in air temperatures below 40°F (4.4°C). Wind chill cooling rate and the cooling power of air are critical factors. The higher the wind speed and the lower the temperature in the work area, the greater the insulation value of the protective clothing required.

4.5.4 An Equivalent Chill Temperature (ECT) chart relating the actual dry bulb air temperature and the wind velocity is presented in *S3AM-112-ATT1 Temperature Thresholds*. Unless unusual or extenuating circumstances exist, cold injury to other than hands, feet, and head is not likely to occur without the development of the initial signs of hypothermia. Superficial or deep local tissue freezing will occur only at temperatures below 32°F (0°C) regardless of wind speed. However, older employees, those with circulatory problems and those with previous cold injuries require special precautionary protection against cold injury. The use of extra insulating clothing and/or a reduction in the duration of the exposure period are among the special precautions that should be considered.

4.5.5 Continuous exposure of skin should not be permitted when the air speed and temperature results in an ECT of -25°F (-32°C) or below.

4.5.6 At air temperatures of 40°F (4.4°C) or less, it is imperative that employees who become immersed in water or whose clothing becomes wet be immediately removed from the cold environment, provided a change of clothing, and be treated for hypothermia.

4.5.7 If the air velocity at the job site is increased by wind, draft, or artificial ventilating equipment, the cooling effect of the wind should be reduced by shielding the work area or by wearing an easily removable windbreak garment.

4.5.8 Adequate protection, such as general ventilation, shall be incorporated into any warming shelter design to prevent carbon monoxide poisoning.

- 4.5.9 Operation of internal combustion or similar devices within warming shelters is prohibited.
- 4.5.10 If the available clothing does not give adequate protection to prevent hypothermia or frostbite, work should be modified or suspended until adequate clothing is made available or until weather conditions improve.
- 4.5.11 Walking and working surfaces shall be cleared of ice and snow to prevent slips and falls.
- 4.5.12 Confirm that employees carry fire starter materials if working in remote areas.
- 4.5.13 Supplies such as PPE, fuels, enclosures, de-icing, traction aids, warm drinks, and batteries will be specified by the SH&E Manager and/or the Manager and made available. These supplies will be inspected at least weekly during cold weather projects and replaced when necessary.
- 4.6 Cold Stress Prevention Measures for the Hands
 - 4.6.1 Special protection of the hands is required to maintain manual dexterity for the prevention of accidents including, but not limited to the following:
 - If fine work is to be performed with bare hands for more than 10 to 20 minutes in an environment below 60°F (15°C), special provisions should be established for keeping the employees' hands warm. For this purpose, warm air jets, radiant heaters (fuel burner or electric radiator), or contact warm plates may be utilized. Metal handles of tools and control bars should be covered by thermal insulating material at temperatures below 30°F (-1°C).
 - If the air temperature falls below 60°F (15°C) for sedentary work, 40°F (4.4°C) for light work, or 20°F (-6°C) for moderate work, and fine manual dexterity is not required, employees should use gloves.
 - 4.6.2 To prevent contact frostbite, employees should wear anti-contact gloves:
 - When cold surfaces below 20°F (-6°C) are within reach, each employee should be warned to prevent inadvertent contact by bare skin.
 - If the air temperature is 0°F (-18°C) or less, employees should protect their hands with mittens or appropriate gloves. Machine controls and tools for use in cold conditions should be designed so that they can be handled without removing the mittens or gloves.
 - Ensure an adequate supply of dry gloves is available to replace wet gloves.
 - 4.6.3 Provisions for additional total body protection are required if work is performed in an environment at or below 40°F (4.4°C). The employees should wear cold protective clothing appropriate for the level of cold and physical activity.
 - 4.6.4 Additional Cold Stress Prevention Measures:

For work practices at or below 10°F (-12°C) ECT, the following will apply:

 - The employee should be under constant protective observation (buddy system or supervision).
 - The work rate should not be so high as to cause heavy sweating that will result in wet clothing. If heavy work is being performed, rest periods should be taken in heated shelters and opportunities to change into dry clothing should be provided.
 - New employees should not be required to work full time in the cold during the first days of employment until they become acclimated to the working conditions and required protective clothing. Refer to *S3AM-112-ATT1 Temperature Thresholds* for guidance.
 - The weight and bulkiness of clothing should be included in estimating the required work performance and weights to be lifted by the employee.
 - The work should be arranged in such a way that sitting still or standing still for long periods is minimized. Unprotected metal chair seats should not be used. The employee should be protected from drafts to the greatest extent possible.

- 4.6.5 Employees handling evaporative liquid (gasoline, alcohol, or cleaning fluids) at air temperatures below 40°F should take special precautions to avoid soaking of clothing or gloves with the liquids because of the added danger of cold injury due to evaporative cooling. Special note should be taken of the particularly acute effects of splashes of “cryogenic fluids” or those liquids with a boiling point that is just above ambient temperature.
- 4.6.6 Trauma sustained in freezing or subzero conditions requires special attention, because an injured employee is predisposed to cold injury. Special provisions should be made to prevent hypothermia and freezing of damaged tissue in addition to providing for first aid treatment.

4.7 Hypothermia in Water

- 4.7.1 Loss of body heat to the water is a major cause of deaths in boating and working near water incidents. Often the cause of death is listed as drowning; however, the primary cause is often hypothermia. It should also be noted that alcohol lowers the body temperature around 2 to 3 degrees by dilating the blood vessels. Do not drink alcohol around cold water. The following table shows the effects of hypothermia in water:

WATER TEMPERATURE	EXHAUSTION	SURVIVAL TIME
32.5°F (0°C)	Under 15 minutes	Under 15 to 45 minutes
32.5 to 40°F (0 to 4°C)	15 to 30 minutes	30 to 90 minutes
40 to 50°F (4 to 10°C)	30 to 60 minutes	1 to 3 hours
50 to 60°F (10 to 16°C)	1 to 2 hours	1 to 6 hours
60 to 70°F (16 to 21°C)	2 to 7 hours	2 to 40 hours
70 to 80°F (21 to 27°C)	3 to 12 hours	3 hours to indefinite
Over 80°F (27°C)	Indefinite	Indefinite

- 4.7.2 Some points to remember when water is a potential hazard:

- Wear a personal flotation device when drowning is a potential hazard. Refer to *S3AM-315-PR1 Working On or Near Water*, and *S3AM-333-PR1 Marine Safety & Vessel Operations*.
- If the water is less than 50°F (10°C), wear a wet suit or dry suit for work in water (e.g., wading, or if a significant potential to fall in water exists).
- While in the water, do not attempt to swim unless to reach nearby safety. Unnecessary swimming increases the rate of body heat loss. Keep the head out of the water. This will increase survival time.
- Keep a positive attitude about rescue. This will increase chances of survival.
- If there is more than one person in the water, huddling is recommended to conserve body heat.

- 4.7.3 If an employee or equipment is to work on ice and the water beneath the ice is or may be more than 3¼ feet (1m) deep at any point:

- Test the ice prior to commencing to ensure it will support the load to be placed on it. Ongoing testing may be necessary.
- If there is any risk of falling through the ice employees must wear personal protective equipment that will ensure buoyancy and protect against hypothermia at all times while on the ice.

4.8 Work-Warming Regimen

- 4.8.1 If work is performed continuously in the cold at an equivalent chill temperature (ECT) at or below 19°F (−7°C), heated warming shelters (tents, cabins, rest rooms, etc.) should be made available nearby. The employees should be encouraged to use these shelters at regular intervals; the frequency will depend on the severity of the environmental exposure. Refer to *S3AM-112-ATT1 Temperature Thresholds* for guidance.

- 4.8.2 The onset of heavy shivering, minor frostbite (frostnip), the feeling of excessive fatigue, drowsiness, irritability, or euphoria are indications for immediate return to the shelter.
- 4.8.3 When entering the heated shelter, the outer layer of clothing should be removed and the remainder of the clothing should be loosened to permit sweat evaporation or a change of dry work clothing provided.
- 4.8.4 A change of dry work clothing should be provided as necessary to prevent employees from returning to the cold environment with wet clothing.

5.0 Records

- 5.1 Exposure assessments will be documented in the location's files.

6.0 Attachments

- 6.1 [S3AM-112-ATT1 Temperature Thresholds](#)
- 6.2 [S3AM-112-ATT2 Symptoms & Treatment](#)

Americas

Temperature Thresholds

S3AM-112-ATT1

1.0 Purpose and Scope

- 1.1 The following Tables 1 and 2 give apparent temperatures (wind chill or equivalent chill temperature [ECT]) for various combinations of wind and air temperature, as well as guidelines to the danger of skin exposure.

Table 1. Wind Chill Chart (C)

Actual Temp (°C)	Wind Speed in km/hour									
	8	16	24	32	40	48	56	64	72	80
	Ambient Temperature (°C)									
0	-2	-8	-11	-14	-16	-17	-18	-19	-19	-20
-5	-7	-14	-18	-21	-23	-25	-26	-27	-28	-28
-10	-12	-20	-25	-28	-31	-33	-34	-35	-36	-36
-15	-18	-26	-32	-35	-38	-40	-42	-43	-43	-44
-20	-23	-32	-38	-43	-46	-48	-50	-51	-52	-52
-25	-28	-38	-45	-50	-53	-56	-57	-59	-59	-60
-30	-33	-45	-52	-57	-61	-63	-65	-67	-67	-68
-35	-39	-51	-59	-64	-68	-71	-73	-75	-75	-76
-40	-44	-57	-65	-71	-75	-79	-81	-83	-83	-84
-45	-49	-63	-72	-78	-83	-86	-89	-90	-91	-92
-50	-54	-69	-79	-85	-90	-94	-96	-98	-99	-100

Note: A. Little Danger: if less than one hour of exposure to dry skin.

B. Danger: Exposed flesh freezes within one minute.

C. Great Danger: Flesh may freeze within 30 seconds.

Source: *2014 Threshold Limit Values (TLV™) and Biological Exposure Indices (BEI™) booklet; published by ACGIH, Cincinnati, Ohio.

Table 2. Equivalent Chill Temperature Chart (F)

Estimated Wind Speed (mph)	Actual Temperature Reading (°F)									
	50	40	30	20	10	0	-10	-20	-30	-40
	Equivalent Chill Temperature (°F)									
Calm	50	40	30	20	10	0	-10	-20	-30	-20
5	48	37	27	16	6	-5	-15	-26	-36	-47
10	40	28	16	4	-9	-24	-33	-46	-58	-70
15	36	22	9	-5	18	-32	-45	-58	-72	-85
20	32	18	4	-10	-25	-39	-53	-67	-82	-96
25	30	16	0	-15	-29	-44	-59	-75	-88	-104
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109
35	27	11	-4	-20	35	-51	-67	-82	-98	-113
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116
Wind speeds >40 mph have little additional effect	LITTLE DANGER				INCREASING DANGER			GREAT DANGER		
	Trenchfoot and immersion foot may occur at any point on this chart.									

- 1.2 How fast a person's body cools in cold weather depends on: air temperature, wind speed, heat of the sun, and work being done.
- 1.2.1 The following Table 3 provides guidelines for establishing periods of work to warming break periods based on ambient temperature and wind speed for workers wearing dry clothing.
- 1.2.2 Notes following the Table take into account additional factor such as physical exertion, whether workers are acclimatized, etc.

Table 3. Work-Warming Schedule Guidelines

Air Temp. (Sunny Sky) °F	No Noticeable Wind		5 mph Wind (8 km/h)		10 mph Wind (16 km/h)		15 mph Wind (24 km/h)		20 mph Wind (32 km/h)		25 mph Wind (40 km/h)		Air Temp. (Sunny Sky) °C
	Max. Work Period	Breaks	Max. Work Period	Breaks	Max. Work Period	Breaks	Max. Work Period	Breaks	Max. Work Period	Breaks	Max. Work Period	Breaks	
above 5°	Normal Work Schedule		Normal Work Schedule		Normal Work Schedule		Normal Work Schedule		Normal Work Schedule		Normal Work Schedule		above -15°
5° to -1°											100 min	2	-15° to -17°
0° to -4°									100 min	2	75 min	2	-18° to -20°
-5° to -9°									100 min	2	75 min	2	55 min
-10° to -14°							100 min	2	75 min	2	55 min	3	40 min
-15° to -19°					100 min	2	75 min	2	55 min	3	40 min	4	30 min
-20° to -24°	100 min	2	75 min	2	55 min	3	40 min	4	30 min	5	Cease Work		-29° to -31°
-25° to -29°	75 min	2	55 min	3	40 min	4	30 min	5	Cease Work				-32° to -34°
-30° to -34°	55 min	3	40 min	4	30 min	5	Cease Work						-35° to -37°
-35° to -39°	40 min	4	30 min	5	Cease Work								-38° to -39°
-40° to -44°	30 min	5	Cease Work										-40° to -42°
-44° & below	Cease Work												Cease Work

Modified from ACGIH 2014 Threshold Limit Values for Chemical Substances and Physical Agents.

- Note 1: Schedule describes the maximum continuous duration of work and number of 10-15 minute breaks to be observed during any 4-hour work period and assumes that period will be followed by an extended warm-up period (e.g., lunch). Allowed breaks should be taken in a warm environment.
- Note 2: Schedule applies to moderate to heavy work performed by acclimated workers wearing appropriate layered clothing. For light to moderate work apply the schedule for conditions one step lower. For unacclimated workers apply the schedule for conditions two steps lower. These modifications are additive.
- Note 3: For work under 25%–50% overcast/clouds, apply the schedule for conditions one step lower. For work at night or under greater than 50% overcast/clouds, apply the schedule for conditions two steps lower. These modifications are additive with any applicable modifications from Note 2.

Note 4: For wind speeds in excess of 25 mph (40 km/h), cease all nonemergency work when temperatures fall below 5°F (-21°C).

Note 5: When the work involves riding on an unshielded vehicle or some other activity that generates wind, the number of breaks should be increased appropriately.

Note 6: If effective protection against the wind can be provided by shields or screens, work modifications or measures, then the work warm-up schedule for "No Noticeable Wind" would apply.

Note 7: If reliable weather reports are not available, use the following as a guide to estimate wind velocity:

- A 5 mph (8 km/h) wind will move a light flag
- A 10 mph (16 km/h) wind will fully extend the flag
- A 15 mph (24 km/h) wind will raise a newspaper sheet
- A 20 mph (32 km/h) wind will produce blowing and drifting snow.

Symptoms & Treatment

S3AM-112-ATT2

1.0 Cold Stress-related Illnesses

1.1 Frostbite

- 1.1.1 Frostbite is a localized cold injury characterized by freezing of the tissues with ice crystal formation. There are several degrees of damage. Frostbite can be categorized into:
- **Frost Nip or Initial Frostbite:** (1st degree frostbite) Characterized by blanching or whitening of skin.
 - **Superficial Frostbite:** (2nd degree frostbite) Skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient. Blistering and peeling of the frozen skin will follow exposure.
 - **Deep Frostbite:** (3rd degree frostbite) Tissues are cold, pale, and solid; extremely serious injury with possible amputation of affected area.
- 1.1.2 Frostbite injury is almost always limited to the upper and lower extremities (finger and toes) or to such appendages as the ears, nose or cheeks.
- 1.1.3 Conditions conducive to frostbite include sub-zero temperatures, hypothermia, dehydration, obstruction of the blood supply to the extremities (by constricting clothing, especially on the feet or at the wrists or ankles), contact with cold metal, contact with organic liquids (such as gasoline or solvents that have been left outdoors in sub-zero temperatures), use of substances that cause vasoconstriction (such as smoking tobacco), or other injury or shock.
- 1.1.4 Frostbite can occur without hypothermia when the extremities do not receive sufficient heat. Frostbite occurs when there is freezing of the fluids around the cells of the affected tissues.
- 1.1.5 Contact by the skin with tools or other metal objects below 20°F (-7°C) may result in contact frostbite.
- 1.1.6 The first symptom of frostbite is an uncomfortable sensation of coldness and pain, followed by numbness. There may be tingling, stinging, or cramping. Ongoing symptoms of frostbite include:
- Sudden and complete cessation of cold or discomfort in affected fingers or toes, often followed by a pleasant feeling of warmth;
 - Subsequently the only symptom may be the absence of any sensation in the frozen part;
 - Paleness in the affected tissues;
 - Firm or hard tissues; and
 - Purple tissue, if a large area, such as an entire hand or foot, is frostbitten.
- 1.1.7 If exposure occurs in temperatures that are below freezing (32°F or below), frostbite or trench foot (immersion foot) may accompany or complicate the symptoms of hypothermia. Frostbite is the freezing of living tissues with a resultant breakdown of cell structure. Symptoms due to frostbite may include, but is not limited to:
- Superficial redness of the skin;
 - Slight numbness;
 - Blisters;
 - Obstruction of blood flow (ischemia);
 - Blood clots (thrombosis); and
 - Skin discoloration due to insufficient oxygen in the blood (cyanosis).

1.1.8 Frostbite may occur if the skin comes into contact with objects with a surface temperature below freezing, such as metal tool handles. Trench foot is caused by continuous exposure to cold combined with persistent dampness or immersion in water. Injuries in this case include permanent tissue damage due to oxygen deficiency, damage to capillary walls, severe pain, blistering, tissue death, and ulceration.

1.1.9 Additionally, cold exposures may either induce or intensify vascular abnormalities. These include chilblain (a swelling or sore), Raynaud's disease, acrocyanosis (blueness of hands and feet) and thromboangiitis (inflammation of the innermost walls of blood vessels with accompanying clot formation). Workers suffering from these ailments should take particular precautions to avoid chilling.

1.2 Hypothermia

1.2.1 Hypothermia is a lower than normal body temperature that occurs when outer cold cools the body faster than the body can produce heat to stay warm. When this situation first occurs, blood vessels in the skin constrict in an attempt to conserve vital internal heat. Hands and feet are the first affected.

- If the body continues to lose heat, involuntary shivers begin. This is the body's way of attempting to produce more heat, and it is usually the first real warning sign of hypothermia.
- Further heat loss produces speech difficulty, confusion, loss of manual dexterity, collapse, and finally death.

1.2.2 Hypothermia can be caused by exposure to wind, cold, and/or moisture. The combination of wind, cold, and moisture can be deadly. Wet clothes or immersion in cold water greatly increases the hypothermia risk. The progressive clinical presentation of hypothermia is described in the table below.

Condition	Core Body Temp.	Signs/Symptoms	Treatment
Mild Hypothermia	99 – 97 F 37 – 36 C	Normal, shivering may begin	Seek dry shelter; replace wet clothing, insulate whole body and head, avoid sweating, use external warmth (bath, fire) only if core above 95 degrees F, give warm sweet drinks and food.
	97 – 95 F 36 – 35 C	Cold sensation, goose bumps, unable to perform complex tasks with hands, shiver can be mild to severe, hands numb.	
Moderate Hypothermia	95 – 93 F 35 – 34 C	Intense shivering, muscle in-coordination becomes apparent, movements slow and labored, stumbling pace, mild confusion may appear alert.	Avoid exercise and external warmth, gently rest; give warm sweet drinks and calories, internal warming via warm moist air, monitor pulse and breathing.
	93 – 90 F 34 – 32 C	Violent shivering persist, difficulty speaking, sluggish thinking, amnesia starts to appear, gross muscle movements sluggish, unable to use hands, stumbles frequently, signs of depression, withdrawn.	
Severe Hypothermia	90 – 86 F 32 – 30 C	Shivering stops, exposed skin blue or puffy, muscle coordination very poor, inability to walk, confusion, incoherent/irrational behavior, but may be able to maintain posture and appearance of awareness.	Medical emergency, give nothing by mouth, wrap in an insulated blanket, avoid rapid rewarming, transfer to hospital immediately.
	86 – 82 F 30 – 28 C	Muscle rigidity, semiconscious, stupor, loss of awareness of others, pulse and respiration rate decrease, possible heart fibrillation.	
	82 – 78 F 28 – 25.5 C	Unconscious, heart beat and respiration erratic, pulse may not be palpable.	
	78 – 75 F 25.5 – 24 C	Pulmonary edema, cardiac and respiratory failure, death. Death may occur before this temperature is reached.	

- 1.2.3 Early warning signs of hypothermia:
- Feeling of being cold and tired;
 - Heavier breathing and increased pulse rate;
 - Tendency to keep moving (e.g., stamping feet, rubbing hands, continued walking/pacing);
 - Goose bumps, holding arms tightly wrapped around the body, hunching of shoulders, and
 - Shivering.
- 1.2.4 Hypothermia damages both the body's internal temperature mechanisms (hypothalamus) and the peripheral mechanisms to prevent heat loss (vasoconstriction and perspiration.) These effects may last up to three years after the initial hypothermia episode. Symptoms of hypothermia may include, but are not limited to:
- Pain in the extremities;
 - Severe shivering and numbness;
 - Low core body temperature;
 - Drowsiness and muscular weakness;
 - Apathy;
 - Mental confusion;
 - Loss of consciousness;
 - Shock, and
 - Decreasing pulse and breathing rate.

2.0 Recommended Treatment for Cold Stress-related Illnesses

2.1 Frostbite

- 2.1.1 Wrap the victim in woollen blanket and keep dry until he or she can be brought inside.
- 2.1.2 Remove the victim from the cold environment.
- 2.1.3 Do not rub, chafe, or manipulate frozen parts.
- 2.1.4 Place the victim in warm water (102°F to 105°F) and make sure the water remains warm. Test the water by pouring it on the inner surface of your forearm. Never thaw affected body parts if the victim has to go back out into the cold; refreezing can cause significant tissue damage.
- 2.1.5 Do not use hot water bottles or a heat lamp, and do not place the victim near a hot stove.
- 2.1.6 Do not allow the victim to walk if his or her feet are affected.
- 2.1.7 Have the victim gently exercise the affected parts once they are thawed.
- 2.1.8 Seek immediate medical attention for thawing of serious frostbite.

2.2 Hypothermia

- 2.2.1 Bring the victim into a warm room or shelter as quickly as possible.
- 2.2.2 Give artificial respiration and stop any bleeding, if necessary.
- 2.2.3 If the victim cannot be moved (spinal injury, etc.), carefully place newspapers, blankets, or some other insulation between the victim and the ground.
- 2.2.4 Remove all wet clothing.
- 2.2.5 Provide an external heat source, because the body cannot generate its own heat. Wrap the victim in prewarmed blankets, place him or her in the liner of a portable hypothermia treatment unit, put the torso (not the extremities) into a tub of warm water, or use body-to-body contact to rewarm the body core. These measures will slowly reopen the peripheral circulation, minimizing the possibility

of after-shock or after-drop (the flowing of cooled, stagnated blood from the limbs to the heart), which may cause ventricular fibrillation, cardiac arrest, or death.

- 2.2.6 Do not allow the victim to sleep.
- 2.2.7 Give warm, sweet drinks. Do not give alcohol or pain relievers.
- 2.2.8 Keep the victim still. Do not try to walk.
- 2.2.9 Do not rub numb skin.
- 2.2.10 Get medical attention as soon as possible.

Compressed Gases

S3AM-114-PR1

1.0 Purpose and Scope

- 1.1 This procedure provides the requirements for using, handling, storing, transporting, disposition and/or decommissioning compressed gas cylinders.
- 1.2 This procedure applies to all AECOM Americas based employees and operations.

2.0 Terms and Definitions

- 2.1 **Compressed Air (Non-Breathable)** – Air that is at a pressure greater than that of the atmosphere. Compressed air shall not be used for cleaning purposes except where reduced to less than 30 psi and then only with effective chip guarding and personal protective equipment. Utilized for tools, equipment, and mechanical machinery and cleaning purposes as described in this procedure.
- 2.2 **Compressed Gas** – Any material or mixture in a pressure vessel having:
 - An absolute pressure exceeding 40 pounds per square inch (PSI) at 70°F (25 pounds per square inch gauge); or
 - An absolute pressure exceeding 104 Psia at 130°F, regardless of the pressure at 70°F.
- 2.3 **Cylinder** – Pressure vessel designed for pressures higher than 40 Psia and having a circular cross section.
- 2.4 **Decommission** – The removal of a compressed gas cylinder from service by rendering it permanently unusable.
- 2.5 **Disposition** – Recycling, treatment, or disposal of a compressed gas cylinder and/or its contents.
- 2.6 **Pneumatics** – The use of pressurized air to affect mechanical motion for machinery, equipment and tools.
- 2.7 **Psi** – Pounds per square inch.
- 2.8 **Psia** – Pounds per square inch absolute (i.e., pressure in a container that would appear on an ordinary gauge plus the local atmospheric pressure [14.696 psi at sea level]), psig- pounds per square inch gauge.
- 2.9 **Psig** – Pounds per square inch gauge. The pressure in a vessel or container as registered on a gauge attached to the container. This reading does not include the pressure of the atmosphere outside the container.
- 2.10 **Pressure Relief Valve** – A device installed on most cylinders to prevent the rupture of a normally pressurized cylinder when it is inadvertently exposed to fire or high temperatures.

3.0 References

- 3.1 S3AM-003-PR1 SH&E Training
- 3.2 S3AM-116-PR1 Hazardous Materials Shipping
- 3.3 S3AM-127-PR1 Exposure Monitoring
- 3.4 S3AM-208-PR1 Personal Protective Equipment
- 3.5 S3AM-209-PR1 Risk Assessment & Management
- 3.6 S3AM-332-PR1 Hot Work

4.0 Procedure

4.1 Roles and Responsibilities

4.1.1 Manager

- Ensuring the safety of employees on their project sites.
- Implement these procedures during all activities involving compressed gases.
- Seek consultation with the SH&E Manager when unknown compressed gas cylinders are encountered.
- Confirm employees have received the appropriate training as it relates to compressed gases/compressed gas cylinders.
- Confirm a hazard assessment/evaluation of the activities involving compressed gases has been completed.
- Contact the SH&E Manager prior to any compressed gas cylinder operation.
- Immediately report any leaking/suspected leaking compressed gas cylinder(s) to the SH&E Manager and implement the appropriate emergency action(s).
- Immediately report the discovery of any unknown compressed gas cylinder(s) to the SH&E Manager and cordon off the area in all directions a minimum of 50 feet (15.24 meters).
- Confirm that all compressed gas cylinders are properly inspected, stored, and, secured.
- Confirm that all compressed gas cylinders are handled in a safe manner, protecting both the person and cylinder.
- Confirm that all compressed gas cylinder manifolds and connections are properly made and inspected.
- Confirm an appropriate emergency response plan is established prior to the start of any compressed gas cylinder operation.

4.1.2 SH&E Manager

- Review and authorize all compressed gas cylinder operations.
- Conduct/support compressed gas hazard assessments/evaluations.
- Provide awareness training to project teams regarding hazards of encountered compressed gases.
- Support the identification/disposition of unknown compressed gas cylinders.
- Support the development of a site-specific cylinder plan.

4.1.3 Employee

- Immediately report any leaking/suspected leaking compressed gas cylinder(s) to a Manager.
- Immediately report the discovery of any unknown compressed gas cylinders to Project Manager.
- Properly handle all compressed gas cylinders.
- Shall be supervised by employees experienced in the operation of compressed gas tools and equipment.

4.2 Training

- 4.2.1 On-site orientation to the hazards of the equipment and the proper use, handling, and storage shall be completed for all employees handling or coming into contact with compressed air tools and equipment or compressed gas cylinders. Refer to *S3AM-003-PR1 SH&E Training* and *S3AM-114-ATT1 Compressor Safety*.

- 4.2.2 Employees shall be instructed on the PPE requirements for the applicable tasks. Refer to *S3AM-208-PR1 Personal Protective Equipment*.
- 4.3 General Use of Compressed Air or Gas
 - 4.3.1 Compressed air or other compressed gases are not to be used to blow dirt, chips, or dust from clothing while it is being worn. Compressed air used for other types of cleaning (other than clothing/persons) is to be limited to 30 psig.
 - 4.3.2 The use of blown compressed air is to be controlled, and proper personal protective equipment or safeguards utilized, to protect against the possibility of eye injury to the operator or other persons.
 - 4.3.3 Compressed air or gases are not to be used to empty containers of liquids.
 - 4.3.4 Compressed gases are not to be used to elevate or otherwise transfer any hazardous substance from one container to another unless the containers are designed to withstand the operating gas pressure with a safety factor of at least four.
 - 4.3.5 Compressed cylinders of unknown content will not be opened, but will be returned to the supplier, manufacturer or equivalent.
- 4.4 Air Compressor Operations
 - 4.4.1 Air compressor equipment should be operated only by authorized and trained employees.
 - 4.4.2 The air intake should be from a clean, outside, fresh air source. Screens or filters can be used to clean the air.
 - 4.4.3 Air compressors should never be operated at speeds faster than the manufacturer's recommendation.
 - 4.4.4 Equipment should not become overheated.
 - 4.4.5 Moving parts, such as compressor flywheels, pulleys, and belts that could be hazardous should be effectively guarded.
 - 4.4.6 Keep the air supplied tools clean and dry. Dust, moisture, and corrosive fumes can damage tools.
 - 4.4.7 Keep tools clean, lubricated, and maintained according to manufacturer's instructions.
 - 4.4.8 Only use attachments and accessories recommended by the manufacturer.
 - 4.4.9 Review the manufacturer's instruction before using a tool.
 - 4.4.10 Post warning signs where pneumatic tools are used.
 - 4.4.11 Set up screens or shields in areas where nearby workers may be exposed to flying fragments, chips, dust, and excessive noise.
 - 4.4.12 Be aware of proper handling and ergonomics while using the tool.
 - 4.4.13 Reduce physical fatigue by supporting heavy tools with a counter-balance wherever possible.
 - 4.4.14 Refer to *S3AM-114-ATT1 Compressor Safety* for additional information.
- 4.5 Air Hoses
 - 4.5.1 Use the proper hose and fittings of the correct diameter.
 - 4.5.2 Use hoses specifically designed to resist abrasion, cutting, crushing and failure from continuous flexing.
 - 4.5.3 Choose air-supply hoses that have a minimum working pressure rating of 1035 kPa (150 psig) or 150% of the maximum pressure produced in the system, whichever is higher.
 - 4.5.4 Check hoses regularly for cuts, bulges and abrasions. Tag and replace, if defective.
 - 4.5.5 Blow out the air line before connecting a tool. Hold hose firmly and blow away from yourself and others.

- 4.5.6 Make sure that hose connections fit properly and are equipped with a mechanical means of securing the connection (e.g., chain, wire, or positive locking device).
- 4.5.7 Install quick disconnects of a pressure-release type rather than a disengagement type. Attach the male end of the connector to the tool, NOT the hose.
- 4.5.8 Do not operate the tool at a pressure above the manufacturer's rating.
- 4.5.9 Turn off the air pressure to hose when not in use or when changing power tools.
- 4.5.10 Do not carry a pneumatic tool by its hose.
- 4.5.11 Do not use compressed air to blow debris or to clean dirt from clothes.
- 4.5.12 All pipes, hoses, and fittings shall have a rating of the maximum pressure of the compressor. Compressed air pipelines should be identified (psi) as to maximum working pressure.
- 4.5.13 Air supply shutoff valves should be located (as near as possible) at the point-of-operation.
- 4.5.14 Air hoses should be kept free of grease and oil to reduce the possibility of deterioration.
- 4.5.15 Avoid trip hazards. Hoses should not be strung across floors or aisles where they are liable to cause employees to trip and fall. When possible, air supply hoses should be suspended overhead, or otherwise located to afford efficient access and protection against damage.
- 4.5.16 Hose ends shall be secured to prevent whipping if an accidental cut or break occurs.
- 4.5.17 Pneumatic impact tools, such as riveting guns, should never be pointed at a person.
- 4.5.18 Before a pneumatic tool is disconnected (unless it has quick disconnect plugs), the air supply shall be turned off at the control valve and the tool bled.
- 4.5.19 Shop air used for cleaning should be regulated to 15 psi unless equipped with diffuser nozzles to provide lesser pressure.
- 4.5.20 Goggles, face shields or other eye protection shall be worn by employees using compressed air for cleaning equipment.
- 4.5.21 Static electricity can be generated through the use of pneumatic tools. This type of equipment shall be grounded or bonded if it is used where fuel, flammable vapors or explosive atmospheres are present.
- 4.5.22 The following are hazards associated with the use of compressed air tools and equipment:
 - Poorly designed tool (wrist strain);
 - Vibration (vibration-induced white finger);
 - Noise (hearing loss); and
 - Dust (respiratory problems).
- 4.5.23 The following hazards have the potential to cause serious bodily injury when working with compressed air:
 - Incorrect tool selection;
 - Use of damaged tool;
 - Improper, inadequate, or no guards;
 - Rotating shaft (entanglement);
 - Wheel breakage (grinder);
 - Flying chips;
 - Whipping of the hose;
 - Accidental start up;

- Air embolism (compressed air injected into the body);
- Dropped tool; and
- Tripping over hose.

4.6 Compressed Air Equipment Maintenance

- 4.6.1 Only authorized and trained employees should service and maintain air compressor equipment.
- 4.6.2 Exposed, non-current-carrying, metal parts of compressor should be effectively grounded.
- 4.6.3 Low Flash Point lubricants should not be used on compressors because of its high operating temperatures that could cause a fire or explosion.
- 4.6.4 Equipment should not be over lubricated.
- 4.6.5 Gasoline or diesel fuel powered compressors shall not be used indoors.
- 4.6.6 Equipment placed outside but near buildings should have the exhausts directed away from doors, windows and fresh air intakes.
- 4.6.7 Soapy water or lye solutions can be used to clean compressor parts of carbon deposits, but kerosene or other flammable substances should not be used. Frequent cleaning is necessary to keep compressors in good working condition.
- 4.6.8 The air systems should be completely purged after each cleaning.
- 4.6.9 During maintenance work, the switches of electrically operated compressors should be locked open and tagged to prevent accidental starting.
- 4.6.10 Portable electric compressors should be disconnected from the power supply before performing maintenance.

4.7 Compressed Gas Cylinder Requirements

- 4.7.1 Cylinders are not to be used unless they bear Department of Transportation (DOT) or Transportation of Dangerous Goods (TDG) markings showing that they have been tested as required by DOT or TDG regulations.
- 4.7.2 Cylinders shall never be dropped, struck, or permitted to strike each other violently. Cylinders may be moved by tilting and rolling them on their bottom edges.
- 4.7.3 Valve protection caps shall always be kept on cylinders when they are being moved or stored, and until ready for use. Caution should be exercised as insects such as spiders, wasps, and bees may be encountered in cylinder caps.
- 4.7.4 Do not lift cylinders by the valve protection cap.
- 4.7.5 Cylinder valves are to be kept closed except when gas is being used or when connected to a permanent manifold. Valves of empty cylinders shall be closed.
- 4.7.6 Cylinders shall never be used as rollers or supports, or for any purpose other than carrying gas.
- 4.7.7 Valves and regulators shall be inspected for foreign materials such as oil or dirt and deficiencies such as damaged threads or broken gauges. Deficient valves or regulators shall be removed from service and replaced.
- 4.7.8 Threads on regulator connections or other auxiliary equipment shall be the same as those on the cylinder valve outlet.
- 4.7.9 Regulators shall be specific to the gas being used and no adapters may be used to connect regulators to cylinders.
- 4.7.10 When withdrawing cylinder content, open the cylinder valve slowly using the appropriate tool (e.g., manufacturer supplied, non-sparking, etc.). Point the valve opening away from yourself and other persons.

- 4.7.11 Before a regulator is removed from a cylinder, close the cylinder valve and release all pressure from the regulator. This procedure also serves as a check to confirm that the main cylinder valve is completely closed.
- 4.7.12 Never hammer the valve wheel in attempting to open or close the valve.
- 4.7.13 No person, except the owner of the cylinder or person authorized by the owner, shall refill a cylinder (Exceptions to this includes the filling of self-contained breathing apparatus cylinders with Grade D breathing air, or the filling of the [Foxboro] Organic Vapor Analyzer (OVA) hydrogen cylinders). Disposable cylinders shall not be refilled with any material after use of the original contents.
- 4.7.14 Cylinders of compressed gas shall be stored in areas where they are protected from external heat sources such as flame impingement, intense radiant heat, electric arc, or high-temperature steam lines.
- 4.7.15 Cylinders are to be stored in an assigned, well-ventilated area, with full and empty cylinders stored separately. Empty cylinders shall be marked 'empty'.
- 4.7.16 Stored fuel gases and oxygen cylinders are to be separated by at least 20 feet, or by a fire wall at least 5 feet high that has a fire-resistance rating of at least ½ hour.
- 4.7.17 Oxygen, nitrogen, helium, or freon cylinders shall only be stored or transported in an upright or horizontal position. Acetylene cylinders shall always be kept in an upright position. All horizontally-placed cylinders are to be secured by chocks or ties to prevent rolling.
- 4.7.18 Cylinders are to be secured to a fixed object by chain or equivalent fastening device whenever they are placed in an upright position. The protective cap is not to be removed or the cylinder valve opened until the cylinder is secured.
- 4.7.19 Repair of leaks shall never be attempted on a pressurized system. System pressure should be reduced to atmospheric pressure as rapidly as possible, and the Manager notified immediately.
- 4.7.20 Compressed gas cylinders shall be legibly marked for the purpose of identifying the gas content with either the chemical or the trade name of the gas. Such marking is to be done by means of stenciling, stamping or labelling, and shall not be readily removable. Whenever practical, the marking is to be located on the shoulder of the cylinder. Positive identification of the gas in any cylinder is required before connecting cylinders for use.
- 4.7.21 Gas cylinders moved by hoist shall be handled in suitable cradles or job-made "skip" (materials) boxes. Any slings used for this purpose shall be specifically designed for that cylinder handling.
- 4.7.22 Cylinders shall not be placed where they might form part of an electrical circuit.
- 4.7.23 Transfer of compressed gases (including acetylene) from one cylinder to another, or mixing of gases in a cylinder, is prohibited.
- 4.7.24 Oxygen cylinders are never to be stored near:
 - Highly combustible materials, especially oil and grease;
 - Reserve stocks of acetylene or other fuel gas cylinders; and
 - Any other substance likely to cause or accelerate fire.
- 4.7.25 Compressed oxygen is never to be used:
 - As breathing air;
 - To purge pipelines, tanks, or any confined area;
 - To supply a head-pressure tank;
 - In pneumatic tools;
 - In oil preheating burners;

- To start internal combustion engines;
- For ventilation;
- For cleaning clothing; and
- In any other way as a substitute for compressed air.

4.7.26 Use of a cylinder's contents for purposes other than those intended by the supplier is prohibited.

4.7.27 Cylinders of compressed natural gas or propane equipped with a pressure relief device shall always be positioned in a manner that this device remains above the liquid level (e.g., if stored or installed horizontally on a forklift, relief device is positioned at the top).

4.7.28 Storage of liquefied petroleum gas (LPG) within buildings is prohibited, and outdoor storage of LPG shall meet applicable building and fire codes.

4.8 Special Precautions for Compressed Gas Cylinders Containing Hydrogen

4.8.1 Inside buildings, cylinders of hydrogen should be separated from oxygen cylinders by a minimum distance of 20 feet (6.1 meters) or by a barrier of non-combustible material at least 5 feet (1.5 meters) high having a fire resistance rating of at least one half hour.

4.8.2 Conspicuous signs should be posted in hydrogen storage areas forbidding smoking, open flames or the use of lights or lighting not approved for use in flammable areas.

4.8.3 Hydrogen storage areas shall be labeled, "Hydrogen-Flammable Gas-No Smoking-No Open Flame" or equivalent.

4.9 Inspection of Compressed Gas Cylinders

4.9.1 Prior to formally accepting any delivered compressed gas cylinders, a visual inspection of each cylinder will be documented as specified below. In addition, all compressed gas cylinders stored at an AECOM facility will be inspected monthly.

- Visually inspect cylinders, refer to *S3AM-114-FM1 Compressed Gas Cylinder Inspection*.
- Verify that all the required markings are on the cylinders.
- If required, determine when the cylinder was last hydrostatically-tested.
- Inspect the safety relief devices, if required.
- If any defects are noted during the inspection, the cylinder should be refused on delivery and a new delivery requested (notify the Manager).

4.9.2 Where compressed gas cylinders are stored at an AECOM facility, a qualified person will be designated to confirm cylinder activities comply with the requirements in this procedure. Inspection entails the evaluation of the integrity of the cylinder as well as the serviceability of any attached manifold and valve fittings. Inspection activities of cylinders beyond visual inspection are recommended to be conducted in isolation or a remote location for worker and public safety. The inspection of any cylinder will be conducted by a qualified person, refer to *S3AM-114-FM1 Compressed Gas Cylinder Inspection*.

4.10 Cylinder Inspection Procedures

4.10.1 All cylinder inspection procedures will adhere to the applicable regulatory requirement. At a minimum, the inspection process will include the following procedures:

- Observe the cylinder from a safe distance to identify any visual markings or other information.
- Inspect the cylinder size, shape, and general condition (if visible, include the valve system/stem in the inspection process).
- If the cylinder or valve system appears to be in poor condition or has lost structural integrity, do not approach the cylinder. Observations indicating a cylinder is in poor condition may include:

- Leaking,
 - Hissing sound,
 - Odor in vicinity of the cylinder,
 - Rusty components,
 - Bulging side wall or end, and/or
 - Corroded valve system.
- 4.10.2 If the cylinder is determined to be in poor condition, cordon the area off and limit access to necessary employees only.
- 4.10.3 Wear applicable PPE and approach the cylinder with the appropriate direct reading air monitoring instrument (do not approach from the ends of the cylinder), then determine the airborne contaminant concentrations in the immediate area.
- 4.10.4 Document cylinder information (e.g., visible markings, labels, placards, etc.).
- 4.10.5 Cylinders presenting potential deficiencies (e.g., dent, missing labels, valve protection cap cannot be removed by hand, corrosion, etc.) shall be tagged 'Do Not Use', removed from use, and returned to the supplier.
- 4.11 Ground Transport of Compressed Gas Cylinders
 - 4.11.1 AECOM will transport (drive/haul) quantities of compressed gases which do not exceed Materials of Trade (MOT) quantities, whereas the transport of placardable quantities is prohibited without the proper DOT / TDG licenses/credentials and consultation with the SH&E Manager.
 - 4.11.2 Compressed gas cylinders in portable service are to be conveyed by suitable trucks, to which they are securely fastened. All gas cylinders in service shall be securely held in substantial racks or secured to other rigid structures so that they will not fall or be knocked over.
- 4.12 Air/Common Carrier Transport
 - 4.12.1 All shipping of compressed gases via air/common carrier including instrument gases, regardless of quantity, shall be conducted by a qualified and trained HazMat Shipper (Level 1-2 Shipper) or jurisdictional equivalent, and shall be conducted under the oversight of a designated DOT/International Air Transport Association (IATA) shipping specialist, or jurisdictional equivalent. Refer to *S3AM-116-PR1 Hazardous Materials Shipping*.
 - 4.12.2 No compressed gas cylinder, regardless of contents or quantity, will be shipped via an external carrier vendor (i.e., UPS, FedEx, etc.) without the authorization of:
 - SH&E Manager, and
 - DOT/IATA shipping specialist.
 - 4.12.3
- 4.13 Cylinder Color Coding Determination
 - 4.13.1 The color coding of compressed gas cylinders is established by the Compressed Gas Association, which has assigned specific colors to categories or classes of chemicals/substances. It is important to note there is currently not requirement to adhere to this color coding scheme.
 - 4.13.2 While recently manufactured cylinders reflect the color coding guidance established by the CGA, older cylinders may not reflect this nomenclature. It is also possible for cylinders to have been repainted a different color from their original.
 - 4.13.3 Cylinder contents should never be determined by the color of the cylinder alone. Colors are not uniform throughout the compressed gas industry.
 - 4.13.4 Cylinder contents shall be identified by a decal, label, tag, or stenciling. If an identifying label is lacking or not legible, return the container to the supplier, unused.

4.14 Air Monitoring Requirements

4.14.1 Air monitoring requirements are dependent upon the specific substances contained within the cylinders and will be specified within the site-specific safety plan prepared prior to commencement of field activities. Air monitoring parameters, refer to *S3AM-127-PR1 Exposure Monitoring*, may include, but are not limited to:

- Explosivity (i.e., lower explosive limit [LEL]), and
- Chemical-specific substance (e.g., chlorine, ammonia, arsine, etc.).

4.14.2 Action levels will be identified in the site-specific safety plan.

4.15 Cylinder Staging

4.15.1 Staging involves the organization, and sometimes consolidation, of cylinders that have similar contents or characteristics.

4.15.2 The staging of cylinders will occur in a remote location at the site in order to minimize the potential injury or property damage from an accidental release or emergency decompression (if the integrity of the cylinder is in question, it should not be moved).

4.15.3 Safe distances will be based on the evacuation distances provided in DOT's Emergency Response Guidebook (most current edition).

4.15.4 When multiple cylinders containing different substances are present, the distance should be based on the greatest evacuation distance required by the substances present.

4.16 Cylinder Disposition & Decommissioning Activities

4.16.1 Disposition refers to the recycling, treatment, or disposal of a compressed gas cylinder and/or its contents.

4.16.2 Recovery and recycling of materials are preferred over any other method of disposition. Cylinder disposition activities shall be approved by the SH&E Manager.

4.16.3 An effort should be made to recover and recycle the contents of a cylinder; however, if recovering or recycling the contents is not possible, then other options include:

- Venting to the Atmosphere,
- Flaring,
- Neutralization, and
- Detonation.

4.16.4 Under no circumstances will poisonous, toxic, or ozone-depleting substances be vented to the atmosphere. Only cylinders containing flammable gases should be detonated, as the flammable contents will be consumed in the subsequent explosion.

4.16.5 If the cylinder valve has been determined to be inoperable, then the available options for disposition are limited to having an outside vendor perform the remote opening and sampling of the cylinder, or detonation of the cylinder where the cylinder contents are consumed in the subsequent explosion (flammable gases only).

4.16.6 All cylinders shall be inventoried, staged, and inspected.

4.16.7 Prior to the commencement of cylinder disposition and decommissioning activities, local emergency response agencies (i.e., Fire Department, Medical, and Emergency Response, if separate) shall be confirmed and, as applicable, activities coordinated with the local agencies.

4.16.8 Air monitoring is mandatory during cylinder disposition and decommissioning operations.

4.16.9 A SH&E Manager shall be contacted during the planning stages of a cylinder disposition and decommissioning effort in order to determine whether a site-specific cylinder plan is required.

4.17 Venting to the Atmosphere

4.17.1 Cylinders that contain non-flammable, non-toxic materials can be vented to the atmosphere. All venting activities will be performed in accordance with the following procedures:

- Atmospheric venting will be accomplished at a remote location and in compliance with all applicable environmental air regulatory requirements.
- Atmospheric venting activities will be completed in a Level B Ensemble (unless otherwise specified in the site-specific safety plan and cylinder plan).
- Venting activities will be dependent upon a wind direction that does not carry the outgas plume in the direction of an adjacent public structure.
- The cylinder will be properly grounded to confirm a static charge is not generated, potentially resulting in ignition of a flammable gas.
- All tools used on the cylinder will be non-sparking.
- Low-pressure discharging will not exceed 15 pounds per square inch gauge (psig).
- Once discharging has started, all workers will retreat to the exclusion zone (minimum 100 feet) around the remote location until the discharging process is complete.

4.18 Flaring

4.18.1 Flaring activities involve the combustion of the cylinder contents through the discharge of a low-intensity flame. Flaring activities will be performed in accordance with the following procedures:

- Flaring will be accomplished at a remote location and in compliance with all applicable environmental air regulatory requirements.
- All personnel involved with flaring activities shall be appropriately trained and wear PPE appropriate to the hazards (e.g. Nomex fire-retardant forearm-length gloves, other fire-retardant clothing, self-contained breathing apparatus, etc.).
- Flaring activities will be dependent upon a wind direction that does not carry the combustion plume in the direction of any offsite structure or activity, or into uncontrolled (public access) areas.
- The cylinder will be properly grounded to confirm a static charge is not generated, potentially resulting in ignition of a flammable gas.
- All tools used on the cylinder will be non-sparking.
- Low-pressure discharging will not exceed 15 pounds per square inch gauge (psig).
- A hot work permit shall be completed prior to the start of flaring activities, refer to *S3AM-332-PR1 Hot Work*.
- No other cylinders will be within 50 feet (15.24 meters) of the cylinder being flared.
- Flaring activities will use a low-pressure discharge and maintain a small, low-intensity flame.
- A firewatch will be established, with a worker stationed outside the exclusion zone with a fire extinguisher (20A:100B:C) during flaring activities (i.e., fire watch). During the work the worker assigned to the firewatch will have no other duties.
- The flare will be positioned so that it is not pointing toward any flammable materials, persons, or equipment in the immediate area.

4.19 Neutralization

4.19.1 Neutralization refers to the on-site neutralization of the cylinder contents through a controlled chemical reaction process. Specialized equipment may be necessary based on the chemical involved, as well as reaction by-products, catalysts, or physical conditions (i.e., temperature, acidic, basic, etc.). Neutralization activities will be performed in accordance with the following procedures:

- Neutralization is the required disposition method for cylinders containing acid gases, as well as many alkaline gases.
- The neutralization process shall be approved by a professional engineer (e.g., chemical) or based on a published chemical-specific neutralization methodology.
- Liquid levels in the reaction vessels will be maintained at least 12 inches (30.5 centimeters) below the top of the vessel.
- Based on the specific chemical reaction, the temperature of the reaction vessel and its contents will be monitored continuously and controlled accordingly.
- Pressure levels will be maintained within acceptable limits to prevent the reaction from accelerating, unwanted by-product formation, or the break-through of the chemical intended to be neutralized.
- Employees involved in neutralization activities shall be appropriately trained and wear the PPE identified within the site-specific safety plan and cylinder plan.

4.20 Detonation

4.20.1 Detonation refers to the use of explosives to open and subsequently consume the contents of the cylinder by the heat generated during the explosion. Detonation activities will be performed in accordance with the following procedures:

- All personnel involved with detonation activities shall be appropriately trained and wear PPE appropriate to the hazards (e.g. Nomex fire-retardant forearm-length gloves, other fire-retardant clothing, self-contained breathing apparatus, etc.).
- A detonation plan shall be submitted to and approved by the SH&E Manager prior to the commencement of cylinder detonation activities.
- The detonation of compressed gas cylinders will be completed under the guidance of experienced ordnance and explosives (OE) professional who is licensed in the use of explosives.
- A sufficient amount of explosives will be used to consume the entire contents of the cylinder (flammable gases only).
- A blast pit will be excavated where all detonations will take place.
- The OE professional will determine the blast hazard zone/potential debris impact zone, and this area will be evacuated prior to the detonation.
- The OE professional will sound a warning signal (e.g., horn or equivalent) three times to indicate that a detonation is imminent and confirm all persons have evacuated the blast hazard zone prior to detonation.
- Employees will be on standby outside the blast hazard zone with fire extinguishers (minimum rating of 20A:100B:C).

4.21 Cylinder Decommissioning Operations

- 4.21.1 Decommissioning refers to the removal of a compressed gas cylinder from service by rendering it permanently unusable.
- 4.21.2 Prior to decommissioning, cylinder contents will be verified, removed from the cylinder, and the cylinder purged with an inert gas (e.g., nitrogen, carbon dioxide, etc.).
- 4.21.3 All identifying marks or decals will be removed from the cylinder.
- 4.21.4 The SH&E Manager shall be contacted prior to the decommissioning of compressed gas cylinders that contain or previously contained:
- Ethylene oxide,

- Arsine,
- Diborane,
- Hydrogen selenide,
- Cyanogen chloride,
- Amines,
- Hydrogen sulfide,
- Acetylene, or
- Methyl mercaptan.

4.21.5 Additional safety precautions may be necessary due to highly reactive residues left behind by these substances.

4.21.6 The recommended methods of decommissioning include:

- Burning/torch-cutting an elongated hole into the side of the cylinder, refer to *S3AM-332-PR1 Hot Work*;
- Torch-cutting the cylinder in half; and
- Crushing the cylinder.

5.0 Records

5.1 None

6.0 Attachments

6.1 [S3AM-114-ATT1 Compressor Safety](#)

6.2 [S3AM-114-FM1 Compressed Gas Cylinder Inspection](#)

Compressor Safety

S3AM-114-ATT1

1.0 Objective / Overview

- 1.1 Compressors should be used with extreme caution in order to prevent personal injury.
- 1.2 When using a compressor it's important to follow the manufacturer's instructions to avoid injuring someone or damaging your compressor.
- 1.3 Allow only trained, authorized personnel to operate the compressor. Along with training, other safety measures include: proper maintenance of equipment and personal protective equipment.

2.0 Safe Operating Guidelines

- 2.1 Follow manufactures recommended operating instructions, every compressor is not the same. Maintain adequate ventilation.
- 2.2 Gas and diesel powered generators emit carbon monoxide (CO). Never operate a fuel-powered compressor in an enclosed building without proper ventilation.
- 2.3 Turn the compressor off to refuel. Gasoline and its vapors may ignite if they come into contact with hot components or an electrical spark, store fuel in a properly designed container in a secure location.
- 2.4 Operators shall perform a pre-operational check of all air hoses, couplings, and connections to determine if leakage or other damage exists. Tag unsafe equipment and take out of service immediately.
- 2.5 Decompress air from the compressor prior to removing any caps or air equipment attachments such as jackhammers, drills, etc.
- 2.6 Keep oil and flammable material clear of air fittings and joints.
- 2.7 Make sure connections are secure to avoid a hose coming loose during use.
- 2.8 To avoid a shock, make sure that your hands are dry and you're standing in a dry place whenever you operate an electrically powered compressor.
- 2.9 Use only UL-listed, three-prong extension cords. Be sure the extension cord is the proper size (wire-gauge) to handle the electric load that will be plugged into it.
- 2.10 Have a Class A:B:C fire extinguisher readily available at all times.

3.0 Potential Hazards

- 3.1 Burns from contact with the hot muffler or engine
- 3.2 Shocks/electrocution
- 3.3 Noise exposure
- 3.4 Inhaling exhaust gases, CO
- 3.5 Contact with pressurized air

4.0 Training Requirements

- 4.1 Review of applicable procedures.
- 4.2 Demonstrated knowledge on the use of the compressor.
- 4.3 Review of manufacturers operating guidelines.

5.0 Personal Protective Equipment

- 5.1 Leather Gloves
- 5.2 Hearing Protection
- 5.3 Long Sleeve Shirt (e.g., to shield from burns, etc.)
- 5.4 Refer to *S3AM-208-PR1 Personal Protective Equipment*

Americas

Compressed Gas Cylinder Inspection

S3AM-114-FM1

Location Inspected: _____ Job No.: _____

Date Inspected: _____ Name of Inspector: _____

1.	DOT / TDG container specification number present on cylinders.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
2.	Proper DOT / TDG shipping name, ID # and hazard class on cylinders.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
3.	Manufacturer's name and appropriate hazard warnings present.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
4.	Serial number of cylinders and inspectors official mark present.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
5.	Most recent hydrostatic test date marked and within 5 years.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
6.	Cylinder valve and neck ring free of oil, grease or other foreign matter.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
7.	Valve threads clean and in good condition.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
8.	Pressure rating of cylinder not exceeded.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
9.	Cylinder surface is free of cracks, and dents, gouges, weld defects, etc.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
10.	Cylinder surface is free of arc burns and fire burns.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
11.	Cylinder cap is present and threaded in place.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
12.	Cylinder surface, particularly bottom, is free of excessive corrosion, and pitting.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
13.	Cylinders must be capped when regulators are removed.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
14.	Oxygen and fuel cylinders are stowed in designated well-ventilated areas.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
15.	Storage areas have temperatures less than 125° F (52° C).	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
16.	Cylinders are stored upright and secured from falling over.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
17.	Cylinders are in segregated groups by gas type and not intermingled with other cylinders.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
18.	Oxygen cylinders are stored at least 20 feet (6.1 meters) away from flammables. (A fire-resistive partition of at least 1-hour fire-resistance rating of at least 5-foot (1.52 meters) height may be used in lieu of 20 foot [6.1 meter] separation.)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
19.	Flammable or combustible materials are kept at least 20 feet (6.1 meters) away from stored cylinders.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
20.	Gas cylinder valves are protected from snow and ice during winter months.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
21.	Oxygen cylinders are kept free from oil and grease.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
22.	Welding cylinders are securely fastened to ready-use racks.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
23.	Smoking or open flames are not permitted in areas where cylinders are stored.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
24.	Cylinder storage areas are posted with the following sign: "DANGER – NO SMOKING OR OPEN FLAME".	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
25.	Cylinders are labeled with gas contents and warning statement.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
26.	Empty cylinders are segregated from full cylinders.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA

Hazardous Materials Communication

S3AM-115-PR1

1.0 Purpose and Scope

- 1.1 Provides a Hazard Communication Program so that AECOM employees are informed of the hazards of the chemicals to which they may be exposed in the course of their work by way of container labeling and other forms of warning, safety data sheets (SDS), and employee training.
- 1.2 This procedure applies to all AECOM Americas-based employees and operations.
- 1.3 The program applies to the use of any hazardous substances which are known to be present in the workplace in such a manner that employees may be exposed under normal conditions of use or in a foreseeable emergency.
- 1.4 The program does not apply to general consumer products, for example, cleaners, printer toner, white out, etc.

2.0 Terms and Definitions

- 2.1 **Acute Effect** – An adverse effect on the human body with immediate onset of symptoms.
- 2.2 **Article** – A manufactured item: (1) which is formed to a specific shape or design during manufacture; (2) which has end use function(s) dependent in whole or in part upon its shape or design during end use; and, (3) which does not release or otherwise result in exposure to, a hazardous chemical, under normal conditions of use.
- 2.3 **Carcinogen** – Those chemicals appearing in any of the following reference sources are established as carcinogens for hazard communication purposes:
 - National Toxicology Program (NTP) Annual Report on Carcinogens.
 - International Agency for Research on Cancer (IARC) Monographs, Volumes 1-34. Note: The Registry of Toxic Effects of Chemical Substances published by NIOSH indicates whether a substance has been found by NTP or IARC to be a potential carcinogen.
- 2.4 **Chemical Name** – The scientific designation of a substance in accordance with the nomenclature system developed by the International Union of Pure and Applied Chemistry or the system developed by the Chemical Abstracts Service.
- 2.5 **Chronic Effect** – An adverse effect on the human body with symptoms which develop slowly over a long period of time or which frequently recur.
- 2.6 **Combustible Liquid** – Any liquid having a flash point at or above 100°F (37.8°C) but below 200°F (93.3°C), except any mixture having components with flash points of 200°F (93.3°C), or higher, the total volume of which makes up 99% or more of the total volume of the mixture.
- 2.7 **Common Name** – Any designation or identification such as code name, code number, trade name or brand name used to identify a substance other than by its chemical name.
- 2.8 **Container** – Any bag, barrel, bottle, box, can, cylinder, drum, reaction vessel, storage tank or the like that contains a hazardous chemical. For purposes of this procedure, pipes or piping systems, and engines, fuel tanks, or other operating systems in a vehicle are not considered to be containers.
- 2.9 **Location** – Any separate and distinct AECOM office, laboratory or other company facility.
- 2.10 **Exposure** – Any situation arising from work operations where an employee may ingest, inhale, absorb through the skin or eyes or otherwise come into contact with a hazardous substance.
- 2.11 **Flammable** – A substance that falls into one of the following categories:

- 2.11.1 **Flammable Aerosol** – An aerosol that when tested by the method described in 16 CFR 1500.45, yields a flame projection exceeding 18 inches at full valve opening or flashback (a flame extending back to the valve) at any degree of valve opening.
- 2.11.2 **Flammable Gas** – A gas that at ambient temperature and pressure:
- Forms a flammable mixture with air at a concentration of 13% of volume or less; or
 - Forms a range of flammable mixtures with air wider than 12% by volume, regardless of the lower limit.
- 2.11.3 **Flammable Liquid** – Any liquid having a flash point below 100°F (37.8°C), except any mixture having components with flash points of 100°F (37.8°C) or higher, the total of which make up 99% or more of the total volume of the mixture.
- 2.11.4 **Flammable Solid** – A solid, including a powdered, granular or pasty mixture of a substance that is liable to cause fire through friction, absorption of moisture, spontaneous chemical change or retained heat from manufacturing or processing or which can be ignited readily and when ignited burns so vigorously and persistently as to create a serious hazard.
- Flammable Solids do not include blasting agents or explosives as defined in 8 CCR 5237(a).
- 2.12 **Flash Point** – Minimum temperature of a liquid at which it gives off sufficient vapors to form an ignitable mixture with the air near the surface of the liquid or within the container used.
- 2.13 **GHS** – The Globally Harmonized System of Classification and Labelling of Chemicals developed by the United Nations with the goal of an international system to define and classify the hazards of chemical products, and communicate health and safety information on labels and safety data sheets.
- 2.14 **Hazardous Chemical** – Those chemicals appearing in any of the following reference sources are established as hazardous chemicals for hazard communication purposes.
- 29 CFR Part 1910, Subpart Z, Toxic and Hazardous Substances, OSHA.
 - Hazardous Products Act, R.C.S. 1985, c. H-3, section 2, Canada.
 - For operations within the state of California, the list of hazardous substances prepared by the California Director of Industrial Relations pursuant to Labor Code Section 6382. The concentrations and footnotes, which are applicable to the list, shall be understood to modify the same substance on all other source lists or hazard determinations set forth in § 8 CCR 5194(d)(3)(B) and (d)(5)(D).
- 2.15 **Hazardous Substance** – A hazardous chemical or carcinogen, or a product or mixture containing a hazardous chemical or carcinogen provided that:
- 2.15.1 The hazardous chemical is 1% or more of the mixture or product or 2% if the hazardous chemical exists as an impurity in the mixture; or
- 2.15.2 The carcinogen is 0.1% or more of the mixture or product;
- 2.15.3 Manufacturers, importers and distributors will be relied upon to perform the appropriate hazard determination for the substances they produce or sell.
- 2.15.4 The following materials are not covered by the Hazard Communication Standard:
- Any hazardous waste as defined by the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976, as amended (42 USC 6901 et seq.) when subject to regulations issued under that act by the Environmental Protection Agency.
 - Tobacco or tobacco products;
 - Wood or wood products. Note: Wood dust is not exempt since the hazards of wood dust are not “self-evident” as are the hazards of wood or wood products;
 - Consumer products (including pens, pencils, adhesive tape) used in the work place under typical consumer usage;
 - Articles (i.e. plastic chairs);

- Foods, drugs, or cosmetics intended for personal consumption by employees while in the work place;
- Foods, drugs, cosmetics in retail store packaged for retail sale; and
- Any drug in solid form used for direct administration to the patient (i.e., tablets or pills).

Hazardous substance shall be considered the equivalent term to 'controlled substance'.

- 2.16 **Hazardous Substance Inventory (HSI) / WHMIS Log** – A listing of all chemicals stored or used at an office or project site. Note that the list may be imbedded in a project Health and Safety Plan.
- 2.17 **Immediate Use** – Means that the hazardous chemical will be under the control of and used only by the person who transfers it from a labeled container and only within the work shift in which it is transferred.
- 2.18 **National Fire Protection Association (NFPA)** – The NFPA is a trade association that issues standards and codes concerning risks associated with fire. A system of categories has been established by NFPA standard 704; colors and numbers, to provide basic hazard information concerning hazardous materials. It enables firefighters and other emergency personnel to easily decide whether or not to evacuate an area or proceed with emergency control operations. The three principal categories of identification are Health, Flammability and Instability. A numerical range of "0 to 4" indicates the severity of the hazard. A "4" indicates the most severe and a "0" indicates a minimal hazard. Refer to *S3AM-115-ATT1 Pictograms & Sample Labels* for an example.
- 2.19 **Mixture** – Any solution or intimate admixture of two or more substances which do not react chemically with each other.
- 2.20 **Reactivity** – A measure of the tendency of a substance to undergo chemical reaction with the release of energy.
- 2.21 **SDS** – A Safety Data Sheet prepared pursuant to state and federal regulations, OSHA Form 174 and Canada regulations (Controlled Products regulations, schedule 1).
- 2.22 **SDS Administrator** – The individual or group designated by the Office Manager (Operations) or Project Manager to maintain the location-specific inventory list or log and the SDS binder required if that location uses or stores hazardous substances.
- 2.23 **Solubility** – The ability of substance to blend and mix uniformly with another.
- 2.24 **Specific Gravity (density)** – Ratio of the weight of a substance to the weight of the same volume of another substance. As used in this directive, specific gravity or density refers to the weight of substance as compared to the weight of an equal volume of water.
- 2.25 **Vapor Density** – The weight of a vapor-air mixture resulting from the vaporization of a volatile liquid at equilibrium temperature and pressure conditions, as compared with the weight of an equal volume of air under the same conditions.
- 2.26 **WHMIS** – The Workplace Hazardous Materials Information System (WHMIS) is Canada's national hazard communication standard. The key elements of the system are cautionary labeling of containers of WHMIS "controlled products", the provision of safety data sheets (SDSs) and worker education and training programs.

3.0 References

- 3.1 Additional definitions can be found in the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), Hazardous Material Regulations (HMR), the Transportation of Dangerous Goods (TDG) Regulations, and the International Air Transport Association (IATA) Dangerous Goods Regulation (DGR).
- 3.2 S3AM-003-PR1 SH&E Training
- 3.3 S3AM-117-PR1 Hazardous Waste Operations
- 3.4 S3AM-208-PR1 Personal Protective Equipment

3.5 S3AM-209-PR1 Risk Assessment & Management

4.0 Procedure

4.1 Roles and Responsibilities

4.1.1 SH&E Manager / SH&E Department

- Audit their regional offices to confirm that they maintain a location-specific Hazardous Substance Inventory (HSI).
- Audit their regional offices to confirm that if a location-specific HSI is required, that current SDSs are available for each substance listed on the HSI.
- Provide interpretation of SDSs and hazard information for GHS labels/WHMIS labels/NFPA labels and other information to assist in training employees.
- Provide hazard communication training to AECOM employees and file documentation related to this training (e.g. trainer name, date trained, brief description of training, etc.).
- Review SDS for adequacy of completion to meet the OSHA and Canadian standard and returning them to supplier, if necessary.

4.1.2 Manager / Site Safety Officer (SSO) / Supervisor

- Have an operations-specific, written hazard communication program which at least describes how the requirements of this Procedure and the US OSHA and Canadian Hazard Communication requirements for labels and other forms of warning, material safety data sheets, and employee information and training will be met.
- Appoint an SDS administrator for their location if they store or use hazardous substances.
- Confirm, if required, that the SDS Administrator maintains an HSI for their location.
- Confirm that a copy of this Procedure and the site-specific SDS are available to all employees (and/or their designated representative). Employees shall be instructed in the location of this Procedure and the SDSs.
- Confirm that all employees (including new employees) under their supervision have received the appropriate training required by this procedure prior to assigning employees to tasks involving the use of, or potential exposure to, hazardous substances.
- Notify employees of hazardous substances covered by this procedure that are used in their work area.
- Determine the potential fire, toxic, or reactivity hazards which are likely to be encountered in the handling or utilization of a hazardous substance and will communicate this information to their affected employees, before any are permitted to work with it.
- Confirm that a current SDS (is replaced as new versions are issued) is available for each hazardous substance used, or potentially encountered, in the work areas or on the projects that are under their supervision.
- Confirm hazardous substances are properly labelled.
- Notify subcontractors (working for AECOM) of any hazardous substances that are used or stored by AECOM to which the subcontractor's employees may be exposed.
- Notify clients or property owner/operators of chemicals brought onto their property by AECOM or AECOM's subcontractors.
- Request SDSs from all subcontractor organization for the relevant chemicals they bring onto an AECOM controlled site.
- Access or obtain, and maintain copies of SDS from:

- The product manufacturer or supplier;
- All AECOM subcontractors bringing chemicals onto the project site; and
- The client, for all of the client's chemicals to which AECOM or AECOM subcontract employees are potentially exposed.

4.1.3 Employee

- Confirm that they have received appropriate hazard communication training prior to working with materials that fall under the procedure.
- Only work with materials for which they have been instructed on how to find an SDS and how to work with that material safely.
- Utilize the appropriate Personal Protective Equipment (PPE) and spill containment materials as per the SDS.
- Provide a copy of all SDSs received to the SDS Administrator at their facility.
- Verify that an SDS is available in their work area for each hazardous substance that they use.

4.2 General Procedure

- 4.2.1 Confirm that containers of hazardous substances that they use are properly labelled. All employees have a right to, and should, know the properties and potential hazards of substances to which they may be exposed.
- 4.2.2 Should AECOM assign employees that do not read and speak English to tasks with chemical exposures, communications will be provided in the language understood by that employee.

4.3 Employee Information and Training

- 4.3.1 Training of employees on hazardous substances in their work area shall be conducted:
- At the time of their initial assignment;
 - Whenever a new hazardous substance is introduced into their work area; and
 - According to jurisdictional requirements (e.g., GHS, WHMIS, etc.).
- 4.3.2 As a minimum, the training requirements apply to employees in the following job categories:
- All employees who perform field work that involves the use of, shipping / receiving of, or potential exposure to, hazardous substances covered under the OSHA Hazard Communication Standard and WHMIS; and
 - Laboratory Employees.
- 4.3.3 The Initial Training will provide instruction in the following:
- Methods and observations that may be used to detect the presence or release of a hazardous substance in the work area (such as personal monitoring, visual appearance or odor of hazardous substances being released, etc.);
 - The physical and health hazards of substances in the work area and measures and procedures AECOM has implemented to protect employees; and
 - The details of this hazard communication program, including an explanation of the labelling system and the SDS, and how he/she can obtain and use appropriate hazard information;
 - Any operations in their work area in which hazardous substances are present;
 - Location and availability of this written hazard communications program (this procedure);
 - Their right to personally receive information regarding hazardous substances to which they may be exposed;

- Their right to have their physician receive information regarding hazardous substances to which they may be exposed; and
- Any relevant jurisdictional regulation, such as an employee's right against discharge or other discrimination (in California) due to the employee's exercise of rights afforded pursuant to provisions of the California Hazardous Substances Information and Training Act.

4.3.4 Periodic Training and Training for Non-Routine Tasks

Additional training will be provided to employees who have received initial training whenever:

- A new hazardous substance is introduced into their work area;
- A new or significantly increased risk has been identified related to an existing hazardous substance (e.g. as identified in an updated SDS); and
- Non-routine tasks are performed, which will potentially result in exposure to hazardous substances, or exposure under circumstances, which were not addressed during initial training.

Supervisors, in coordination with their SH&E Manager, shall provide such training through an explanation of the information on the contents of the SDS for that substance.

When training their employees, supervisors shall explain:

- Any health hazards associated with use of the substance or mixture;
- Proper precautions for handling;
- Necessary personal protective equipment or other safety precautions to prevent or minimize exposure; and
- Emergency procedures for spills, fire, disposal, and first aid.

For most projects involving field work, this periodic training requirement will be facilitated through the implementation of the site specific SH&E Plan that has been developed for the project.

4.3.5 Documentation of Initial and Periodic Training

- All training required shall be documented at the time it is performed by having the employee sign a copy of a training attendance sheet.

4.4 Hazardous Waste Exemption

4.4.1 In the U.S., hazardous wastes are excluded from the state and federal Hazard Communication standards. AECOM employees who handle or are otherwise exposed to hazardous wastes are covered by the requirements of the Resource Conservation and Recovery Act (RCRA) and other local waste related laws and regulations and the OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) standard at 29 CFR 1910.120 and *S3AM-117-PR1 Hazardous Waste Operations*.

4.5 Hazardous Substance Inventory and Chemical Usage

Establishment of a Specific Hazardous Substance Inventory (HSI) or WHMIS Log, as referenced or contained within the safe to work plan, refer *S3AM-209-PR1 Risk Assessment & Management*, shall include:

- 4.5.1 If an AECOM location uses or stores additional hazardous substances, a location-specific HSI or WHMIS Log shall be maintained at that location.
- 4.5.2 If it is determined that an office-specific HSI is needed, the Manager shall confirm that one is developed and maintained by someone appointed as the location's SDS Administrator.
- 4.5.3 The HSI or WHMIS Log may be hard copy or managed through an electronic SDS management system.

4.5.4 The content of the HSI or WHMIS Log shall be updated as new hazardous substances are procured for, or removed from the location, and shall be verified by the SH&E Manager through regular inspections of the location.

4.5.5 In order to meet the 30-years-after-employment-termination record retention requirement, the office or project specific HSIs shall be managed as a permanent record.

Prior to using any chemical, a Task Hazard Analysis (THA) shall be completed by the employees assigned to use the chemical. The analysis will identify the hazards associated with the chemical (e.g. review the SDS to identify carcinogens or extremely hazardous chemicals), the tasks to be performed, and prescribe the Personal Protective Equipment (PPE) to be used, refer to *S3AM-208-PR1 Personal Protective Equipment*.

4.6 Safety Data Sheets (SDS)

4.6.1 Location-Specific SDS Inventory

- If it is determined that an AECOM location is required to maintain a location-specific inventory SDSs for the specific hazardous substances shall be maintained on file at that location.
- The SH&E Manager shall audit the local office or project for SDS request and maintenance and report deficiencies to the appropriate management level, as necessary, to confirm compliance with this procedure.

4.6.2 Field Project Sites and Client Facilities

- The Project Manager and/or the Site Safety Officer shall access or obtain, and maintain copies of SDS from:
 - The product manufacturer or supplier;
 - All AECOM subcontractors bringing chemicals onto the project site; and
 - The client, for all of the client's chemicals to which AECOM or AECOM subcontract employees are potentially exposed.

4.6.3 Employee Access to SDSs

SDSs should be maintained at the local location that uses that hazardous substance. Copies of this program and the SDS should be made available to the employee upon request to the office's SDS Administrator.

4.6.4 Field Access to SDSs

When hazardous substances are brought into the field, the user shall confirm that a copy of the SDS for that substance accompanies it and is available at the field location where it is to be used.

4.6.5 SDSs for AECOM Products

It is unlikely that AECOM activities would create a chemical for which a new SDS were needed. If such a chemical were created, the SH&E Department shall work with the appropriate operations groups to draft, review, and publish the new SDS.

4.6.6 Content of the SDS:

- Safety Data Sheets, previously referred to as Material Safety Data Sheets, will now require a 16-section format that is essentially the same as the ANSI standard for Hazardous Workplace Chemicals-Hazard Evaluation and Safety Data Sheets and Precautionary Labeling Preparation (ANSI Z400.1 & Z129.1 – 2010).
- Section 1, Identification includes product identifier; manufacturer or distributor name, address, phone number; emergency phone number; recommended use; restrictions on use.
- Section 2, Hazard(s) identification includes all information regarding the hazards of the chemical and the appropriate warning information associated with the hazards including classification, signal word, hazard statement, pictograms, and precautionary statement.

- Section 3, Composition/information on ingredients includes information on chemical ingredients; trade secret claims.
- Section 4, First-aid measures includes important symptoms/ effects, acute, delayed; required treatment.
- Section 5, Fire-fighting measures lists suitable extinguishing techniques, equipment; chemical hazards from fire.
- Section 6, Accidental release measures lists emergency procedures; protective equipment; proper methods of containment and cleanup.
- Section 7, Handling and storage lists precautions for safe handling and storage, including incompatibilities.
- Section 8, Exposure controls/personal protection lists OSHA's Permissible Exposure Limits (PELs); Threshold Limit Values (TLVs); appropriate engineering controls; personal protective equipment (PPE).
- Section 9, lists the physical and chemical properties of the hazardous substance.
- Section 10, Stability and reactivity lists chemical stability and possibility of hazardous reactions.
- Section 11, Toxicological information includes routes of exposure; related symptoms, acute and chronic effects; numerical measures of toxicity.
- Section 12, Ecological information
- Section 13, Disposal considerations
- Section 14, Transport information
- Section 15, Regulatory information
- Section 16, Other information, includes the date of preparation or last revision.

SDSs that do not contain this information shall be returned to the distributor or manufacturer to be updated.

4.6.7 Trade Secrets

Some hazardous substance suppliers may claim the information requested on SDSs is proprietary and not provide the information to AECOM.

When SDSs supplied to the SH&E Manager indicate that proprietary information has been withheld, the SH&E Manager will either obtain the necessary information to make a hazard assessment or reject the material for use within AECOM.

4.6.8 For Canadian operations, all relevant SDS shall be current (no more than 3 years old) and readily available (in French and English) for all hazardous materials.

4.7 Labeling

4.7.1 Containers of hazardous substances used or stored in each AECOM location shall be labeled, tagged or marked with the following information:

- Product name or Identifier;
- Hazard Pictogram;
- Signal Word;
- Physical, Health, Environmental Statements;
- Supplemental Information;
- Precautionary Measures and Pictograms;

- First Aid Statements;
- Name and Address of Company; and
- Telephone Number.

4.7.2 Refer to *S3AM-115-ATT1 Pictograms & Sample Labels*.

4.7.3 Labels on containers shall not be removed or defaced. Labels or other forms of warning shall be legible, in English and French (Canada), and prominently displayed on the container.

4.7.4 Formal and informal inspections shall include observing that hazardous materials are properly labeled.

4.7.5 Immediately replace lost or illegible labels provided the product can be conclusively identified. Any failure to have the appropriate labeling information on a container at any time, or illegible or missing labels will be cause to suspend use of the product until the product is conclusively identified and is properly labeled.

4.7.6 Carcinogen Labeling

Chemicals which have been indicated as positive or suspect carcinogens by either OSHA, ACGIH, the International Agency for Research on Cancer (IARC) (World Health Organization), or the National Toxicology Program (NTP) will be considered to be carcinogenic for purpose of the HCS.

4.7.7 Stationary Process Containers

If there is stationary process equipment within a work area, signs, placards, pictograms, process sheets, batch tickets, operating procedures, or other such written materials may be used in lieu of fixed labels on the containers, as long as the alternative method conveys the appropriate hazard information. The written materials shall be readily accessible to the employees in the work area.

4.7.8 Portable Containers

Portable containers of hazardous substances need not be labelled when the substance is transferred from labelled containers and will be used immediately by the employee who performs the transfer, however the container shall still contain the product identifier (name). Immediate use means the container will remain in the employee's immediate possession and direct oversight until the container is fully emptied or contents are returned to a labelled container.

Containers of hazardous substances transferred from labelled containers and not intended for the immediate use of the employee performing the transfer shall be labelled with the chemical name and a hazard warning label meeting workplace label requirements in accordance with the OSHA Hazard Communication Standard or WHMIS (as applicable to the given jurisdiction).

4.8 Chemical Storage

4.8.1 Hazardous chemicals are to be stored in labeled containers with the lids securely closed using appropriate undamaged caps or lids. Confirm liners are in place if used.

4.8.2 Flammable and combustible materials shall be stored in fire impervious cabinets in designated stockroom areas. Chemicals shall be stored in compliance with instructions provided on their labels, SDS, or the manufacturer's specifications (e.g. compatibility with other substances, environmental conditions, etc.).

NOTE: Flammable gases or other compressed gases should not be stored in flammable material cabinets as these cabinets are not designed for containment of pressurized gases.

4.8.3 All hazardous chemicals shall be stored in a manner that prevents spillage and leakage from exposing people or the environment to the chemical.

4.8.4 Hazardous chemicals shall not be stored with foods or beverages. Food and beverages shall not be consumed in areas where hazardous chemicals are used or stored.

4.9 Chemical Use in Offices

4.9.1 In general, hazardous substances should not be taken into office areas, conference rooms, or break areas, contact the SH&E Manager for guidance if this general requirement is infeasible.

4.9.2 General exceptions to this rule are the following:

- Liquid paper;
- Toner;
- Cleaners;
- Isobutylene calibration gas; and
- pH calibration solutions for instruments.

4.9.3 Each office or location using or storing hazardous materials will develop a written office/ location-specific Hazard Communication/WHMIS Program.

4.9.4 If the local office decides to implement the requirements of the standard in any way that differs from this procedure, they shall verify the changes with the SH&E Manager, document the changes, and communicate the differences to all affected employees.

4.10 Canada-specific

4.10.1 Consumer products are exempt from supplier labels and SDS requirements. Some cleaning solvents may be packaged as consumer products and these shall be labeled in accordance with the Consumer Product Act requirements.

4.10.2 In addition to the labelling of storage containers in the workplace, the contents of process piping (including valves), process vessels and reaction vessels are required to be identified through the use of colour coding, labels, placards or other modes of identifications that shall be communicated to workers through training programs. It is important for employees to be aware of and understand Client labelling requirements for these types of process systems.

5.0 Records

5.1 HSI or WHMIS Logs shall be retained in project or office files for a minimum of 30 years or according to jurisdictional requirements.

5.2 Training documentation shall be retained in accordance with *S3AM-003-PR SH&E Training*.

6.0 Attachments










6.1 S3AM-115-ATT1 Pictograms & Sample Labels

Americas

Pictograms & Sample Labels

S3AM-115-ATT1

1.0 Hazard Pictograms

<p>Health Hazard</p>  <ul style="list-style-type: none"> ▪ Carcinogen ▪ Mutagenicity ▪ Reproductive Toxicity ▪ Respiratory Sensitizer ▪ Target Organ Toxicity ▪ Aspiration Toxicity 	<p>Flame</p>  <ul style="list-style-type: none"> ▪ Flammables ▪ Pyrophorics ▪ Self-Heating ▪ Emits Flammable Gas ▪ Self-Reactives ▪ Organic Peroxides 	<p>Exclamation Mark</p>  <ul style="list-style-type: none"> ▪ Irritant (skin and eye) ▪ Skin Sensitizer ▪ Acute Toxicity (harmful) ▪ Narcotic Effects ▪ Respiratory Tract Irritant ▪ Hazardous to Ozone Layer (Non-Mandatory)
<p>Gas Cylinder</p>  <ul style="list-style-type: none"> ▪ Gases Under Pressure 	<p>Corrosion</p>  <ul style="list-style-type: none"> ▪ Skin Corrosion/Burns ▪ Eye Damage ▪ Corrosive to Metals 	<p>Exploding Bomb</p>  <ul style="list-style-type: none"> ▪ Explosives ▪ Self-Reactives ▪ Organic Peroxides
<p>Flame Over Circle</p>  <ul style="list-style-type: none"> ▪ Oxidizers 	<p>Environment (Non-Mandatory)</p>  <ul style="list-style-type: none"> ▪ Aquatic Toxicity 	<p>Skull and Crossbones</p>  <ul style="list-style-type: none"> ▪ Acute Toxicity (fatal or toxic)

2.0 United States OSHA Sample Labels

2.1 Workplace Label

- 2.1.1 Workplace labels can either provide all of the required information that is on the 5 label from the chemical manufacturer or, the product identifier and words, pictures, symbols or a combination thereof, which in combination with other information immediately available to employees, provide specific information regarding the hazards of the chemicals.

2.2 Sample Supplier Label

SAMPLE LABEL

CODE _____ Product Name _____ Company Name _____ Street Address _____ City _____ State _____ Postal Code _____ Country _____ Emergency Phone Number _____	} } }	Product Identifier Supplier Identification	Hazard Pictograms Signal Word Danger	} } }	Hazard Statements
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Keep container tightly closed. Store in a cool, well-ventilated place that is locked.
 Keep away from heat/sparks/open flame. No smoking.
 Only use non-sparking tools.
 Use explosion-proof electrical equipment.
 Take precautionary measures against static discharge.
 Ground and bond container and receiving equipment.
 Do not breathe vapors.
 Wear protective gloves.
 Do not eat, drink or smoke when using this product.
 Wash hands thoroughly after handling.
 Dispose of in accordance with local, regional, national, international regulations as specified.

In Case of Fire: use dry chemical (BC) or Carbon Dioxide (CO₂) fire extinguisher to extinguish.

First Aid
 If exposed call Poison Center.
 If on skin (or hair): Take off immediately any contaminated clothing. Rinse skin with water.

Precautionary Statements

Highly flammable liquid and vapor.
May cause liver and kidney damage.

Supplemental Information

Directions for Use

Fill weight: _____ Lot Number: _____
 Gross weight: _____ Fill Date: _____
 Expiration Date: _____

OSHA 3492-01 R 2016

3.0 Canada WHMIS Sample Labels

3.1 Workplace Label

- 3.1.1 A workplace label will require the following information:
- Product name (matching the SDS product name);
 - Safe handling precautions, may include pictograms or other supplier label information;
 - A reference to the SDS (if available).
- 3.1.2 Workplace label requirements fall under your provincial or territorial jurisdiction

3.2 Sample Supplier Label

3.2.1 Supplier labels may be one bilingual label, or two labels (one English and another in French).

Product K1 / Produit K1

Danger

Fatal if swallowed.
Causes skin irritation.

Precautions:
Wear protective gloves.
Wash hands thoroughly after handling.
Do not eat, drink or smoke when using this product.

Store locked up.
Dispose of contents/containers in accordance with local regulations.

IF ON SKIN: Wash with plenty of water.
If skin irritation occurs: Get medical advice or attention.
Take off contaminated clothing and wash it before reuse.
IF SWALLOWED: Immediately call a POISON CENTRE or doctor.
Rinse mouth.

Danger

Mortel en cas d'ingestion.
Provoque une irritation cutanée.

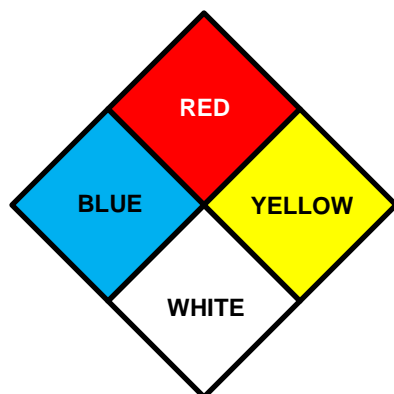
Conseils :
Porter des gants de protection.
Se laver les mains soigneusement après manipulation.
Ne pas manger, boire ou fumer en manipulant ce produit.

Garder sous clef.
Éliminer le contenu/récipient conformément aux règlements locaux en vigueur.

EN CAS DE CONTACT AVEC LA PEAU : Laver abondamment à l'eau.
En cas d'irritation cutanée : Demander un avis médical/consulter un médecin.
Enlever les vêtements contaminés et les laver avant réutilisation.
EN CAS D'INGESTION : Appeler immédiatement un CENTRE ANTIPOISON ou un médecin.
Rincer la bouche.

Compagnie XYZ, 123 rue Machin St, Mytown, ON, N0N 0N0 (123) 456-7890

4.0 NFPA Label



BLUE Health Hazard	RED Flammability Hazard	YELLOW Instability Hazard	WHITE Special Hazard
4 = Can be lethal	4 = Will vaporize and readily burn at normal temperatures	4 = May explode at normal temperatures and pressures	OX = Oxidizer
3 = Can cause serious or permanent injury	3 = Can be ignited under almost all ambient temperatures	3 = May explode at high temperature or shock	SA = Simple asphyxiant gas
2 = Can cause temporary incapacitation or residual injury	2 = Must be heated or high ambient temperature to burn	2 = Violent chemical change at high temperature or pressures	W = Reacts explosively or violently with water
1 = Can cause significant irritation	1 = Must be preheated before ignition can occur	1 = Normally stable. High temperatures make unstable	
0 = No hazard	0 = Will not burn	0 = Stable	

Hazardous Materials Shipping

S3AM-116-PR1

1.0 Purpose and Scope

- 1.1 This procedure prescribes the minimum requirements for shipping samples, hazardous materials (HzM) and dangerous goods. These minimum requirements are intended to prevent shipping-related incidents and prevent injuries to employees, members of the public, and emergency response personnel. This procedure is also designed to provide a framework for compliance with the requirements of:
- The U.S. Department of Transportation (DOT) Hazardous Materials Regulations (HMR) published under 49 CFR;
 - Transport Canada Transportation of Dangerous Goods Regulations (TDG Regulations) for shipment of hazardous materials/dangerous goods by land;
 - The International Air Transportation Association (IATA) Dangerous Goods Regulations (DGR) for shipping dangerous goods by air; and
 - Other related regulations applicable to the Americas.
- 1.2 This document is not a replacement for the regulatory requirements, but is intended to provide information surrounding the shipment of HzM and/or Dangerous Goods.
- 1.3 Examples of hazardous materials / dangerous goods regulated by the DOT and IATA that may be encountered or used during AECOM business may include, but are not limited to, certain field environmental samples, compressed gases (fire extinguishers, calibration gases, compressed air, and welding and cutting gases), ionizing radiation sources used to calibrate detection equipment or analytical equipment, nuclear-density meters, laboratory reagents, hazardous wastes, materials used for bench-scale and pilot plant operations, oils, greases, lubricating fluids, cleaning solvents, degreasing solvents, paints, spray paints, paint removers and/or strippers, diesel fuel, gasoline, pesticides, inks, glues and other adhesives, battery fluids, ammonia cleaning solutions, and peroxide solutions.
- 1.4 This procedure applies to all AECOM Americas-based employees and operations.

2.0 Terms and Definitions

A complete list of definitions can be found in their entirety in the HMR, the TDG Regulations, and the IATA DGR. The terms and definitions below are representative of those most likely applicable to AECOM operations.

- 2.1 **Agency Letter** – A letter approved by both AECOM's Legal Department and the client and that authorizes AECOM to act as its agent for the purpose of arranging for the transport and/or disposal of waste, and indemnifies AECOM's liability when acting "As an Agent of [client's name]".
- 2.2 **Carrier** – Also called the transporter. A person engaged in the transportation of passengers or property by land, water, or air either as a common, contract, private carrier, or civil aircraft.
- 2.3 **Consignor** – Also referred to as **Offeror**. The person who, prior to offering goods for transport, performs functions including selecting packaging, classifying hazardous materials, physical transfer (not to be confused with transport) of hazardous materials, preparing shipping papers, signing hazardous material certifications on shipping papers (as agent for), marking or placarding vehicles or packagings, or providing placards to carriers. See also **Generator**.
- 2.4 **Consignee** – Also called the receiver. The person or place shown on a shipping document, package marking, or other media as the location to which a carrier is directed to transport a hazardous material.

- 2.5 **Dangerous Goods** – Products, substances, or organisms which are capable of posing a risk to health, safety, property, or the environment and which are shown in the list of dangerous goods in the TDG Regulations and/or IATA DGR or which are classified according to the TDG Regulations and/or IATA DGR, generally synonymous with hazardous materials.
- 2.6 **Delegation of Authority (DoA)** – The framework of authority within which AECOM (Americas) carries out its day-to-day operations.
- 2.7 **Generator** – Any person, by site, whose act or process created the hazardous waste; hazardous waste generators are divided into categories based on the amount of waste they produce each month. A generator may also be referred to as a **Consignor** when offering the hazardous waste for transport.
- 2.8 **Hazardous Materials (HzM)** – A substance or material which has been determined by the U.S. Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and includes hazardous substances, hazardous wastes, marine pollutants, and elevated temperature materials. Hazardous materials may include, but are not limited to: batteries, adhesives, paints, compressed gases, nuclear density meters, laboratory reagents, field samples, soil and sand siftings, hazardous wastes, and materials used for bench scale and pilot plant operations. While most environmental samples (both water and soil) do not meet the definition of hazardous material, extreme care must be taken to properly classify materials. HzM Classifications:
- Class 1 Explosives
 - Class 2 Gases
 - Class 3 Flammable Liquid and Combustible Liquid
 - Class 4 Flammable Solid, Spontaneously Combustible, and Dangerous When Wet
 - Class 5 Oxidizer, Organic Peroxide
 - Class 6 Poison (Toxic), Poison Inhalation Hazard, Infectious Substance
 - Class 7 Radioactive
 - Class 8 Corrosive
 - Class 9 Miscellaneous Hazardous Material.
- 2.9 **Hazardous Waste (HzW)** – A “solid waste” which because of its quantity, concentration, or physical, chemical, or infectious characteristics may
- (1) pose a substantial hazard or potential hazard to human health or the environment when improperly treated, stored or disposed of, or otherwise mismanaged; or
- (2) cause or contribute to an increase in mortality, or an increase in irreversible or incapacitating illness.
- Four types of hazardous waste exist:
- Listed Waste: Wastes that USEPA has determined are hazardous. The lists include the F-list (waste from common manufacturing and industrial processes), K-list (wastes from specific industries), and P- and U-lists (wastes from commercial chemical products);
 - Characterized Wastes: Wastes that do not meet any of the listings above but that exhibit ignitability, corrosivity, reactivity, or toxicity;
 - Universal Wastes: Batteries, pesticides, mercury-containing equipment and lamps;
 - Mixed Wastes: Waste that contains both radioactive and hazardous waste components.
- 2.10 **Hazardous Waste Manifest System** – A set of forms, reports, and procedures designed to track hazardous waste from the time it leaves the generator facility where it was produced, until it reaches the off-site waste management facility that will store, treat, or dispose of the hazardous waste.

- 2.11 **HzM Employee** – A person who is employed by a HzM employer, who in the course of employment directly affects dangerous goods/hazardous materials transportation safety. This term includes employees who prepare hazardous materials for transportation, or are responsible for safety of transporting hazardous materials.
- 2.12 **HzM Employer** – A person who uses one or more of its employees in connection with transporting dangerous goods/hazardous materials in commerce, causing hazardous materials to be transported or shipping in commerce.
- 2.13 **HMR** – Hazardous Material Regulation.
- 2.14 **IATA** – International Air Transport Association.
- 2.15 **ICAO** – International Civil Aviation Organization.
- 2.16 **Hazardous Waste Manifest** – A paper document that contains information on the type and quantity of the waste being transported, instructions for handling the waste, and signature lines for all parties involved in the disposal process, which must be signed by each party that handles the waste.
- 2.17 **Materials of Trade (MOT)** – A hazardous material, other than a hazardous waste, that is carried on a motor vehicle:
- For the purpose of protecting the health and safety of the motor vehicle operator or passengers;
 - For the purpose of supporting the operation or maintenance of a motor vehicle (including its auxiliary equipment); or
 - By a private motor carrier in direct support of a principal business that is other than transportation by motor vehicle.
 - Refer to *S3AM-116-ATT1 Materials of Trade Limits*.
- 2.18 **NAPL** – Non-aqueous phase liquid
- 2.19 **Offeror** – Refer to **Consignor**.
- 2.20 **Reportable Quantity (RQ)** – The spill-related or incident-related quantity of a material listed in the applicable Federal, State, or Provincial regulations requiring a formal report.
- 2.21 **TDG** – Transportation of Dangerous Good – Canadian Act and Regulation.
- 2.22 **Transporter** – Refer to **Carrier**.

3.0 References

- 3.1 S3AM-003-PR1 SH&E Training
- 3.2 S3AM-004-PR1 Incident Reporting, Notification & Investigation

4.0 Procedure

4.1 Roles and Responsibilities

4.1.1 Manager / Supervisor

- Verifying the potential to ship HzM via a carrier during the planned scope of services and if confirmed, identify the appropriately trained individuals are available to support the HzM shipment;
- Prior to authorizing an AECOM employee to sign a client's Hazardous Waste Manifest, the Manager will:
 - Verify with the Office of Risk Management that the necessary Delegations of Authority (DoA), Americas approvals are in-place;

- Obtain an Agency Letter approved by both the client and AECOM Counsel.
- Prior to assignment, confirm that employees are properly trained to perform their job-specific assignments;
- Filing copies of all HzM shipping documents in the associated program or project files;
- As applicable, providing for the appropriate storage of the HzM in the office or other necessary location;
- Verifying that the HzM to be shipped is prepared / packaged by the designated AECOM DOT Level 1 or 2 Shipper (United States), appropriately TDG trained personnel (Canada), or personnel trained to the requirements of the applicable jurisdiction, type of HzM and method of transport;
- Immediately reporting any incident, spill, release, mishandling, mislabeling, etc. related to an HzM shipment to AECOM's Incident Reporting Line, refer to *S3AM-004-PR1 Incident Reporting, Notifications & Investigations*.

4.1.2 **Employee**

- Completing training appropriate to role(s) in hazardous materials shipping;
- Shipping or transporting HzM as authorized;
- Signing a client's Hazardous Waste Manifest as authorized;
- Immediately reporting any incident, spill, release, mishandling, mislabeling, etc. related to a HzM shipment to the Manager or Supervisor and in accordance with *S3AM-004-PR1 Incident Reporting, Notifications & Investigations*;
- As required and applicable, initiating emergency response procedures.

4.1.3 **AECOM DOT Level 1 Shipper (United States)**

- Identifying, with the support of an AECOM DOT Level 2 Shipper, the appropriate HzM shipping requirements (i.e., packaging, labelling, regulated status, and shipping documents);
- Preparing the necessary HzM shipping documents;
- Contacting a AECOM DOT Level 2 Shipper if uncertain of the shipping requirements;
- Maintaining the appropriate training as required by the HMR, TDG, and IATA;

4.1.4 **AECOM DOT Level 2 Shipper (United States)**

- Serving as the HzM shipping Subject Matter Expert for the Geography, Business Group, or business unit, as appropriate;
- Supporting information requests from AECOM DOT Level I Shippers.

4.1.5 **SH&E Department**

- Contracting a 24-hour emergency response service with a telephone number that will be answered by a person either with information on the hazards of the shipment or with immediate access to such a person;
- Maintaining the annual renewal of AECOM's U.S. DOT Hazardous Materials Registration and applicable renewals of Canadian TDG Permits;
- Posting AECOM's Hazardous Materials Registration and Permits on the AECOM intranet;
- Defining the training to be required of employees involved in HzM shipping and facilitates the delivery of that training.

4.1.6 **SH&E Manager**

- Provide resources to employees involved in shipping hazardous materials;
- Approving the designation of a AECOM DOT Level 2 Shipper (United States);
- Supporting the delivery of HzM shipping and Hazardous Waste Manifest training.

4.1.7 **Counsel**

- Reviewing and approving the Agency Letter authorizing AECOM to sign a client's Hazardous Waste Manifest "As an Agent of [client's name]";
- Updating the template Agency Letter to address additional liabilities, as necessary;
- Providing the template Agency Letter to Managers, as requested.

4.1.8 **Office of Risk Management**

- Supporting Managers in understanding the applicable *Sub-Delegations of Authority, Americas* requirements as it pertains to signing a client's Hazardous Waste Manifest "As an Agent of [client's name]".

4.2 General Requirements

4.2.1 Do not offer packages for shipment without knowing the contents and classifying the packages in accordance with the DOT or TDG requirements, and, if applicable, IATA regulations.

4.2.2 Select the best way to ship the hazardous material based on the quantity, hazard(s), and mode of transportation (e.g., air, land, water). When possible, only use ground carriers for transportation of hazardous material, since more restrictive requirements apply to air shipments.

- The air shipment of environmental samples represents a significant percentage of hazardous materials/dangerous goods shipped by AECOM;
- Although most environmental samples (both water and soil) do not meet the definition of hazardous, extreme care must be taken to properly classify materials;
- AECOM employees must follow the IATA Dangerous Goods Regulations for any air transportation of hazardous materials.

4.2.3 Employees trained and designated as AECOM HzM DOT Level 1 or 2 Shippers (United States), appropriately TDG trained personnel (Canada), or personnel trained to the requirements of the applicable jurisdiction, are the only individuals authorized to physically transport or prepare documents to ship HzM via a carrier.

- Employees shall confirm training certificates are valid and readily available when handling or transporting dangerous goods.

4.2.4 Shipments of HzM must be placed in appropriate containers to prevent any leaks or releases of the HzM. Containers of dangerous materials, no matter what shape or size, shall be labeled;

- Specific packaging and shipping instructions apply to all hazardous material shipments. These instructions vary by chemical/product and are different for passenger aircraft and cargo aircraft;
 - Carrier-specific requirements can be obtained from the Internet or by calling the carrier's customer service line.
- Carrier (transporter) shall confirm cargo is securely loaded, properly segregated and free of leaks prior to departure;
- Carrier (transporter) shall refuse consignments of hazardous materials that are offered for transport that do not meet the requirements of the applicable regulations;

- Vehicles that transport dangerous materials as per regulations shall appropriately display the applicable placards (e.g. correct placard(s), clean and in appropriate locations) and any other required information (e.g. motor vehicle carrier number, etc.);
 - Carrier (transporter) shall replace any marks that are damaged or lost while in transport.
- 4.2.5 Proper shipping documents or the appropriate exemption Permit, must accompany every shipment of dangerous materials.
- 4.2.6 Specific technical names must be used on shipping documents (i.e., Shipper's Declaration for Dangerous Goods); never use an acronym (i.e., LNAPL) as the technical name.
- 4.2.7 AECOM has selected INFOTRAC® (<http://www.infotrac.net/>) to provide 24-hour emergency response support service in the United States and Canada. All HzM shipping papers which list INFOTRAC® for 24-hour emergency response must list AECOM's account number 74984.
- All HzM shipments via a carrier must be reported to INFOTRAC.
- 4.2.8 If AECOM is the consignor (shipper or generator), registration with CANUTEC (Canada) to provide 24-hour emergency contact is permitted and shall be confirmed prior to shipment. If AECOM is listed on the shipping document (Canada) as carrier (transporter) only, registration with CANUTEC does not apply, and an alternate 24-hour emergency number shall be in place (e.g. INFOTRAC).
- Emergency response procedures applicable to the dangerous materials transported shall be developed and followed in the event of an incident;
 - Employees shall be appropriately trained to these procedures, AECOM incident reporting requirements (refer to *S3AM-004-PR1 Incident Reporting, Notification & Investigation*) and any applicable external reporting requirements;
 - A copy of applicable emergency response information should be supplied with the shipping papers for responders to use in emergency situations (e.g. Canada – Emergency Response Assistance Plan [ERAP, appropriate pages from the DOT Emergency Response Guidebook [ERG], and/or Safety Data Sheets [SDS]);
 - The external reporting requirements and to which agency or body, as specified in legislation, vary according to jurisdiction and the class of the goods spilled, released, lost, stolen or misplaced (e.g. local authorities or police, National Response Center, Center for Disease Control, etc.);
 - External reporting requirements for spills, releases, loss, theft or misplacement of hazardous materials are dependent upon the quantities or levels of the hazardous materials involved in the incident.
 - AECOM shall submit a written report of all incidents involving the transportation of hazardous materials to:
 - The US Department of Transportation;
 - Transport Canada within 30 days of a reportable occurrence (Dangerous Occurrence Report); or
 - Report in any other manner as specified by the applicable jurisdiction.
- 4.2.9 Employees are not authorized to physically transport HzM quantities, in a motor vehicle, in excess of the MOT limits. Refer to *S3AM-116-ATT1 Materials of Trade Limits*.
- 4.2.10 Carrier (transporter) shall inspect for transportation of dangerous materials compliance as a part of vehicle inspections.
- 4.2.11 AECOM will never be identified as the GENERATOR on a client's Hazardous Waste Manifest.
- Employees are only authorized to sign a client's Hazardous Waste Manifest if:
 - The necessary approvals have been obtained per the *Sub-Delegations of Authority, Americas*;

- The client could not logistically sign the manifest given they were not on the site;
- An Agency Letter was signed by the client and approved by AECOM Counsel; and
- Employees completed the required training.
- Never sign a client's Hazardous Waste Manifest as AECOM, sign "As an Agent of [client name]".

4.2.12 Carrier (transporter) shall transport materials using identified "Dangerous Goods Routes" as applicable.

4.3 Security

4.3.1 AECOM sites that transport or offer the following types or quantities of materials for transportation in the United States must have a Hazardous Material Transportation Security Plan on site and must ensure that all applicable employees are trained in the plan:

- Any quantity of a Division 1.1, 1.2, or 1.3 material;
- A quantity of a Division 1.4, 1.5, or 1.6 material requiring placarding in accordance with subpart F;
- A large bulk quantity of Division 2.1 material;
- A large bulk quantity of Division 2.2 material with a subsidiary hazard of 5.1;
- Any quantity of a material poisonous by inhalation, as defined in 49 CFR 171.8;
- A large bulk quantity of a Class 3 material meeting the criteria for Packing Group I or II;
- A quantity of desensitized explosives meeting the definition of Division 4.1 or Class 3 material requiring placarding in accordance with subpart F;
- A large bulk quantity of a Division 4.2 material meeting the criteria for Packing Group I or II;
- A quantity of a Division 4.3 material requiring placarding in accordance with subpart F;
- A large bulk quantity of a Division 5.1 material in Packing Groups I and II; perchlorates; or ammonium nitrate, ammonium nitrate fertilizers, or ammonium nitrate emulsions, suspensions, or gels;
- Any quantity of organic peroxide, Type B, liquid or solid, temperature controlled;
- A large bulk quantity of Division 6.1 material (for a material poisonous by inhalation see paragraph (e) above);
- A select agent or toxin regulated by the Centers for Disease Control and Prevention under 42 CFR 73 or the United States Department of Agriculture under 9 CFR 121;
- A quantity of uranium hexafluoride requiring placarding under 49 CFR 172.505(b);
- International Atomic Energy Agency (IAEA) Code of Conduct Category 1 and 2 materials including Highway Route Controlled quantities as defined in 49 CFR 173.403 or known radionuclides in forms listed as RAM-QC by the Nuclear Regulatory Commission;
- A large bulk quantity of Class 8 material meeting the criteria for Packing Group I.

4.3.2 The specific HzM security plan shall be reviewed annually and updated if required.

4.4 Training

4.4.1 Employees involved in shipping hazardous materials/dangerous goods (e.g., packaging, preparing paperwork, loading and/or unloading, and transporting hazardous materials) are required to have documented training prior to shipping activities, refer to *S3AM-003-PR SH&E Training*. Training requirements are based on the type of materials shipped (e.g., calibration/compressed gases, laboratory reagents, field samples, hazardous wastes, etc.) and employee responsibility.

- AECOM (US) DOT Level 1 Shipper Performance Training: The specific content of this training (typically 4 hours) is focused on proper procedures for packaging, labeling and shipping HzM/HzW over land and sea. This training has a three year renewal requirement;
- AECOM (US) DOT Level 2 Shipper Performance Training: A comprehensive 2-day HzM shipping training course typically completed in an in-person seminar;
- IATA Performance Training: This training supplements (US) DOT Level 1 training and provides additional information for the proper shipment of HzM/HzW via air transportation. This training has a two year renewal requirement;
- Resource Conservation and Recovery Act (RCRA) Part B Awareness Training (US Project Sites): Applicable to employees shipping HzW, including listed wastes, from US project sites. General RCRA Awareness training can be completed through online vendors. Additional project-specific training regarding HzW generation, project site roles and responsibilities, HzW management and shipment will need to be coordinated between the Manager and Client. Training may also include procedures for signing waste documents, i.e. profiles and characterization forms, where permitted by client contracts. Training will be provided in accordance with Permits, Consent Orders or other Regulatory Agency-issued agreements regarding project site HzW generation. This training has an annual renewal requirement.
- TDG Training: Training is focused on proper procedures for labeling, placarding, documenting and shipping of HzM/HzW. This training has a three year renewal requirement.

4.5 Documentation

4.5.1 Permits

- The carrier (transporter) shall obtain any required permits prior to transporting hazardous materials.

4.5.2 Bills of Lading

- Bills of Lading documents include those generated when shipping non-hazardous materials and hazardous materials and include Oilfield Waste Manifests and Hazardous Waste Manifests. Bills of Lading are to be completed as follows:
 - Consignor (shipper or generator) shall input or provide the appropriate information, including the consignor's information (e.g. name, address, etc.) and the appropriate identifiers for the materials to be transported;
 - If the item is a dangerous material, it must be clearly identified as a dangerous good (e.g. marked with an "X" in the DG column), and the primary class and subsidiary class must be entered along with the UN number, name, packing group (if applicable) and quantity;
 - The carrier (transporter) shall enter in full the Carrier information, such as:
 - Company name, address, date, truck unit number, and telephone number;
 - The applicable emergency response information, including the 24-hour emergency number;
 - Carrier's employee shall confirm the bill of lading has been properly completed, print his/her name and sign the form prior to transport;
 - The carrier (transporter) driver shall maintain the bill of lading within immediate reach when restrained by a seatbelt and visible to a person entering the vehicle, or in a holder mounted on the inside of the driver's door;
 - Once the waste is transported to the destination, the consignee (receiver) completes their appropriate sections;
- Copies are maintained by the consignor, carrier and consignee.

5.0 Records

- 5.1 Bill of Lading and Shipper's Declaration for Dangerous Goods shall be retained in the project files for a minimum of 2 years.
- 5.2 Agency Letters and hazardous waste manifests shall be retained in the project files for at least 3 years after the initial carrier accepted the material.

6.0 Attachments

- 6.1 [S3AM-116-ATT1 Materials of Trade Limits](#)

Materials of Trade Limits

S3AM-116-ATT1

1.0 United States

- 1.1 The Department of Transportation (DOT) "Materials of Trade" or "MOTs" exception applies to hazardous materials, other than hazardous waste, that are carried on a motor vehicle for one of the following purposes:
 - 1.1.1 To protect the health and safety of the motor vehicle operator or passengers, such as insect repellent or a fire extinguisher;
 - 1.1.2 To support the operation or maintenance of a motor vehicle (including its auxiliary equipment), such as a spare battery or gasoline; or
 - 1.1.3 To directly support a principal business of a private motor carrier (including vehicles operated by a rail carrier) that is other than transportation by motor vehicle – for example, landscaping, pest control, painting, plumbing, or welding services.
- 1.2 Some AECOM activities (e.g., environmental sampling and other field services), may be able to use this exception. The exception is found in the Code of Federal Regulations at 49 CFR 173.6. A HzM-trained employee should make the determination as to whether this exception will apply to the shipment.
- 1.3 The MOTs exception allows AECOM employees to transport certain amounts of chemicals aboard their vehicles without preparing shipping papers, emergency response information, placarding, or formal training.
- 1.4 MOTs must be packaged in the manufacturer's original packaging, or a packaging of equal or greater strength or integrity. Gases must be in DOT specification cylinders. If the inner container (such as the bottle) is secured against movement inside the vehicle (if it is kept in a cabinet or tool box), then no outer packaging (such as a cardboard box) is required. The MOT must be marked with a common name or the technical name.
- 1.5 No HzM training is required, except that the driver must have general knowledge of the MOT regulations, quantity limitations, packaging requirements, and marking and labeling requirements. The driver is not allowed to exceed total aggregate weight of 440 pounds of MOTs aboard the vehicle.
- 1.6 The HzM classes and quantities of HzM items typically transported by AECOM can be transported as MOTs:
- 1.7 The inner container of a Packing Group II and III material in Class 3, 8, 9, Division 4.1, 5.1, 5.2, 6.1, or ORM-D cannot exceed 66 pounds (30 kilograms) or 8 gallons each.
- 1.8 A Division 2.1 or 2.2 cylinder cannot exceed 220 pounds (100 kilograms).
- 1.9 The inner container of a Packing Group II or III material in Division 4.3 cannot exceed 1 ounce (28 grams).

2.0 Canada

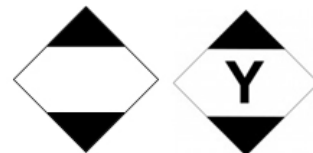
- 2.1 Canada's TDG Regulations apply to everyone. They even apply when an individual transports dangerous goods such as gasoline, oxygen and propane for personal use. However certain exemptions exist for small quantities or for specific situations.
 - 2.1.1 Most of these exemptions, which are called "special cases", are found in Part 1 of the TDG Regulations, under section 1.15 to 1.48. This document contains a basic overview of a few of these "special cases."
 - 2.1.2 These "special cases" may exempt the parties involved from documentation requirements, or placarding and training requirements of the TDG Regulations.
 - 2.1.3 Please refer to the TDG Regulations for further guidance before applying exemptions.

2.2 150 kilogram gross mass exemption

- 2.2.1 The total gross mass of all dangerous goods (i.e. oxygen, propane, gasoline, etc.) must not be greater than 330 pounds (150 kilograms). "Gross mass" includes the weight of the container and all of its contents.
- 2.2.2 The dangerous goods must be packed in containers that weigh 66 pounds (30 kilograms) or less (except for gases).
- 2.2.3 The dangerous goods must be available to the general public and transported by the user/purchaser or by a retailer to or from a user/purchaser.
- 2.2.4 The containers must be designed not to leak under normal conditions of transport.
- 2.2.5 When using the "150 kilogram Gross Mass Exemption" for class 2 gases, remember:
 - If transporting a gas such as propane or oxygen, the cylinder must be certified for use in Canada and marked with the letters TC or DOT/TC;
 - Flammable gases, such as propane or acetylene, are limited to a cylinder size of 46L.

2.3 Limited Quantity

- 2.3.1 A limited quantity is a small quantity of dangerous goods to which the general public normally has access, such as aerosol sprays and small cans of paint.
- 2.3.2 Since dangerous goods cannot all be shipped as limited quantities, consult Column 6(a) of Schedule 1 of the TDG Act and Regulation.
- 2.3.3 Do not ship dangerous goods as a "limited quantity" when a "0" is in Column 6(a) of Schedule 1.
- 2.3.4 Each means of containment (i.e. box, etc.) must have a gross mass of 66 pounds (30 kilograms) or less and display one of the following international marks:



2.4 Gases in Small Means of Containment

- 2.4.1 This exemption allows for the transport up to 1102 pounds (500 kilograms) of the gases listed below. When using this exemption, the maximum amount of cylinders is limited to five. The cylinders must be visible from outside the vehicle.
 - UN1001, ACETYLENE, DISSOLVED;
 - UN1002, AIR, COMPRESSED;
 - UN1006, ARGON, COMPRESSED;
 - UN1013, CARBON DIOXIDE;
 - UN1060, METHYLACETYLENE AND PROPADIENE MIXTURE, STABILIZED;
 - UN1066, NITROGEN, COMPRESSED;
 - UN1072, OXYGEN, COMPRESSED; or
 - UN1978, PROPANE.

Hazardous Waste Operations

S3AM-117-PR1

1.0 Purpose and Scope

- 1.1 Provides requirements for AECOM operations pertaining to hazardous waste and emergency response (HAZWOPER) services. In Canada and South America, there is no direct counterpart to HAZWOPER; however, as due diligence and in compliance with applicable duty of care/general duty clauses, staff working in Canada and South America will comply with this procedure as far as it aligns with the location's respective legislation.
- 1.2 Provides a procedure intended to address small incidental spills from work related equipment and supplies. For operations with bulk quantities of fuels, chemicals, oils, and for operations where AECOM is providing emergency response services for spills, the SH&E Manager or designee shall specify spill prevention and preparedness criteria including training, equipment, and proficiency.
- 1.3 To define appropriate procedures to decontaminate both equipment and personnel when exposure to hazardous chemicals or physical agents has occurred.
- 1.4 This procedure applies to all AECOM Americas-based employees and operations.

2.0 Terms and Definitions

- 2.1 **Contamination Reduction Zone (CRZ)** – The transition area between the contaminated area and the clean area where decontamination activities occur.
- 2.2 **Decontamination** – The process of removing or neutralizing contaminants that have accumulated on personnel or equipment.
- 2.3 **Emergency Response** – A response effort by employees from outside the immediate release area or by other designated responders (e.g., mutual-aid groups, local fire departments, etc.) to an occurrence that results, or is likely to result, in an uncontrollable release of a hazardous substance or whenever a release requires that a federal, state, territorial or provincial agency be notified, such as:
 - A release at or above a reportable quantity (RQ) of a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) hazardous substance (40 CFR 302.8) is required to be reported to the National Response Center (NRC).
 - A release at or above provincial reporting thresholds, if any, or alternatively those specified under the Canadian Transportation of Dangerous Goods Act are reportable under the Canadian Environmental Protection to the respective provincial or territorial Environmental Regulatory Agency .
 - A hazardous chemical release at or above an RQ under the Emergency Planning and Community Right-to-Know Act (EPCRA) (Title III under the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 350-372) is required to be reported to state and local officials.
 - A release in violation of a facilities Spill Prevention, Control, and Countermeasure (SPCC) Plan (40 CFR 112).

Responses to incidental release of hazardous substances where the substance can be absorbed, neutralized, or otherwise controlled at the time of release by employees in the immediate release area or by maintenance personnel are not considered to be emergency responses within the scope of the HAZWOPER standard. Responses to releases of hazardous substances where there is no potential safety or health hazard are not considered to be emergency responses.
- 2.4 **Exclusion Zone (EZ)** – The area where contamination does or could occur.

- 2.5 **First Responder** – First responders are individuals who are likely to witness or discover a hazardous substance release, injury, fire, or other incident and who have been trained to initiate an emergency response sequence by notifying the proper authorities of the release. They would take no further action beyond first aid, initial control of the incident, and notifying the authorities and others of the incident.
- 2.6 **Hazardous Materials** – A hazardous material is any item or agent (biological, chemical, physical) that has the potential to cause harm to humans, animals, or the environment, either by itself or through interaction with other factors. Additionally a hazardous material may be defined as any substance or chemical which is a "health hazard" or "physical hazard," including chemicals that are carcinogens, toxic agents, irritants, corrosives, sensitizers; agents that act on the hematopoietic system; agents that damage the lungs, skin, eyes, or mucous membranes; chemicals that are combustible, explosive, flammable, oxidizers, pyrophoric, unstable-reactive, or water-reactive; and chemicals that in the course of normal handling, use, or storage may produce or release dusts, gases, fumes, vapor, mists, or smoke that may have any of the previously mentioned characteristics. This may be caused when released by spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, disposing into the environment, by being transported or moved, and items or chemicals that are "special nuclear source" or by-product materials or radioactive substances.
- 2.7 **Hazardous Materials Specialist** – Hazardous materials specialists are individuals who respond with and provide support to hazardous materials technicians. Their duties parallel those of the hazardous materials technician; however, those duties require a more directed or specific knowledge of the various substances they may be called upon to contain. The hazardous materials specialist would also act as the site liaison with federal, state, local, and other government authorities in regards to site activities.
- 2.8 **Hazardous Materials Technician** – Hazardous materials technicians are individuals who respond to releases or potential releases for the purpose of stopping the release. They assume a more aggressive role than a first responder in that they will approach the point of release in order to plug, patch, or otherwise stop the release of a hazardous substance.
- 2.9 **Hazardous Waste** – Hazardous waste is waste that is dangerous or potentially harmful to our health or the environment. Hazardous wastes can be liquids, solids, gases, or sludge. They can be discarded commercial products, like cleaning fluids or pesticides, or the by-products of manufacturing processes. Hazardous waste are divided into:
- Listed wastes (<http://www.epa.gov/osw/hazard/wastetypes/listed.htm>);
 - Characteristic wastes (<http://www.epa.gov/osw/hazard/wastetypes/characteristic.htm>);
 - Universal wastes (<http://www.epa.gov/osw/hazard/wastetypes/universal/index.htm#wastes>); and
 - Mixed wastes;
 - Specific procedures determine how waste is identified (<http://www.epa.gov/osw/hazard/wastetypes/wasteid/index.htm>), classified, listed, and delisted.
- 2.10 **Health and Safety Plan (SH&E PLAN)** – A document prepared for each project that contains site-specific information including the Emergency Response Plan for the project.
- 2.11 **Incidental Releases** - A response to a spill or release of a hazardous substance (in quantities below its RQ) where the substance can be absorbed, neutralized, or otherwise controlled at the time of release by employees in the immediate release area using equipment and materials available to them at the time or the spill or release. Any spill or release that cannot be managed with the personnel, materials, and equipment at the site shall be considered an Emergency Response.
- Responses to releases of hazardous substances where there is no potential safety or health hazard (i.e., fire, explosion, or chemical exposure) are not considered to be emergency responses. Handling of incidental releases shall be in accordance with applicable standard operating procedures.

- 2.12 **Incident Command System (ICS)** – ICS is a standardized on-scene incident management concept designed specifically to allow responders to adopt an integrated organizational structure equal to the complexity and demands of any single incident or multiple incidents without being hindered by jurisdictional boundaries. In the ICS the first person responding to an incident becomes the Incident Commander and turns that title and duties over to more qualified responders as they arrive on scene.
- 2.13 **Incident Commander** – The Incident Commander (IC) is responsible for all aspects of the response, including developing incident objectives and managing all incident operations. The title and responsibilities are typically assumed by a qualified IC from the client or public sector.
- 2.14 **Support Zone (SZ)** – An uncontaminated zone where administrative and other support functions (e.g. first aid, equipment supply, emergency information, etc.) are located.

3.0 References

- 3.1 RS2-003-PR1 Disruptive Event Response Standard
- 3.2 S3AM-003-PR1 SH&E Training
- 3.3 S3AM-004-PR1 Incident Reporting, Notifications & Investigation
- 3.4 S3AM-010-PR1 Emergency Response Planning
- 3.5 S3AM-012-PR1 First Aid
- 3.6 S3AM-017-PR1 Injury & Illness Recordkeeping
- 3.7 S3AM-127-PR1 Exposure Monitoring
- 3.8 S3AM-128-PR1 Medical Screening & Surveillance
- 3.9 S3AM-208-PR1 Personal Protective Equipment
- 3.10 S3AM-209-PR1 Risk Assessment & Management
- 3.11 S3AM-213-PR1 Subcontractor Management

4.0 Procedure

4.1 Roles and Responsibilities

4.1.1 Manager

- Enforces and supports the implementation of SH&E Plans, Location Specific Emergency Response Plans, and Spill Response Plans;
- Prepare or request a SH&E Plan for every AECOM project with Hazardous Waste Operations and Emergency Response Activities, refer to *S3AM-209-PR1 Risk Assessment & Management*;
- Verify that all personnel working on the project are qualified to perform the activities they are assigned (see HAZWOPER and Emergency Spill Response Training requirements below);
- Request client's emergency response procedures;
- Appoint a Site Safety Officer (SSO) with appropriate qualifications for the specific hazardous waste project;
- Confirm that the SSO for complex projects, such as those with complicated remediation activities, has no duties other than site safety and health of the field team;
- Confirm the communication of the location-specific emergency response plan details to all employees assigned to a field project;
- Authorize the procurement of the necessary decontamination supplies;

- Verify that the applicable decontamination steps are clearly defined in the approved SH&E Plan;
- Verify staff are appropriately trained to execute the defined decontamination procedures;
- Verify that adequate staffing is available to safely conduct the applicable decontamination steps;
- Confirm that the necessary communications equipment for the project is available;
- Confirm that incident investigations are performed as required and a report is filed. Refer to *S3AM-004-PR1 Incident Reporting, Notifications & Investigation*;
- During spill response, all AECOM emergency responders and their communications shall be coordinated and controlled through the Manager. The individual in charge shall implement the and shall be responsible for the following tasks:
 - Become the individual in charge at the incident until relieved by more qualified personnel;
 - Notify the appropriate agency, the AECOM incident Reporting line, and operations. Refer to *S3AM-117-ATT1 Spill Notification Numbers North America* for US and Canadian required notifications;
 - Designate a safety supervisor who is knowledgeable about the operations being implemented at the emergency response site and who will have specific responsibility to identify and evaluate hazards and to provide direction on the safety of operations for the emergency at hand. If the safety supervisor judges activities to be an Immediately Dangerous to Life or Health (IDLH) and/or to involve an imminent danger condition, the safety supervisor shall have the authority to alter, suspend, or terminate those activities. The safety official shall immediately inform the individual in charge of the ICS of any actions needed to be taken to correct these hazards at the emergency scene;
 - Identify all hazardous substances or conditions present and address as appropriate site analysis, use of engineering controls, maximum exposure limits, hazardous substance, and handling procedures;
 - Implement appropriate emergency operations. Refer to *S3AM-010-Emergency Response Planning*;
 - Limit the number of emergency response personnel at the emergency site;
 - Implement the buddy system in groups of two or more;
 - Confirm that the PPE worn is appropriate for the hazards to be encountered;
 - Implement appropriate decontamination procedures after emergency operations have terminated.
- Responsibility for the emergency response shall be transferred upon arrival of a more qualified AECOM Incident Commander or a Public Service Incident Commander.
- Confirm appropriate communications concerning an emergency event are initiated as per *S3AM-010-PR1 Emergency Response Planning* and *RS2-003-PR1 Disruptive Event Standard*.

4.1.2 SH&E Manager or designee

- Provide technical guidance for:
 - The development and implementation of SH&E Plans and Emergency Response Plans;
 - The Incident Commander regarding the correct way to respond to the spill;
 - Project-specific Spill Response Plans when required;
- Prepare emergency action plans as part of project SH&E Plans and emergency reference sheets;

- Interface with the local emergency responders when necessary;
- Interface with clients regarding facility emergency response procedures;
- Decide whether AECOM or an outside emergency response company will clean up the spill;
- Report spills, as necessary, to state/provincial environmental agencies;
- Review the incident report and facilitate the post-response discussion;
- Review and revise this procedure as necessary based on recommendations from post-response discussions;
- Advise Managers and Supervisors on the necessary decontamination procedures for the known or reasonably anticipated chemical hazards and physical agents associated with the planned scope of work;
- Support the project team to verify that adequate protective measures are in-place (e.g. Engineering Controls, Administrative Controls, Personal Protective Equipment, etc.).

4.1.3 **Site Safety Officer (SSO)**

- Verify that a SH&E PLAN is available for the project and is reviewed prior to the commencement of site activities;
- Conduct pre-entry briefing and daily tailgate meetings and review facility, site-specific emergency procedures, and site specific decontamination procedures;
- Communicate the site-specific emergency response details to all employees assigned to a field project;
- Establish the designated site work zones (e.g., EZ, CRZ, SZ, etc.);
- Enforce the applicable decontamination steps as defined in the approved SH&E Plan;
- Initiate Stop Work and emergency response procedures as required;
- Account for all AECOM and subcontractor employees after site evacuation;
- Brief on-site and off-site responders in the event of an emergency;
- Conduct site-specific training on the applicable decontamination steps/procedures;
- Procure the necessary decontamination supplies and establishing the decontamination line;

4.1.4 **Employees**

- Maintain HAZWOPER training, or equivalent training as it relates to the given jurisdiction;
- Follow the SH&E Plan and emergency procedures prepared for the project;
- Initiate Stop Work if necessary;
- Initiate emergency response via verbal communications or the alarm system if first to encounter an emergency;
- Follow the defined decontamination steps as stated in the approved SH&E Plan;
- Follow precautions and safe handling practices to avoid spills;
- Alert Manager to any deteriorating hazardous materials containers within the office or project area;
- Report all spills and leaks to the Manager immediately;
- Secure the spill area as quickly as possible and prevent the migration of exterior spilled materials or substances to drains or other openings; and

- 4.1.5 **All personnel** (e.g., AECOM employees, general laborers, equipment operators, chemists, supervisors, etc.) performing activities at hazardous waste sites that expose or potentially expose them to hazardous wastes and health hazards are considered HAZWOPER site workers and shall meet the training and medical surveillance requirements specified in 29 CFR 1910.120(e) and (f), respectively. Additional training may be required based on site activities including related exposures and risks (e.g., confined space entry, excavations, fall protection, other materials [lead], etc.). These additional training requirements are to be outlined in the project- or site-specific SH&E Plan.
- 4.2 Project SH&E Documentation—SH&E Plan
- 4.2.1 The project SH&E documentation prepared for HAZWOPER activities is referred to as a site-specific SH&E Plan, and shall meet the requirements presented in 29 CFR 1910.120(b)(4).
- 4.2.2 A safety and health risk or hazard analysis for each on-site task that will be performed.
- 4.2.3 The required SH&E Plan elements include:
- A description of the work location, the site history, and a summary of any information available concerning site hazards (including both physical hazards and contamination conditions);
 - A summary of the work activities to be performed under AECOM's scope of activities;
 - Identified risks shall include both chemical and physical hazards to which personnel may be exposed during the conduct of the work task;
 - Protective measures for each work task to prevent or mitigate the potential hazards identified in the hazard analyses;
 - Personal protective equipment (PPE) requirements for each work task. Refer to *S3AM-208-PR1 Personal Protective Equipment*;
 - Frequency and types of air monitoring, personal monitoring, and environmental sampling techniques and instrumentation to be used;
 - Site control measures;
 - Decontamination procedures;
 - An emergency response plan, *S3AM-010-PR1 Emergency Response Planning*, addressing actions to be taken in the event of each type of credible incident that might result during the performance of planned work activities, including minor and major injuries, and chemical release and fire. Response plans shall address the means for coordinating the evacuation of all on-site personnel in the event of a catastrophic incident.
- 4.2.4 Responsibility for development of each AECOM SH&E Plan will be coordinated between the Manager and the SH&E Manager or SH&E Department designee as part of project initiation. Regardless of where the SH&E Plan is developed, it will be reviewed and approved by the SH&E Manager prior to submission to any agency outside of AECOM.
- 4.2.5 Contractors and Subcontractors
- The health and safety of the employees of any contractor or subcontractor who does not have a contract directly with AECOM, and for whom AECOM does not have contractual safety oversight, is the responsibility of that contractor or subcontractor. The contractor or subcontractor shall evaluate the hazards and potential hazards to their own employees and shall adhere to their own Health and Safety Plan;
 - Subcontractors who maintain a contract directly with AECOM shall comply with AECOM SH&E program requirements. Refer to *S3AM-213-PR1 Subcontractor Management*;
 - In addition, all AECOM subcontractors' Health and Safety Plans shall, at a minimum conform to the requirements of the AECOM SH&E Plan. The AECOM SH&E Plan does not, nor is it intended to, address procedures of contractors or subcontractors during their site activities.

4.3 Personnel Qualifications— Training and Medical Surveillance

4.3.1 HAZWOPER-qualified employees shall participate in the following medical surveillance and training requirements. Medical surveillance and SH&E training requirements are further described in *S3AM-128-PR1 Medical Screening & Surveillance* and *S3AM-003-PR1 SH&E Training* respectively.

4.3.2 Employees receiving initial and refresher responder training shall be issued a certificate indicating training competency. Copies of all training records shall be maintained in accordance with the *S3AM-003-PR1 SH&E Training*.

4.3.3 Medical Surveillance

- Specific HAZWOPER medical examination protocols have been developed by AECOM's Corporate Medical Provider (CMP) to meet the requirements of 29 CFR 1910.120(f). To be medically qualified to perform HAZWOPER work, employees receive the following medical examinations:
 - Initial (Baseline) Examination — The initial examination is part of pre-employment requirements and shall be completed (with results received) prior to the employee's start of work date;
 - Annual Examination — HAZWOPER-qualified employees will complete a medical examination once each year. Medical qualification expires on the anniversary date of the last examination completed. There will be no "grace period" exemptions beyond this date without the express approval of the Region SH&E Manager. At the recommendation of the SH&E Department, the CMP may approve an alternate examination frequency at periods of up to two years (biennial) in cases in which the worker's exposures to environmental contaminants are infrequent and typically well below any occupational exposure limits (e.g., senior management personnel);
 - Termination Examination — When reassigned to non-HAZWOPER duties or at the conclusion of employment at AECOM, HAZWOPER-qualified personnel will be provided with the opportunity to receive a termination medical examination;
 - Special Examinations — The SH&E Department and the CMP will jointly determine the need for special examinations because of:
 - Unusual exposure conditions; and
 - In response to possible overexposures.
- The CMP will determine the medical protocol elements for each of these examinations based on exposure information provided by the SH&E Department. The CMP will evaluate the results of each Employee's examination and will provide a written statement of medical clearance clearly stating medical compliance with the HAZWOPER regulatory standard (29 CFR 1910.120(f)) and approval of the Employee to perform unrestricted HAZWOPER activities. For initial and annual examinations, the CMP will also evaluate the Employee for the use of air purifying and supplied air respiratory protection. The written evaluation from these examinations will indicate the CMP's approval/limitations on the Employee's use of respiratory protection;
- If an Employee does not wish to participate in part or in the complete medical surveillance program, and is permitted by the given jurisdiction, the employee shall provide a written statement of refusal. Refer to *S3AM-128-PR1 Medical Screening & Surveillance*;

4.3.4 Training - HAZWOPER

All personnel assigned to work at a hazardous waste site, sampling at Treatment, Storage and/or Disposal Facilities (TSDFs), or are performing Remediation and Investigation Activities, shall participate in training meeting the requirements of 29 CFR 1910.120(e), or equivalent training as it relates to the given jurisdiction. All personnel shall have the following training:

- 40-hour initial Training — Before being assigned to a HAZWOPER site, AECOM Employees shall complete 40 hours of off-site training meeting the requirements of 29 CFR 1910.120(e)(3)(i). At the conclusion of training, personnel will receive a written certification of course completion, signed by the instructor, that indicates the course of instruction (40-hour HAZWOPER) and training dates. A copy of this certification shall be provided to the employee's SH&E Manager. Employees are responsible for maintaining their own copy of this certificate and for presenting it to the SSO when working on any HAZWOPER site;
- 3 days of on-the-job training — The Employee shall receive 3 days of actual supervision by a trained experienced supervisor;
- Refresher 8-Hour Training — To remain qualified to perform on-site HAZWOPER work activities, each AECOM Employee will complete 8 hours of HAZWOPER refresher training meeting the requirements of 29 CFR 1910.120(e)(8) at yearly intervals following completion of Initial 40-hour training. At the conclusion of training, personnel will receive a written certification of course completion, signed by the instructor, that indicates the course of instruction (8-hour HAZWOPER Refresher) and the training date. A copy of this certification shall be provided to the employee's SH&E Manager. Employees are responsible for maintaining their own copy of this certificate and for presenting it to the SSO when working on any HAZWOPER site;
- 8-hour Supervisor 8-Hour Training - any AECOM Employee acting in a management capacity for HAZWOPER activities (e.g., project manager, site safety officers, etc.) shall complete an additional 8 hours of HAZWOPER Supervisor training meeting the requirements of 29 CFR 1910.120(e)(4). Although this training is required only once, supervisors shall maintain their overall HAZWOPER qualification through annual completion of refresher training. At the conclusion of Supervisor 8-Hour Training personnel will receive a written certification of course completion, signed by the instructor that indicates the course of instruction and the training date. A copy of this certification shall be provided to the SH&E Manager. Employees are responsible for maintaining their own copy of this certificate and for presenting it to the SSO when working on any HAZWOPER site;
- 24-Hour HAZWOPER Training — Site support contractors and site visitors may qualify to substitute 24-hour HAZWOPER training in place of 40-hour training, as specified in 29 CFR 1910.120(e)(3)(ii). Personnel potentially qualifying for this alternative training include:
 - Site support personnel who will not work in any Exclusion Zone areas;
 - Subcontractors and site visitors whose duties will not entail significant exposure to site contaminants defined as not working in any areas where airborne contaminant concentrations exceed one-half of any applicable occupational exposure limit, and no contact or exposure to materials with site contaminant concentrations exceeding natural background levels. The SH&E Manager shall approve the substitution of 24-hour training for initial 40-hour training. Persons qualifying for 24-hour training shall provide written certification of course completion prior to beginning work on site. Persons completing 24-hour training shall complete 8 hours of annual refresher training at the required interval to maintain eligibility for on-site work and shall provide proof of this training (as necessary to demonstrate retraining) prior to beginning work on site.

Available Training Sources:

- On-site training provided by the SH&E Department;
- Outsourced training providers approved by the SH&E Department;

4.3.5 Training – Emergency Response

On an as-needed basis, if a project requires AECOM to provide a HAZMAT emergency response team, the following training requirements shall be met:

- Operations Level – a minimum of 8 hours of initial and refresher training for those responsible for acting defensively in the case of a release, attempting to contain the release from a safe distance;
- HAZMAT Technician – at least 24 hours of initial training and 8 hours of refresher training. They will participate in operations-level training and know how to implement the emergency response plan for the facility/site/project location;
- HAZMAT Specialist – at least 24 hours of initial training and 8 hours of refresher training. They will be trained in the same content as the HAZMAT Technician, as well as in how to develop a site safety and control plan;
- Incident Commander – will have at least 40 hours of training covering the Operations Level training and techniques for implementing the emergency response plan and directing the incident. They will be knowledgeable in relevant regulations. The Incident Commander will become the individual in charge of a site-specific incident command system and will coordinate and control communications with external agencies;

4.3.6 Subcontractor Personnel Training Records

Any subcontractor organization whose employees will support AECOM operations at a HAZWOPER site will:

- Provide the Manager with a copy of their written HAZWOPER medical surveillance and training program requirements. The elements of the program(s) shall be similar to those for AECOM's own program, as detailed above. Refer to *S3AM-213-PR1 Subcontractor Management*;
- Provide the Manager with written certification of a physician's approved medical clearance for each employee who will work on the site. Certification can be demonstrated by:
 - A copy of the physician's signed medical clearance for each employee (preferred); or
 - A letter identifying the medical status and clearance expiration date of every employee, signed by the company's safety director or an officer of the company.
 - A copy of the each employee's training certifications, which will include:
 - The initial 40-hour training certificate (24-hour training may be substituted with SH&E Manager approval);
 - The most current Refresher training certificate (shall be current within the previous one-year period);
 - A copy of the Supervisor training certificate for each person serving in a site supervisory capacity (e.g., project manager, site safety officers, etc.).

4.4 HAZWOPER and Spill Response Equipment

4.4.1 Specific HAZWOPER activity and spill response equipment shall be identified in the site specific SH&E PLAN. All AECOM offices and project sites that store chemicals at their location shall have the appropriate spill response equipment. Such equipment may include the following:

- Over-pack containers of varying capacities;
- Absorbent material such as vermiculite or commercially prepared, absorbent containing pillows, rolls, sheets, or booms;
- Acid and base neutralizing agents;
- Chemically resistant gloves for solvents, alcohols, and acids;
- Poly-coated Tyvek coveralls;
- Safety goggles;
- Respiratory protection;

4.4.2 Spill response equipment shall be placed adjacent to areas where chemicals are routinely handled, stored, and/or where shipments are received. Similar types of spill response equipment shall also be available in any AECOM vehicle or rented vehicle in which chemicals are being transported. Location of spill response equipment shall be selected to permit access outside of likely spill locations.

4.4.3 Spill Response Equipment for Field Programs

- The amount of chemicals being used during a field program will dictate the types and quantity of spill response equipment that is brought to the site;
- If several squirt bottles of decontamination solution are all that is being brought to a site, a few spill pillows and a one-gallon bucket (3.8 liters) may be sufficient to respond to a spill of these materials;
- If gallons of chemicals are being delivered to the site in drums or bulk tanks, a greater variety of spill response equipment will be needed. As indicated previously, during these types of field programs, a separate spill plan will be incorporated into the project or site specific SH&E Plan, and will provide a greater level of detail regarding the specific spill response effort for that field program. Refer to *S3AM-209-PR1 Risk Assessment & Management*,

4.5 Personal Protective Equipment (PPE) Ensembles

4.5.1 Defined HAZWOPER PPE ensembles are specified for general use on all AECOM HAZWOPER operations. The project SH&E Plan may specify modifications to these requirements to meet site-specific conditions. Refer also to *S3AM-208-PR1 Personal Protective Equipment* for additional information concerning PPE requirements.

4.5.2 Level D Ensemble

The Level D ensemble provides a minimal level of skin protection (primarily against physical rather than chemical hazards) and no respiratory protection. Level D PPE is the minimum work uniform to be used on HAZWOPER sites. Its use is appropriate when there is no significant potential for encountering hazardous substances or health hazards while working in controlled work areas.

Level D Equipment List:

- Hard hat;
- Eye protection;
- Safety-toe work boots;
- Shirts with sleeves and long pants (shorts are unacceptable for use); and
- Hearing protection (as required).

4.5.3 Modified Level D Ensemble

The Modified Level D ensemble provides moderate skin protection against contact with hazardous substances, but no respiratory protection. Its use is appropriate where there is a moderate-to-low potential for skin contact with known hazardous substances and health hazards, but no significant inhalation hazard is anticipated. The Modified Level D ensemble will consist of the Level D ensemble, supplemented by the addition of one or more of the following items:

Modified Level D Equipment List:

- Full faceshield;
- Plain (uncoated) disposable coveralls;
- Chemical-resistant disposable outer coveralls;

- Chemical-resistant outer gloves taped to outer coveralls;¹
- Chemical-resistant inner gloves; and¹
- Chemical-resistant safety-toe boots (taped to outer coveralls).

4.5.4 Level C Ensemble

The Level C ensemble provides moderate skin protection against contact with hazardous substances and moderate respiratory protection. Its use is appropriate where there is the potential for skin contact with known hazardous substances and health hazards, together with a limited and well-defined potential for exposure via inhalation.

Level C Equipment List:

- Full-face air-purifying respirator (APR) equipped with cartridge types as designated in the project SH&E PLAN;²
- Plain (uncoated) disposable coveralls;
- Chemical-resistant disposable outer coveralls;
- Chemical-resistant outer gloves taped to outer coveralls;³
- Chemical-resistant inner gloves;
- Hard hat;
- Safety-toe boots taped to coveralls; the use of boot covers (e.g., booties) or chemical-resistant boots may be specified; and
- Hearing protection (as required).

4.5.5 Level B Ensemble

The Level B ensemble provides both the highest level of inhalation exposure protection and considerable skin contact protection. Its use is appropriate where there are significant known or suspected hazardous substances and health hazards, involving both skin and inhalation exposure (up to and including Immediately Dangerous to Life or Health [IDLH] conditions) or where adverse atmospheric conditions cannot be mitigated by use of air purifying respirators (e.g. oxygen deficient atmospheres or chemicals with poor warning properties). The use of Level B PPE requires prior approval by the SH&E Manager.

Level B Equipment List:

- Supplied air respirator (SCBA or airline system with Grade D or better breathing air);
- Chemical-resistant disposable outer coveralls;
- Chemical-resistant outer glove taped to outer coveralls;³
- Chemical-resistant inner gloves;³
- Hard hat;
- Chemical resistant safety-toe boots taped to coveralls; and
- Hearing protection (as required).

¹ Selection of specific glove types/materials will be provided in the project SH&E Plan based on consideration of the contaminants and the physical conditions of the work.

² Selection of specific cartridges will be made by the SH&E Department (or Competent Person – Respiratory Protection as designated by the SH&E manager) based on contaminants present. A cartridge change-out frequency will also be specified in the SH&E based on the manufacturer's cartridge performance data.

³ Selection of specific glove types/materials will be provided in the project SH&E based on consideration of the contaminants and the physical conditions of the work.

4.5.6 Level A Ensemble

The Level A ensemble provides the highest level of both respiratory and skin protection, up to and including protection against skin contact with vapor-phase contaminants. The use of Level A PPE requires prior approval by the Americas SH&E Director.

Specific Level A ensemble components will be determined on a case-by-case basis by the SH&E Department.

4.6 Emergency Response Plans

- 4.6.1 A Location Specific Emergency Response Plan shall be developed and implemented to handle anticipated emergencies prior to performing emergency response operations. The plan shall be in writing and available for inspection and copying by employees, their representatives, and OSHA personnel. The plan shall be reviewed and approved by the SH&E Manager prior to issue.
- 4.6.2 AECOM'S *S3AM-010-PR1 Emergency Response Planning* shall apply and employees shall evacuate from the danger area whenever an emergency occurs, provided the associated contract does not require AECOM to provide emergency response services
- 4.6.3 AECOM Employees are not expected to take action or to participate in rescues or responses to chemical releases beyond the initial discovery of the release and immediate mitigation actions such as closing a valve, placing absorbents, and notifying the client and or public emergency response system (911).
 - If AECOM Employees are to participate in the response to a chemical release beyond the initial reaction, there shall be a contractual provision for this response and the Employees shall be specifically trained for this response;
 - This document is designed to provide guidelines on how to prepare a written plan that will confirm prompt and proper response to an emergency situation that arises during field investigations and to outline the duties of AECOM Employees during a field emergency and the associated training requirements.
- 4.6.4 Site specific SH&E plans that are prepared to comply with the HAZWOPER standard (29 CFR 1910.120) shall address emergency response. This standard specifically outlines the elements that shall be contained in an emergency response plan. However, the definition of emergency response, as written in 29 CFR 1910.120, focuses on emergencies involving the uncontrolled release of hazardous substances. Under 29 CFR 1910.120, an employer can opt to evacuate employees from the danger area when such an emergency occurs. AECOM does not expect its Employees to actively assist in the handling of uncontrollable chemical releases that may occur during the implementation of field programs. As such, and as provided by the HAZWOPER standard, AECOM is exempt from the emergency response plan requirements of the standard as long as it provides an emergency action plan within the SH&E PLAN that complies with 29 CFR 1910.38 (a). Therefore, all emergency response plans required under 29 CFR 1910.120 will be written to comply with 29 CFR 1910.38 (a).
 - There are two types of emergency situations that AECOM personnel shall be prepared for and that shall be addressed in the emergency response plan. These include:
 - Emergencies related to the operations of our clients at the facility where AECOM is working;
 - Emergencies related to our own on-site activities/investigations.
 - Employees are not to accept the role of Incident Commander without specific authority from the SH&E Manager and the Manager responsible for the project. Assuming the role of the Incident Commander requires training beyond the scope of this Procedure.

4.6.5 The HAZWOPER standard does not prohibit AECOM Employees from performing limited response activities.

- Appropriately trained AECOM Employees can provide voluntary First Aid services;
- AECOM Employees can provide response assistance by placing absorbent pillows or vermiculite around a small, contained spill that occurs during sampling efforts;
- Refer to Spill Response, Incidental procedures contained herein which describes the specific procedures that AECOM will follow when responding to an incidental chemical spill.

4.6.6 Field Project Preparation

- Every SH&E Plan that is prepared by AECOM will contain a Location Specific Emergency Response Plan in which the required elements of an emergency action plan will be addressed. Refer to *S3AM-010-PR1 Emergency Response Planning*;
- When AECOM is working at an operating facility, the emergency response procedures of the facility will be appended to the SH&E Plan or the Location Specific Emergency Response Plan;
- As a minimum, each emergency response plan shall contain the following topics as required by 29 CFR 1910.38 (a):
 - Procedures and contact information for reporting emergencies to public service responders and on-site (client or host employer) emergency control centers;
 - Pre-emergency planning and coordination with outside parties;
 - Emergency escape procedures and emergency escape route assignments;
 - Procedures to be followed by employees who remain to operate critical site operations before they evacuate;
 - Procedures to account for all employees after emergency evacuation is complete;
 - Rescue and medical duties for those employees who are trained to perform them;
 - Preferred means of reporting fires and other emergencies;
 - PPE to protect employees from expected exposures and potential exposures during an emergency;
 - Names of persons or departments who can be contacted for further information (i.e. emergency reference sheet);
 - Site security and control;
 - Availability of medical surveillance for workers who might have been exposed to chemicals, bloodborne pathogens, or other biological agents as a result of project work or emergency response;
 - Emergency medical treatment and first aid;
 - Emergency alerting and response procedures;
 - Critique of response and follow-up.
- In addition, each plan shall establish the specific alarm system that will be used on site to warn employees of an AECOM emergency. The chosen alarm signals should not conflict with alarm signals already in place at the facility.

4.6.7 Client Facility Emergency Response Procedures

- AECOM implements field programs on active properties, including manufacturing facilities. These facilities have typically developed an emergency response plan that is specific to facility-related emergencies. If AECOM is working at an operating facility, emergency procedures established by the facility shall be followed in the event of a facility catastrophe.

AECOM personnel shall be aware of and familiar with the alarm signals used at the facility to alert personnel to an emergency. AECOM personnel shall also know where to assemble in the event of a facility evacuation as the facility shall be able to account for all personnel, including subcontractors such as AECOM in the event of an evacuation.

- The first priority in AECOM's preparation of a project emergency action plan is to confirm that the responsibilities under the client's emergency response plan are fully understood. Because of the nature of their business, many of our clients have in-house fire brigades, medical staff, and hazardous materials teams that can assist AECOM in the event of an emergency related to our field activities. In many instances, our clients prefer or require that subcontractors seek emergency assistance through their facility first before calling outside responders to the site.
- A copy of the facility's procedures shall be made available to AECOM so that the information can be incorporated into the SH&E Plan or attached to the Location Specific Emergency Response Plan. If this information is not available to AECOM prior to arriving on site, the SSO shall meet with client representatives upon arrival to the facility to review procedures in the event of an emergency related to plant operations.

4.6.8 Escape Routes and Procedures

Although emergency evacuation procedures are included in AECOM's initial 40-hour HAZWOPER training, emergency procedures at each site will be different. Employees shall be instructed about the location specific emergency response plan. Updating training is required anytime escape routes or procedures change. An evacuation drill will be conducted for projects that are scheduled for one month or longer. Visitors and untrained employees shall not be allowed into the project area until they receive a safety briefing including evacuation alarms and procedures.

Prior to the commencement of on-site activities, the SSO shall determine how AECOM employees will evacuate each AECOM work area of the site:

- Two or more routes that are separate or remote from each other for each work area shall be identified. Multiple routes are necessary in case one is blocked by fire or chemical spill. These routes shall not overlap because, if a common point were obstructed, all intersecting routes would be blocked;
- Prominent wind direction should also be considered when designating escape routes and assembly areas. Escape routes and assembly areas should be upwind of the site whenever possible;
- Upon arrival to the site, the SSO shall verify that the selected routes are appropriate for evacuation. During an emergency, the quickest and most direct route should be selected. However, when working at an operating facility, the established escape routes of the facility should be used whenever possible;
- In the event of a facility-related emergency, all AECOM employees shall meet at the facility's assembly area so that the client can verify that AECOM has evacuated the property.

4.6.9 Alarm Signals

An emergency communication system shall be in effect at all sites.

- The most simple and effective emergency communication system in many situations will be direct verbal communications. However, verbal communications shall be supplemented any time voices cannot be clearly perceived above ambient noise levels and any time a clear line of sight cannot be easily maintained among all AECOM personnel because of distance, terrain, or other obstructions;
- Portable two-way radio communications may be used when employees shall work out of the line of sight of other workers;
- When it is necessary to supplement verbal communications, Employees shall be informed of the established emergency signals. The following emergency signals, or other appropriate signals, shall be implemented using handheld portable air horns, whistles, or similar devices.

Signals shall be capable of being perceived above ambient noise by all employees in the affected portions of the workplace:

- One Blast: General Warning—A relatively minor and localized, yet important, on-site event. An example of this type of an event would be a minor chemical spill where there is no immediate danger to life or health yet personnel working on the site should be aware of the situation so that unnecessary problems can be avoided. If one horn blast is sounded, personnel shall stop all activity and equipment on-site and await further instructions from the SSO;
- Three Blasts: Medical Emergency—A medical emergency for which immediate first aid or emergency medical care is required. If three horn blasts are sounded, all First Aid Providers should respond as appropriate. All other activity and equipment should stop and personnel should await further instructions from the SSO;
- Three Blasts Followed by One Continuous Blast: Immediate Threat to Life and Health — A situation that could present an immediate danger to life and health of personnel onsite. Examples include fires, explosions, large hazardous chemical release, severe weather-related emergencies, or security threats. If three horn blasts followed by a continuous blast are sounded, all activity and equipment shall stop. All personnel shall evacuate the site and meet in the designated assembly area where the SSO will account for all employees. The SSO will arrange for other emergency response actions if necessary. Information concerning the need to follow decontamination procedures during an emergency evacuation will be addressed in the Location Specific Emergency Response Plan;
- The SSO or his designate will acknowledge the distress signal with two short blasts on the air-horn or whistle;
- One Continuous Blast Following Any of the Above: All Clear/Return to Work — Personnel who sound the initial alarm are required to send an all clear signal when the emergency is over.

4.6.10 Accounting Method for All Employees after Evacuation

The SSO is responsible for determining that all AECOM employees have been successfully evacuated from the work area(s):

- It is the responsibility of each AECOM subcontractor to verify that all of its employees evacuated the site and to report this information to the SSO. All employees shall meet at the designated assembly area;
- A headcount is an acceptable way to determine complete evacuation when the field team is of a small size. The site log-in book or equivalent should be referenced when attempting to account for more than 10 people. In the event of a facility-related emergency, the SSO shall notify facility representatives that all AECOM employees and AECOM subcontract employees have successfully evacuated the work area(s);
- The SSO shall notify emergency responders if any employee is unaccounted for and where on the site they were last seen;
- In the event of a project-related emergency, the SSO will provide off-site emergency responders or on-site HAZMAT teams or fire brigades (Incident Commander) with all available knowledge about the emergency situation upon their arrival to the scene.

4.6.11 Employees Who Remain to Operate Critical Site Operations Before They Evacuate

All equipment and operations are required to cease in accordance with the established alarm signal procedures. The only exception will be related to health and safety:

- The SSO shall determine at the time of the emergency if health and safety will be jeopardized by immediate stoppage of any particular piece of equipment;

- If such a determination is made, personnel involved in critical operations shall be minimized. Once it is determined that the operation is no longer needed or the threat to the operators is imminent, operations will cease and the operators will immediately evacuate.

4.6.12 Rescue and Medical Response

- Only currently trained individuals will administer first aid, CPR or an AED. Refer to *S3AM-012-PR1 First Aid*.
- In the event of an incident, refer to material's SDS labels to confirm proper first aid is administered for the hazardous material and call the nearest Poison Centre or 911. Refer to *S3AM-012-PR1 First Aid*.
 - The American National Standards Institute (ANSI) Standard for Emergency Eyewash and Shower Equipment (ANSI Z358.1-1998) recommends that the affected body part shall be flushed immediately and thoroughly for at least 15 minutes using a large supply of clean fluid under low pressure. However, other references recommend a minimum 20-minute flushing period if the nature of the contaminant is not known. The flushing or rinsing time can be modified if the identity and properties of the chemical are known. For example, at least:
 - 5 minutes flushing time for mild irritants;
 - 20 minutes for moderate to severe irritants;
 - 20 minutes for non-penetrating corrosives;
 - 60 minutes for penetrating corrosives;
 - If irritation persists, repeat the flushing procedure.
- It is important to note that ingestion of any chemical is not likely to occur in the workplace. If ingestion does occur, evidence indicates that inducing vomiting is not necessary in most situations where there has been an occupational chemical ingestion.
 - Induction of vomiting should only be recommended if the chemical has very high, short-term (acute) toxicity, and medical follow-up is not readily available;
 - In these cases, first aiders should receive special training on how to safely and effectively induce vomiting in the appropriate circumstances.
- If the injury is life threatening, the Emergency Medical System (EMS) should be called (911). Depending on the procedures established for the project, the SSO would contact an emergency responder directly or notify the facility representatives for medical assistance;
- If the employee needs medical attention that cannot be provided on-site, the SSO shall escort the individual to the local hospital identified on the emergency reference sheet and shall remain with the person until release or admittance is determined. The escort will relay all appropriate medical information to the Manager and SH&E Manager.

4.6.13 On-site and Off-site Communications

Regardless of the size or location of AECOM's field projects, it is extremely important that both on-site and off-site communications be maintained so that in the event of an emergency employees can contact each other or place a phone call immediately with the appropriate responder(s).

A reliable and approved form of communication (e.g. two way radio, cell phone, etc.) is required when members of the field team are working in separate areas of the site and verbal communications are no longer effective because of distance. A communication device shall be available for each team that is working in a separate area of the site.

When AECOM is working at an occupied facility, a telephone may be accessible. When AECOM is working on abandoned properties or when there is no access to a phone, as appropriate, a cellular telephone, two-way radio, or satellite telephone shall be brought to the work location.

4.6.14 Preferred Means of Reporting

Employees shall immediately notify the Supervisor of incidents and emergencies, and report in accordance with *S3AM-004-PR1 Incident Reporting, Notification & Investigation*:

- Unless facility representatives specifically indicate that they prefer AECOM personnel to notify them first of an emergency, the SSO will directly contact the appropriate emergency responders listed on the Location Specific Emergency Response Plan;
- Additional communications within AECOM concerning an emergency event may be required as per *S3AM-010-PR1 Emergency Response Planning* and *RS2-003-PR1 Disruptive Event Standard*;
- “Dangerous occurrences” shall be reported immediately to the police, employer, vehicle owner/lesser and the dangerous goods owner. Such events would include spills, bulk container damage, fire, explosion, and transportation accidents involving dangerous goods;
- Confirm and seek direction on external reporting requirements. Each jurisdiction has regulations governing the minimum quantities for reporting based on the type of product spilled or release refer to *S3AM-117-ATT1 Spill Notification Numbers for North America*;

Individuals who have knowledge of a spill, release, or unlawful discharge, shall notify authorities immediately. Reporting does not imply guilt or assign blame. The following details are to be reported:

- Location and time of spill;
- Description of circumstances leading to spill;
- Type and quantity of material or substance spilled;
- Details of any action taken at the site of the spill;
- Description of location of spill and immediately surrounding the area;
- Any additional information in respect of the spill that the Minister, Environmental Protection Officer or person designated by regulations requires.

4.6.15 First Responder

First responders shall have sufficient training or have had sufficient experience to objectively demonstrate competency in the following areas:

- An understanding of what hazardous substances are, and the risks associated with them in an incident;
- An understanding of the potential outcomes associated with an emergency;
- The ability to recognize the presence of hazardous substances and physical hazards in an emergency;
- An understanding of the role of the first responder;
- The ability to realize the need for additional resources and to make appropriate notifications to the communication center.

4.6.16 First Responder HAZWOPER Operations Level

First responders at the operations level are individuals who respond to releases or potential releases of hazardous substances as part of the initial response to the site for the purpose of protecting nearby persons, property, or the environment from the effects of the release:

- They are trained to respond in a defensive fashion without actually trying to stop the release; Their function is to contain the release from a safe distance, keep it from spreading, and prevent exposures;

- First responders at the operational level shall have received at least eight hours of training or have had sufficient experience to objectively demonstrate competency in the following areas in addition to those listed for the awareness level and the employer shall so certify:
 - Knowledge of the basic hazard and risk assessment techniques;
 - Know how to select and use proper personal protective equipment provided to the first responder operational level;
 - An understanding of basic hazardous materials terms;
 - Know how to perform basic control, containment, and/or confinement operations within the capabilities of the resources and personal protective equipment available with their unit;
 - Know how to implement basic decontamination procedures;
 - An understanding of the relevant standard operating procedures and termination procedures;

4.6.17 Hazardous Materials Technician

Hazardous materials technicians shall have received at least 24 hours of training equal to the first responder operations level and in addition have competency in the following areas and the employer shall so certify:

- Know how to implement the employer's emergency response plan;
- Know the classification, identification, and verification of known and unknown materials by using field survey instruments and equipment;
- Be able to function within an assigned role in the Incident Command System, refer to *Federal Emergency Management Agency—FEMA: Incident Command System*;
- Know how to select and use proper specialized chemical PPE provided to the hazardous materials technician;
- Understand hazard and risk assessment techniques;
- Be able to perform advance control, containment, and/or confinement operations within the capabilities of the resources and personal protective equipment available with the unit;
- Understand and implement decontamination procedures;
- Understand termination procedures;
- Understand basic chemical and toxicological terminology and behavior.

4.6.18 Hazardous Materials Specialist

Hazardous materials specialists shall have received at least 24 hours of training equal to the technician level and in addition have competency in the following areas and the employer shall so certify:

- Know how to implement the local emergency response plan;
- Understand classification, identification, and verification of known and unknown materials by using advanced survey instruments and equipment;
- Know the state or applicable jurisdictional emergency response plan;
- Be able to select and use proper specialized chemical PPE provided to the hazardous materials specialist;
- Understand in-depth hazard and risk techniques;
- Be able to perform specialized control, containment, and/or confinement operations within the capabilities of the resources and personal protective equipment available;

- Be able to determine and implement decontamination procedures;
- Have the ability to develop a site safety and control plan;
- Understand chemical, radiological, and toxicological terminology and behavior.

4.7 Decontamination Procedures

- 4.7.1 When possible, all necessary steps shall be taken to reduce or minimize contact with chemicals and impacted materials while performing field activities (e.g., avoid sitting or leaning on, walking through, dragging equipment over, tracking, or splashing potential or known impacted materials).
- 4.7.2 All personal decontamination activities shall be performed with an attendant (buddy) to provide assistance to personnel that are performing decontamination activities. An attendant may not be required for Level D equipment removal and decontamination. Depending on specific site hazards, attendants may be required to wear a level of protection that is equal to the required level in the exclusion zone.
- 4.7.3 All persons and equipment entering the EZ shall be considered contaminated, and thus, shall be properly decontaminated prior to entering the SZ. No equipment, including personal protective equipment or contaminated clothing shall be taken or worn into the SZ.
- 4.7.4 Decontamination procedures may vary based on site conditions and nature of the contaminant. If chemicals or decontamination solutions are used, care should be taken to minimize reactions between the solutions and contaminated materials. In addition, personnel shall assess the potential exposures created by the decontamination chemical(s) or solutions. The safety data sheets shall be reviewed, implemented, and filed by personnel contacting the chemicals/solutions.
- 4.7.5 All contaminated personal protective equipment (PPE) and decontamination materials shall be stored and disposed of in accordance with site-specific requirements identified in the approved work plan.
- 4.7.6 For all Level A and B ensembles, adequate supplied air shall be available to allow the employee to safely complete all necessary decontamination steps.
- 4.7.7 Where decontamination procedures involving radioactive materials are required, the removable limits for both personnel and equipment will be specified by a Certified Health Physicist or Certified Industrial Hygienist in the project's approved Radiation Protection Plan or approved safety planning document.
- 4.7.8 Materials Needed to Decontaminate Personnel and/or Equipment
- The equipment required to perform decontamination may vary based on site-specific conditions and nature of the contaminant(s). The following equipment is commonly used for decontamination purposes:
 - Soft-bristle scrub brushes or long-handled brushes to remove contaminants;
 - Hoses, buckets of water or garden sprayers for rinsing;
 - Large plastic/galvanized wash tubs or children's wading pools for washing and rinsing solutions;
 - Large plastic garbage cans or similar containers lined with plastic bags for the storage of contaminated clothing and equipment;
 - Metal or plastic cans or drums for the temporary storage of contaminated liquids;
 - Paper or cloth towels for drying protective clothing and equipment; and
 - Poly or plastic sheeting to lay down and form the base for the CRZ, as well as to contain contaminants and decontamination fluids.

4.7.9 Personal Decontamination Steps

- The decontamination plan shall be in writing and shall specify the exact steps in either wet or dry decontamination or personnel exiting the EZ to the SZ. The decontamination plan shall also address respirator cartridge change out, SCBA bottle changes and equipment decontamination.

4.7.10 Decontamination Steps during a Medical Emergency

- If decontamination can be done:
 - Wash, rinse and/or cut off protective clothing and equipment.
- If decontamination cannot be done:
 - Wrap the victim in blankets, plastic sheeting, or rubber to reduce contamination of other personnel;
 - Alert emergency and offsite medical personnel to potential contamination;
 - Instruct them about specific decontamination procedures if necessary;

4.7.11 Equipment Decontamination Steps

- All equipment leaving the EZ shall be considered contaminated and shall be properly decontaminated to minimize the potential for exposure and off-site migration of impacted materials. Such equipment may include, but is not limited to: sampling tools, heavy equipment, vehicles, PPE (hoses, cylinders, etc.), and various handheld tools;
- All Employees performing equipment decontamination shall wear the appropriate PPE to protect against exposure to contaminated materials. The level of PPE may be equivalent to the level of protection required in the EZ. Other PPE may include splash protection, such as face-shields and splash suits, and knee protectors. Following equipment decontamination, Employees may be required to follow the proper personal decontamination procedures above;
- For larger equipment, a high-pressure washer may need to be used. Some contaminants require the use of a detergent or chemical solution and scrub brushes to confirm proper decontamination. Personnel operating a high pressure washer will be trained in the operation of the equipment and follow the manufacturer's operational instructions;
- For smaller equipment, use the following steps for decontamination:
 - Remove majority of visible gross contamination in EZ;
 - Wash equipment in decontamination solution with a scrub brush and/or power wash heavy equipment;
 - Rinse equipment;
 - Visually inspect for remaining contamination;
 - Follow appropriate personal decontamination steps outlined above.
- All decontaminated equipment shall be visually inspected for contamination prior to leaving the CRZ. Signs of visible contamination may include an oily sheen, residue or contaminated soils left on the equipment. All equipment with visible signs of contamination shall be discarded or re-decontaminated until clean. Depending on the nature of the contaminant, equipment may have to be analyzed using a wipe method or other means.

4.8 Employee Exposure Monitoring

- #### 4.8.1
- Explosive levels, oxygen levels, and airborne contaminants may present potential hazards to HAZWOPER personnel working within controlled work areas and to non-HAZWOPER workers and the general public present outside the controlled work areas.

- 4.8.2 As appropriate, exposure monitoring at HAZWOPER sites will be conducted to determine explosive and oxygen levels, monitor and control employee exposures to airborne contaminants, and to determine and regulate controlled work area boundaries (e.g., support zone, contamination reduction zone, and exclusion zone) for the protection of non-HAZWOPER workers and the general public.
- 4.8.3 Specific exposure monitoring requirements will be established in individual SH&E Plans. Refer to *S3AM-127-PR1 Exposure Monitoring*. All monitoring efforts using direct reading instruments and will remain part of the project file.
- 4.8.4 Work Area Exposure Monitoring
 - Work area exposure monitoring will include breathing zone readings for the maximum exposed worker(s);
 - Results will be used to determine adequacy of PPE (especially respiratory protection). Specific criteria for upgrade/downgrade will be established in the SH&E Plan.
- 4.8.5 Perimeter Exposure Monitoring
 - Perimeter air samples will be collected when the potential exists for airborne contaminants to migrate off-site and will be collected near the work zones when performing work at an active client facility. Refer to *S3AM-127-PR1 Exposure Monitoring*;
 - Perimeter exposure monitoring will be conducted at locations downwind from the project activities at a minimum (also upwind if the potential exists for offsite contamination to migrate onto the site).
- 4.8.6 Exposure results will be posted on site and explained in a safety briefing.
- 4.8.7 Employees will receive a written statement of results within 15 days of receipt from the laboratory.
- 4.8.8 Results of all personal exposure monitoring will be provided to the SH&E department for inclusion in the employee medical records, refer to *S3AM-017-PR1 Injury & Illness Recordkeeping*.

5.0 Records

- 5.1 All forms and documents generated during a HAZWOPER project will be maintained in the project file.
- 5.2 All medical screening and surveillance documentation shall be retained for 30 years.

6.0 Attachments

- 6.1 [S3AM-117-ATT1](#) [Spill Notification Number for North America](#)

Americas

Spill Notification Numbers for North America

S3AM-117-ATT1

Jurisdiction	Name	Phone
Within the United States		
National Response Center		1-800-424-8802
AECOM Incident Reporting Number		1-800-348-5046
Within Canada		
AECOM Incident Reporting Number		1-800-348-5046
Alberta	Environmental Service Response Centre	1-800-222-6514
British Columbia	Provincial Emergency Program	1-800-663-3456
Manitoba	Conservation Emergency Response Program	1-204-944-4888
New Brunswick	Canadian Coast Guard	1-800-565-1633
Newfoundland & Labrador	Canadian Coast Guard	1-800-563-9089
NWT & Nunavut	Spill Report Line	1-867-920-8130
Nova Scotia	Canadian Coast Guard	1-800-565-1633
Ontario	Spill Action Centre	1-800-268-6060
Prince Edward Island	Canadian Coast Guard	1-800-565-1633
Quebec	National Environmental Emergencies Center	1-866-283-2333
Saskatchewan	Spill Report Centre	1-800-667-7525
Yukon Territory	Spill Report Centre	1-867-667-7244

Respiratory Protection

S3AM-123-PR1

1.0 Purpose and Scope

- 1.1 This procedure establishes a written respiratory protection program with the required elements and work site-specific procedures for respirator selection, use, and maintenance for any workplace where respirators are necessary to protect the health of an Employee.
- 1.2 The primary objective shall be to prevent exposure to atmospheric contaminants as far as feasible by accepted engineering control measures (e.g. enclosure or confinement of the operation, general and local exhaust ventilation [LEV], and substitution of less toxic materials). If respiratory hazards remain, suitable administrative controls and respiratory protective equipment requirements shall be established.
- 1.3 This procedure applies to all AECOM Americas-based employees and operations, except where local or governmental regulations are more stringent.

2.0 Terms and Definitions

- 2.1 **Action Level (AL)** – An airborne concentration of a potentially toxic or hazardous substance, measured in parts per million by volume (ppm), microgram per cubic meter ($\mu\text{g}/\text{m}^3$) milligram per cubic meter (mg/m^3) or fibres per cubic centimetre (f/cc), that triggers certain provisions as required by the applicable jurisdictional legislation. In many cases the action level is 50% of the established exposure limit.
- 2.2 **Air-purifying respirator** – A respirator with an air-purifying filter, cartridge, or canister that removes specific air contaminants by passing ambient air through the air-purifying element.
- 2.3 **Approved** – Equipment tested and listed by the Bureau of Mines, jointly by the Mining Enforcement and Safety Administration (MESA), and the National Institute for Occupational Safety and Health (NIOSH), or jointly by the Mine Safety and Health Administration (MSHA) and NIOSH. Please note Canadian Standards Association (CSA) bases respirator selection on NIOSH criteria for the testing and certification of respirators.
- 2.4 **Assigned protection factor (APF)** – The ratio of the ambient concentration of an airborne substance (outside the respirator) to the concentration of the substance inside the respirator.
- 2.5 **Atmosphere-supplying respirator** – A respirator that supplies the user with breathing air from a source independent of the ambient atmosphere, including supplied-air respirators (SARs) and self-contained breathing apparatus (SCBA) units.
- 2.6 **Breakthrough** – The first perception of an odor, taste or irritation experienced while wearing an air-purifying respirator. Breakthrough is generally an indication that the cartridges are saturated and are no longer filtering out the contaminant. Breakthrough can also be an indication of an improperly functioning respirator.
- 2.7 **Established Exposure Limit** – The maximum regulatory exposure concentration to which an individual may be exposed to for an 8- hour time weighted average (TWA).
 - This limit is referred to by different terminology depending upon the given jurisdiction (e.g. Permissible Exposure Limit (PEL), Contamination Limit, Occupational Exposure Limit (OEL), Threshold Limit Value (TLV), etc.).
 - Acceptable methods of adjusting this limit to correspond to a different exposure period (e.g. 10 hours) vary by jurisdiction and substance.
- 2.8 **Filtering facepiece (dust mask)** – A negative pressure particulate respirator with a filter as an integral part of the facepiece or with the entire facepiece composed of the filtering medium.
- 2.9 **Fit factor** – A quantitative estimate of the fit of a particular respirator to a specific individual, typically estimating the ratio of the concentration of a substance in ambient air to its concentration inside the respirator when worn.

- 2.10 **Fit test** – The use of a protocol to qualitatively or quantitatively evaluate the fit of a respirator on an individual. (See also Qualitative fit test [QLFT] and Quantitative fit test [QNFT].)
- 2.11 **Hazardous atmosphere** – Any atmosphere, either immediately or not immediately dangerous to life or health, that is oxygen-deficient or that contains a toxic or disease-producing contaminant exceeding the legally established permissible exposure limit or, where applicable, the Threshold Limit Value established by the American Conference of Governmental Industrial Hygienists.
- 2.12 **Immediately dangerous to life or health (IDLH)** – An atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from a dangerous atmosphere.
- 2.13 **Maximum use concentration (MUC)** – The maximum concentration of an airborne contaminant from which an employee is expected to be protected when wearing a respirator, determined by the assigned protection factor of the respirator or class of respirators and the occupational exposure limit for that contaminant. The MUC is usually determined mathematically by multiplying the assigned protection factor (APF) specified for a respirator by the established exposure limit, which can include a short-term exposure limit and a ceiling limit or any other exposure limit used for that chemical agent, as defined by the authority having jurisdiction.

MUC = APF x established exposure limit
- 2.14 **Negative pressure respirator (tight fitting)** – A respirator in which the air pressure inside the facepiece is negative during inhalation with respect to the ambient air pressure outside the respirator.
- 2.15 **Oxygen-deficient atmosphere** – An atmosphere with oxygen content below 19.5 percent by volume.
- 2.16 **Physician or other licensed health care professional (PLHCP)** – An individual whose legally permitted scope of practice (i.e., license, registration, or certification) allows him or her to independently provide or be delegated the responsibility to provide some or all of the health care services required by local or governmental respiratory protection standards.
- 2.17 **Positive pressure respirator** – A respirator in which the pressure inside the respiratory inlet covering exceeds the ambient air pressure outside the respirator.
- 2.18 **Powered air-purifying respirator (PAPR)** – An air-purifying respirator that uses a blower to force the ambient air through air-purifying elements to the inlet covering.
- 2.19 **Pressure demand respirator** – A positive pressure atmosphere-supplying respirator that admits breathing air to the facepiece when the positive pressure is reduced inside the facepiece by inhalation.
- 2.20 **Qualitative fit test (QLFT)** – A pass/fail fit test to assess the adequacy of respirator fit that relies on the individual's response to the test agent.
- 2.21 **Quantitative fit test (QNFT)** – An assessment of the adequacy of respirator fit by numerically measuring the amount of leakage into the respirator.
- 2.22 **Self-contained breathing apparatus (SCBA)** – An atmosphere-supplying respirator for which the breathing air source is designed to be carried by the user.
- 2.23 **Supplied-air respirator (SAR) or airline respirator** – An atmosphere-supplying respirator for which the source of breathing air is not designed to be carried by the user.
- 2.24 **Tight-fitting facepiece** – A respiratory inlet covering that forms a complete seal with the face.
- 2.25 **User seal check** – An action conducted by the respirator user to determine if the respirator is properly sealed to the face.

3.0 References

- 3.1 S3AM-003-PR1 SH&E Training
- 3.2 S3AM-114-PR1 Compressed Gases

3.3 S3AM-128-PR1 Medical Screening & Surveillance

4.0 Procedure

4.1 Roles and Responsibilities

4.1.1 Respiratory Protection Program Administrator

The Respiratory Protection Program Administrator will be established at each project/location where employees are required to wear respirators. The Respiratory Protection Program Administrator will:

- Verify full compliance with this procedure.
- Assist with the arranging of any required medical evaluations or any other additional medical attention related to the use of a respirator.
- Perform or arrange suitable providers to perform the program evaluations described in this procedure.
- Maintain required inspections and testing/certifications of SCBA units

4.1.2 Manager /Supervisor

- Verify compliance with the respiratory protection program set forth in this procedure.
- Verify that only those employees who are medically qualified, properly trained, and fit tested are assigned to respirator work.
- Verify that respirators are provided, repaired, or replaced as may be required due to wear and deterioration.
- Confirm that the emergency rescue service is available to respond prior to any employees entering the IDLH area.

4.1.3 SH&E Manager (or designee)

- Monitor compliance with the various aspects of this program.
- Provide technical assistance regarding respirator selection and use, evaluate the effectiveness of this program, and support respirator training and fit testing (e.g. determine cartridge change out schedule for negative air respirators).
- Audit company compliance with this procedure.

4.1.4 Employee

- Use respiratory protection in accordance with instructions and training received.
- Maintain the respirator in accordance with this procedure and the manufacturer's instructions.
- Immediately report any malfunction of the respirator to the Supervisor or Manager or other responsible person.
- For employees who wish to wear respirators on a voluntary basis when not required to by AECOM or a regulatory agency, the employee shall complete *S3AM-123-FM2 – Voluntary Use of Respirators* or an equivalent form.

4.2 Training

- 4.2.1 Employees who wear respiratory protection shall receive training before they are assigned to a task that requires the use of respiratory protection.
- 4.2.2 Employees that may be exposed to a respiratory hazard will be instructed on the hazard and the controls prior to beginning work.

- 4.2.3 Atmospheric testing will be carried out by qualified personnel trained in the use, calibration, and interpretation of the test equipment.
- 4.2.4 Retraining shall be administered annually, and when the following situations occur:
- Changes in the workplace or the type of respirator render previous training obsolete;
 - Inadequacies in the Employee's knowledge or use of the respirator indicate that the Employee has not retained the requisite understanding or skill; or
 - Any other situation arises in which retraining appears necessary to verify safe respirator use.

4.2.5 Basic Respirator Training Program

Respirator training classes will include, at a minimum, the following:

- Instruction in the nature of the respiratory hazards, whether acute, chronic, or both, and a description of potential health effects if the respirators are not used;
- Why the respirator is necessary and how improper fit, usage, or maintenance can compromise the protective effect of the respirator;
- The limitations and capabilities of the respirator;
- Proper fitting, including demonstrations and practice in wearing, adjusting, determining the fit of, and performing a user seal check each time respirator is donned. Refer to *S3AM-123-ATT1 Fit Testing Protocol*, *S3AM-123-FM1 Respiratory Equipment Fit Test* and *S3AM-123-ATT2 User Seal Check*;
- How to inspect, put on, use and remove the respirator;
- How to use the respirator effectively in emergency situations, including situations in which the respirator malfunctions;
- The procedures for maintenance and storage of the respirator;
- How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators; and
- The general requirements of local or governmental Respiratory Protection Standards.

4.3 Medical Surveillance

- 4.3.1 No Employee shall be assigned to a task that requires the use of a respirator unless it has been determined that he/she is physically able to perform the work while using the required respirator.
- 4.3.2 Prior to wearing a respirator and in accordance with the applicable jurisdictional requirements, Employees shall complete medical screening to identify any relevant psychological or physiological impediments to respiratory protection use. Screening may require an initial baseline medical surveillance examination, based on jurisdictional requirements or screening results, performed by a PLHCP in accordance with the requirements of *S3AM-128-PR1 Medical Screening & Surveillance Program*.
- 4.3.3 Additional medical examinations will be provided to employees who wear respirators when:
- An Employee reports medical signs or symptoms that are related to ability to use a respirator;
 - A PLHCP, Supervisor, or the Respiratory Protection Program Administrator determines that an Employee needs to be reevaluated;
 - Information from the Respiratory Protection Program, including observations made during fit testing and program evaluation, indicates a need for Employee reevaluation; or
 - A change occurs in workplace conditions (e.g., physical work effort, protective clothing, temperature, etc.) that may result in a substantial increase in the physiological burden placed on an Employee.

- 4.3.4 All medical surveillance examinations shall be at no cost to the employee and occur during normal working hours; shall be convenient, understandable, and confidential; and the Employee will be given the chance to discuss results with examining physician.

4.4 Respirator Selection

- 4.4.1 The location or project specific SH&E Plan shall identify applicable respiratory hazards and develop appropriate controls, which may include respiratory protection. If respiratory protection is necessary the SH&E Plan shall detail the requirements.
- 4.4.2 SH&E Managers or his/her designated representative shall select and provide an appropriate respirator based on:
- The respiratory hazard(s) to which the employee may be exposed, including oxygen deficiency. Identify potential contaminants, concentrations, and the physical state of airborne contaminants:
 - Particulates (dust, fibers, micro-organisms, smoke, fumes).
 - Indicate the presence of any oil in particulate hazards. (may be produced by motor vehicles, air compressor systems using oil lubricators) If unknown, oil shall be assumed to be present.
 - Vapor and gases
 - Gases which may produce an oxygen deficiency (i.e. helium, argon, carbon monoxide and nitrogen).
 - Gases which are acids or produce acids when in contact with moisture (i.e. sulphur oxides, carbon dioxide, hydrogen chloride).
 - Gases which are alkaline or produce alkalis in reaction with moisture (i.e. ammonia, amines, phosphine).
 - True gases or vapors from evaporation of organic liquids (i.e. acetone, toluene, benzene).
 - Metal reacted with an organic compound (i.e. tetra-ethyl lead: was used in leaded fuel and still in aviation fuel, organic phosphates).
 - Mercury vapor.
 - Radon.
 - The eye and face hazards to which the employee may be exposed (absorption, irritant, impact).
 - Workplace or user factors that may affect respirator performance and reliability.
- 4.4.3 SH&E Managers or his/her designated representative shall identify and evaluate the respiratory hazard(s) in the workplace. Evaluations shall include a reasonable estimate of employee exposures to respiratory hazard(s) and an identification of the contaminant's chemical state and physical form.
- 4.4.4 Respiratory protection is required for those operations in which engineering controls or work practice controls are not feasible to reduce toxic or hazardous substance exposure at or below the AL (or if applicable, established exposure limit).
- 4.4.5 Where the employee exposure cannot be identified or reasonably estimated, the atmosphere shall be considered IDLH.
- 4.4.6 Only approved respirators shall be selected and they shall be used in compliance with the conditions of their certification.

- 4.4.7 Respirators shall be selected from a sufficient number of respirator models and sizes so that the respirator is acceptable to, and correctly fits, the user.

4.5 Fit Testing Procedures

- 4.5.1 After the medical assessment is complete, employees using a tight-fitting respirator shall pass an appropriate QLFT or QNFT prior to initial use of the respirator, whenever a different respirator facepiece (size, style, model or make) is used, and at least annually (or as required by the applicable jurisdiction) thereafter. Refer to *S3AM-123-ATT1 Fit Testing Protocol*.
- 4.5.2 Fit testing shall be performed using the same make, model, style and size of respirator the user would be expected to use.
- 4.5.3 Should the fit test fail, alternative makes, models, styles and sizes shall be tested to find a correct fit for the user.
- 4.5.4 Respiratory protective equipment shall not be used unless a satisfactory fit test has been achieved for that particular equipment.
- 4.5.5 Fit testing shall also verify user competency in donning, doffing, inspecting and performing of seal checks.
- 4.5.6 Additional fit tests will be performed:
- Whenever there is an indication that changes in the Employee's physical condition might have an effect on respirator fit (such conditions include, but are not limited to, facial scarring, dental changes, cosmetic surgery, or an obvious change in body weight);
 - If the Employee notifies his/her Supervisor or SH&E Manager that the fit of his/her respirator is unacceptable.

4.6 Interference with Facepiece Seal

- 4.6.1 AECOM shall not permit respirators with tight-fitting facepieces to be worn by Employees who have:
- Facial hair that comes between the sealing surface of the facepiece and the face or that interferes with valve function; or
 - Any condition that interferes with the face-to-facepiece seal or valve function.
- 4.6.2 If an employee wears corrective glasses or goggles or other personal protective equipment, the Supervisor or Manager shall confirm that such equipment is worn in a manner that does not interfere with the seal of the facepiece to the face of the user.
- 4.6.3 Employees shall perform a user seal check each time they don the respirator. Refer to *S3AM-123-ATT2 User Seal Check Procedures*.

4.7 Specification of Proper Level of Respiratory Protection

- 4.7.1 The SH&E Manager or his/her designated and qualified representative shall provide guidance on the proper selection and use of all respiratory protective devices, including half-face and full-face air purifying respirators, airline respirators, and self-contained breathing apparatus. This information is generally specified as part of the written site-specific SH&E plan and Task Hazard Assessment (THA).
- 4.7.2 Employees engaged in activities not covered by a THA or SH&E plan shall stop work and consult with the SH&E Manager or his/her designated representative to determine the proper equipment to use prior to resuming activities. Whenever appropriate, exposure levels will be measured to verify that the actual use conditions are within the limitations of the approvals specified by NIOSH/MSHA for the selected respirator.

4.8 Cartridges

4.8.1 NIOSH certifies three classes of filters*:

Three categories of resistance to filter efficiency degradation:	Three levels of filter efficiency:
N (N ot resistant to oil)	95% (called "95")
R (R esistant to oil)	99% (called "99")
P (oil P roof)	99.97% (called "100")

*Filters are available in any combination of the above.

4.8.2 Generally cartridge color denotes the type of contaminant the cartridge was designed to filter:

Olive:	Multi-contaminant
White:	Acid gas
Black:	Organic vapors
Green:	Ammonia gas
Yellow:	Acid gas and organic vapors
Blue:	Carbon Monoxide
Purple (Magenta):	Radioactive material, except tritium & noble gases
Purple:	Any particulates - P100
Orange:	Any particulates - P95, P99, R95, R99, R100
Teal:	Any particulates free of oil - N95, N99, or N100

Please note; this is only a basic listing and should only be used as a reference. Combinations, deviations or additional types may be encountered. To ensure proper cartridge selection consult the cartridge supplier to ensure applicability to the contaminant(s) anticipated

- 4.8.3 Filter cartridges shall be changed out whenever an increase in breathing resistance is detected by the user.
- 4.8.4 When available, chemical cartridges that are equipped with end-of-service life indicators (ESLI) shall be utilized. In those cases, cartridges should be changed when indicated by the ESLI. A buddy system should be used so coworkers can monitor each other's cartridge color condition.
- 4.8.5 In the absence of cartridges equipped with an ESLI, employees shall change chemical cartridges on the following schedule:
- Immediately if breakthrough is perceived or if resistance to breathing is detected by the user; and
 - In accordance with the change out schedule based upon the anticipated contaminant concentration, environmental conditions, employee work rate, and the specific data provided by manufacturer.
- 4.8.6 When PAPRs are worn, the same rules apply with the exception that filter cartridges should be changed when airflow through the filter elements decreases to an unacceptable level, as indicated by the manufacturer's test device.

4.9 Air-Supplying Respirator Use

4.9.1 Air-supplying respirators will be specified for use when it has been determined that any of the following conditions exist:

- The oxygen concentration is less than 19.5 percent;
- The contaminant is unknown or its concentration cannot be quantified;
- The airborne contaminant concentration is above its IDLH;
- An air-purifying respirator canister or cartridge that removes the contaminant is not available;
- The contaminant concentration is above the concentration for which an air-purifying canister or cartridge is approved; or
- The contaminant concentration is above the MUC of a full-face air-purifying respirator.

4.9.2 No Employee may engage in an operation requiring the use of an air-supplied respirator unless the SH&E Manager or his/her designated representative has reviewed the operation and approved its use.

4.9.3 The determination of the type of air-supplying respirator (i.e., SCBA, airline, demand, pressure demand, etc.) appropriate for the job, outside standby persons, communication, proper training and equipment, notification procedures, and necessary action should be part of the THA or SH&E Plan. Mandatory equipment including SCBA or SAR with auxiliary air supply and emergency appropriate retrieval equipment or equivalent rescue means shall be made by the SH&E Manager or his/her designated representative at the time of the THA or SH&E Plan review. The need for any additional precautions (i.e., equipment specific training, on-site health and safety support, etc.) shall also be determined by the SH&E Manager or his/her designated representative.

4.10 Minimum Procedures for IDLH Atmospheres

4.10.1 One Employee or, when needed, more than one Employee shall be located outside the IDLH atmosphere. This employee shall be responsible for communicating with the Employees in the IDLH atmosphere, alerting rescue services if needed, and restricting entrance to the IDLH area by untrained and unapproved persons.

4.10.2 Visual, voice, or signal line communication shall be maintained between the Employee(s) in the IDLH atmosphere and the employee(s) located outside the IDLH atmosphere.

4.10.3 The Employee(s) located outside the IDLH atmosphere shall be trained and equipped to provide effective emergency rescue or to initiate on-site rescue services.

4.10.4 If on-site rescue services are to be used, the Manager or Supervisor shall confirm that the service is available to respond prior to any employees entering the IDLH area.

4.10.5 Employee(s) located outside the IDLH area and/or on-site rescue services shall be equipped with:

- Pressure demand or other positive pressure SCBAs, or a pressure demand or other positive pressure supplied-air respirator with auxiliary SCBA; and either
- Appropriate retrieval equipment for removing the employee(s) who enter(s) these hazardous atmospheres where retrieval equipment would contribute to the rescue of the employee(s) and would not increase the overall risk resulting from entry; or
- Equivalent means for rescue where retrieval equipment would create a hazard to the Employees in the IDLH area.

4.11 Breathing Air

4.11.1 Compressed air used for respiration shall be of high purity and shall meet, as a minimum, the requirements of the specification for Grade D breathing air as described in Compressed Gas Association Specification G-7.1 (ANSI Z86.1).

4.11.2 Oxygen shall NOT be used as a source of breathing air at any time in open-circuit SCBAs or airline respirators.

4.11.3 Compressor Supplied Breathing Air

- All compressors used for filling SCBA air cylinders or for supplying airline respirators shall be equipped with the following safety and standby devices:
 - The compressor intake shall be located to verify that only respirable (uncontaminated) air is admitted. This requires attention to the location of the compressor intake with respect to compressor engine exhaust, chemical storage or use areas, and suitable intake screening or filtration.
 - Alarms to indicate compressor failure (such as low-pressure air horns, etc.) shall be installed in the system.
 - A receiver of sufficient capacity to enable the respirator wearer to exit from a contaminated atmosphere shall be provided.
- If an oil-lubricated compressor is used to supply breathing air, it shall be equipped with both of the following devices:
 - A continuous reading carbon monoxide monitoring system set to alarm should the carbon monoxide concentration exceed 10 parts per million; and,
 - A high temperature alarm which will activate when the discharge air exceeds 110 percent of the normal operating temperature in degrees Fahrenheit.
- An in-line purifying filter assembly to remove oil, condensed water, particulates, odors, and organic vapors shall be used in conjunction with the air compressor.

4.11.4 Compressed Air Cylinder Systems for Airline Respirators

- Compressed air cylinders shall meet the requirements of *S3AM-114-PR1 Compressed Gases*.
- Compressed air cylinder systems used to supply airline respirators shall be equipped with low pressure warning bells (e.g., Scott Pak-Alarm) or similar warning devices to indicate air pressure in the manifold below 500 pounds per square inch (psi). When such systems are used, one employee shall be assigned as safety standby within audible range of the low pressure alarm.
- Airline hose couplings shall be incompatible with outlets for other gas systems to prevent inadvertently supplying airline respirators with non-respirable gases or oxygen.
- The air pressure at the hose connection to airline respiratory equipment shall be within the range specified in the approval of the equipment by the manufacturer.
- Routine inspection and maintenance of the air compressor shall be performed.

4.11.5 Compressed Air Cylinder Systems for Recharging SCBAs

- When a cascade system is used to recharge SCBA air cylinders, it shall be equipped with a high-pressure supply hose and coupling rated at a capacity of at least 3,000 psi.

4.11.6 Escape/Egress Units

- Escape/egress unit respirators are intended for use in areas where escape with a short-term (minimum 5 minutes) air supply is necessary. It is important that escape bottle size be provided that will allow the employee to get to a safe location considering breathing rate and distance.
- Escape bottles are required on air-line respirators used in IDLH and high hazard work conditions.
- They may be used as adjuncts to airline pressure demand respirators as a backup air supply or as independent emergency devices in areas where respiratory protection is not normally required.

- Appropriate training shall be conducted and documented prior to assigning Employees to tasks or locations subject to the use of these respirators.
- Escape/egress units (minimum 5 minutes) shall never be used to enter a hazardous atmosphere or as primary standby respirators for confined space entry.

4.12 Respirator Inspection, Cleaning, Maintenance, and Storage

When respirator use is required, only properly cleaned and maintained NIOSH/MSHA approved respirators shall be used.

4.12.1 Inspection

- Respirators should be inspected before and after use using *S3AM-123-FM3 Respiratory Equipment Inspection*, or equivalent. The respirator should not be used and removed and marked out of service if any item on the checklist fails inspection.
- Respirators for emergency use should be inspected once per month.
- Defects shall be reported to their Supervisor or Manager. No defective respirator shall be issued or worn.

4.12.2 Cleaning and Maintenance

- Respirator facepiece assemblies shall be cleaned and sanitized minimally after each day of use in accordance with the requirements specified in *S3AM-123-ATT3 Respirator Cleaning*.
- The respirator should also be inspected for any damaged parts (repair should only be done by trained personnel with the proper tools).
- Respiratory equipment shall not be passed from one person to another until it has been cleaned and sanitized.
- Respiratory equipment shall be maintained according to manufacturer's instructions.
- In field situations, a pre-moistened towelette (e.g., baby wipes) can be used. The mask should then be rinsed with clean warm water and dried. Towelettes or wipes shall be compatible with the respirator materials.
- Alcohol should never be used to clean masks as it can damage the facepieces and rubber parts.
- Where respirators are assigned to individual employees, management shall verify compliance with cleaning and maintenance requirements by periodic inspection and field audits of respiratory equipment.

4.12.3 Storage

- Store clean respirators so that they are protected from dust, excessive moisture, damaging chemicals, temperature extremes and direct sunlight or UV light. They should be placed in a sealed plastic bag and stored in the original box or similar container which blocks light.

4.13 Hygiene

- ##### 4.13.1
- Employees shall leave the work area to wash, change cartridges, or if they detect breakthrough or resistance.

4.14 Costs

- ##### 4.14.1
- The costs for training, medical examinations, fit testing, respirators, spectacle kits, and cleaning materials should be considered as operational costs.

4.15 Program Evaluation

- ##### 4.15.1
- The SH&E Manager or his/her designated representative shall conduct evaluations of the workplace as necessary to verify that the provisions of the current written program are being effectively implemented and that it continues to be effective.

- 4.15.2 The SH&E Manager shall regularly (i.e., during annual training) consult Employees required to use respirators to assess their views on program effectiveness and to identify any problems. Any problems that are identified during this assessment shall be corrected. Factors to be assessed include but are not limited to:
- Respirator fit (including the ability to use the respirator without interfering with effective workplace performance);
 - Appropriate respirator selection for the hazards to which the Employee is exposed;
 - Proper respirator use under the workplace conditions the Employee encounters; and
 - Proper respirator maintenance.

5.0 Records

- 5.1 Medical records under this section shall be maintained at a minimum in accordance with *S3AM-128-PR1 Medical Screening & Surveillance*.
- 5.2 Fit Test Records shall be maintained in the Employee's health and safety records. *S3AM-123-FM1 Respiratory Equipment Fit Test*, or equivalent, will be used to document each fit test.
- 5.3 Training Records shall be maintained in accordance with *S3AM-003-PR1 SH&E Training*.

6.0 Attachments

- 6.1 [S3AM-123-ATT1](#) [Fit Testing Protocol](#)
- 6.2 [S3AM-123-ATT2](#) [User Seal Check](#)
- 6.3 [S3AM-123-ATT3](#) [Respirator Cleaning](#)
- 6.4 [S3AM-123-FM1](#) [Respiratory Equipment Fit Test](#)
- 6.5 [S3AM-123-FM2](#) [Voluntary Use of Respirators](#)
- 6.6 [S3AM-123-FM3](#) [Respiratory Equipment Inspection](#)
- 6.7

Fit Testing Protocol

S3AM-123-ATT1

1.0 Selection

- 1.1 Fit testing shall not be conducted until after the medical screening and any medical examination is concluded, to confirm there are no relevant psychological or physiological impediments or restrictions to respiratory protection use. A medical examination may result in clearance to use any type of respirator, total restriction for respiratory equipment use, or specific respiratory use restrictions (e.g. powered air-purifying respirator (PAPR) only).
- 1.2 Employees are expected to present themselves for a fit test in the same condition as when using the respiratory protective equipment in their job. These conditions include hair style and whether or not make-up, face creams, glasses, contact lenses, and/or dentures would be used.
- 1.3 Employees shall confirm that no jewelry, head-coverings or other items could interfere with the fit and the face is clean shaven where a tight-fitting respirator is required to seal. Any PPE required to be used concurrently with the RPE that could affect the fit of a tight-fitting facepiece shall be utilized during the fit test.
- 1.4 The Employee shall be allowed to pick the most acceptable respirator from a sufficient number of respirator models and sizes so that the respirator is acceptable to, and correctly fits, the Employee.
- 1.5 Prior to the selection process, the Employee shall be shown how to put on a respirator, how it should be positioned on the face, how to set strap tension, and how to determine an acceptable fit. A mirror shall be available to assist the Employee in evaluating the fit and positioning of the respirator. This instruction may not constitute the Employee's formal training on respirator use, because it is only a review.

2.0 Comfort

- 2.1 The Employee shall be instructed to hold each chosen face piece up to the face and to eliminate those that obviously do not give an acceptable fit.
- 2.2 The more acceptable face pieces are noted in case the one selected proves unacceptable; the most comfortable mask is donned and worn at least 5 minutes to assess comfort.
- 2.3 If the Employee is not familiar with using a particular respirator, he/she shall be directed to don the mask several times and to adjust the straps each time to become adept at setting proper tension on the straps.
- 2.4 Assessment of comfort shall include a review of the following points with the Employee and allowing he/she adequate time to determine the comfort of the respirator:
 - Position of the mask on the nose;
 - Room for eye protection;
 - Room to talk; and
 - Position of mask on face and cheeks.

3.0 Fit Test Criteria

- 3.1 The following criteria shall be used to help determine the adequacy of the respirator fit:
 - Chin properly placed;
 - Adequate strap tension, not overly tightened;
 - Fit across nose bridge;
 - Respirator of proper size to span distance from nose to chin;

- Tendency of respirator to slip; and
 - Self-observation in mirror to evaluate fit and respirator position.
- 3.2 The test shall not be conducted if there is any hair growth between the skin and the face piece sealing surface, such as stubble beard growth, beard, moustache, or sideburns that cross the respirator sealing surface. Any type of apparel that interferes with a satisfactory fit shall be altered or removed.
- 3.3 Before conducting the negative and positive pressure checks, the Employee shall be told to seat the mask on the face by moving the head from side to side and up and down slowly while taking in a few slow deep breaths. Another face piece shall be selected and retested if the Employee is unable to seat the mask.
- 3.4 The Employee shall conduct a user seal check, either the negative and positive pressure seal checks described in *S3AM-123-ATT2 User Seal Check* or as recommended by the respirator manufacturer that provide equivalent protection to the procedures in *S3AM-123-ATT2 User Seal Check*.
- 3.5 If an Employee exhibits difficulty in breathing or signs of claustrophobia or anxiety during the tests, she or he shall be referred to a physician or other licensed health care professional, as appropriate, to determine whether the Employee can wear a respirator while performing her or his duties.
- 3.6 If the Employee finds the fit of the respirator unacceptable, the Employee shall be given the opportunity to select a different respirator and to be retested.

4.0 Test Exercise Regimen

- 4.1 Prior to the commencement of the fit test, the Employee shall be given a description of the fit test and their responsibilities during the test procedure. The description of the process shall include a description of the test exercises that will be performed. The respirator to be tested shall be worn for at least 5 minutes before the start of the fit test.
- 4.2 The fit test shall be performed while the Employee is wearing any applicable safety equipment that may be worn during actual respirator use and that could interfere with respirator fit.

5.0 General Test Exercises

- 5.1 The following test exercises are to be performed for all fit testing methods prescribed in this procedure, except for the Controlled Negative Pressure (CNP REDON) method. A separate fit testing exercise regimen is contained in the CNP protocol. The Employee shall perform exercises, in the test environment, in the following manner:
- 5.1.1 **Normal breathing.** In a normal standing position, without talking, the Employee shall breathe normally.
 - 5.1.2 **Deep breathing.** In a normal standing position, the Employee shall breathe slowly and deeply, taking caution so as not to hyperventilate.
 - 5.1.3 **Turning head side to side.** Standing in place, the Employee shall slowly turn his/her head from side to side between the extreme positions on each side. The head shall be held at each extreme momentarily so the Employee can inhale at each side.
 - 5.1.4 **Moving head up and down.** Standing in place, the Employee shall slowly move his/her head up and down. The Employee shall be instructed to inhale in the up position (i.e., when looking toward the ceiling).
 - 5.1.5 **Talking.** The Employee shall talk out loud slowly and loud enough so as to be heard clearly by the test conductor. The Employee can read from a prepared text such as the Rainbow Passage, count backward from 100, or recite a memorized poem or song.
 - Rainbow Passage. "When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch with its path high above and its two ends apparently beyond the

horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond reach, his friends say he is looking for the pot of gold at the end of the rainbow.”

- 5.1.6 **Grimace.** The Employee shall grimace by smiling or frowning. (This applies only to QNFT testing; it is not performed for QLFT.)
- 5.1.7 **Bending over.** The Employee shall bend at the waist as if he/she were to touch his/her toes. Jogging in place shall be substituted for this exercise in those test environments such as shroud-type QNFT or QLFT units that do not permit bending over at the waist.
- 5.1.8 **Normal breathing.** In a normal standing position, without talking, the Employee shall breathe normally (this is the same as the first test).
- 5.2 Each test exercise shall be performed for one minute except for the grimace exercise, which shall be performed for 15 seconds.
- 5.3 The Employee shall be questioned by the test conductor regarding the comfort of the respirator upon completion of the protocol. If it has become unacceptable, another model of respirator shall be tried.
- 5.4 The respirator shall not be adjusted once the fit test exercises begin. Any adjustment voids the test and the fit test shall be repeated.

6.0 Qualitative Fit Test (QLFT) Protocols

6.1 General

- 6.1.1 QLFT test methods have been validated only for a fit factor of 100. A tight-fitting respirator operated in air-purifying (negative-pressure) mode can be tested by QLFT methods to validate a maximum APF of 10.
- 6.1.2 The maximum APF that can be applied for all tight-fitting respirators operated in air-purifying (negative-pressure) mode is 10 when fit tested using a QLFT method.
- 6.1.3 AECOM will confirm that persons administering QLFT are able to calibrate equipment and perform tests properly, recognize invalid tests, and confirm that test equipment is in proper working order.
- 6.1.4 AECOM will confirm that that QLFT equipment is kept clean and well maintained so as to operate within the parameters for which it was designed.

6.2 Irritant Smoke (Stannic Chloride) Protocol

- 6.2.1 This QLFT uses a person's response to the irritating chemicals released in the “smoke” produced by a stannic chloride ventilation smoke tube to detect leakage into the respirator.
- 6.2.2 **General Requirements and Precautions**
 - The test conductor has the option of donning an air purifying respirator to protect himself/herself from the test agent.
 - The respirator to be tested shall be equipped with high-efficiency particulate air (HEPA) or P100 series filter(s).
 - Only stannic chloride smoke tubes shall be used for this protocol.
 - No form of test enclosure or hood for the Employee shall be used.
 - The smoke can be irritating to the eyes, lungs, and nasal passages. The test conductor shall take precautions to minimize the Employee's exposure to irritant smoke. Sensitivity varies, and certain individuals may respond to a greater degree to irritant smoke. Care shall be taken when performing the sensitivity screening checks that determine whether the Employee can detect irritant smoke to use only the minimum amount of smoke necessary to elicit a response from the Employee.

- The fit test shall be performed in an area with adequate ventilation to prevent exposure of the person conducting the fit test or the build-up of irritant smoke in the general atmosphere.

6.2.3 Sensitivity Screening Check

- The Employee to be tested shall demonstrate his or her ability to detect a weak concentration of the irritant smoke.
- The test operator shall break both ends of a ventilation smoke tube containing stannic chloride and attach one end of the smoke tube to a low flow air pump set to deliver 200 milliliters per minute or to an aspirator squeeze bulb. The test operator shall cover the other end of the smoke tube with a short piece of tubing to prevent potential injury from the jagged end of the smoke tube.
- The test operator shall advise the Employee that the smoke can be irritating to the eyes, lungs, and nasal passages and instruct the Employee to keep his/her eyes closed while the test is performed.
- The Employee shall be allowed to smell a weak concentration of the irritant smoke before the respirator is donned to become familiar with its irritating properties and to determine if he/she can detect the irritating properties of the smoke. The test operator shall carefully direct a small amount of the irritant smoke in the Employee's direction to determine that he/she can detect it.

6.2.4 Irritant Smoke Fit Test Procedure

- The Employee being fit tested shall don the respirator without assistance, and perform the required user seal check(s).
- The Employee shall be instructed to keep his/her eyes closed.
- The test operator shall direct the stream of irritant smoke from the smoke tube toward the face seal area of the Employee, using the low-flow pump or the squeeze bulb. The test operator shall begin at least 12 inches from the facepiece and move the smoke stream around the whole perimeter of the mask. The operator shall gradually make two more passes around the perimeter of the mask, moving to within 6 inches of the respirator.
- If the Employee being tested has not had an involuntary response and/or has not detected the irritant smoke, proceed with the test exercises.
- The General Test Exercises shall be performed by the Employee while the respirator seal is being continually challenged by the smoke, directed around the perimeter of the respirator at a distance of 6 inches.
- If the Employee being fit tested reports detecting the irritant smoke at any time, the test is failed. The Employee being retested shall repeat the entire sensitivity check and fit test procedure.
- Each Employee passing the irritant smoke test without evidence of a response (involuntary cough, irritation) shall be given a second sensitivity screening check, with the smoke from the same smoke tube used during the fit test, once the respirator has been removed, to determine whether he/she still reacts to the smoke. Failure to evoke a response shall void the fit test.
- If a response is produced during this second sensitivity check, then the fit test is passed.

6.3 Isoamyl Acetate (IAA, Banana oil) Protocol

6.3.1 This protocol is not appropriate to use for the fit testing of particulate respirators. If used to fit test particulate respirators, the respirator shall be equipped with an organic vapor filter.

6.3.2 General Requirements and Precautions

- As smoke can be irritating to some employees, this test method is preferred to reduce risk of irritation to the employee tested and the person conducting the fit test.

- The screening test shall be conducted in a room separate from the room used for actual fit testing. The two rooms shall be well-ventilated to prevent the odor of IAA from becoming evident in the general room air where testing takes place.
- The mixtures used in the IAA odor detection test shall be prepared in an area separate from where the test is performed, in order to prevent olfactory fatigue in the subject.
- The respirator to be tested shall be equipped with a P100 series filter (for organic vapors).

6.3.3 Sensitivity (Odor threshold) Screening Check

- Odor threshold screening, performed without wearing a respirator, is intended to determine if the individual tested can detect the odor of IAA at low levels.
- Obtain the following supplies required to complete the screening:
 - Three 1 liter glass jars with metal lids
 - Odor-free water (e.g., distilled or spring water) at approximately 25 deg. C (77 deg. F) shall be used for the solutions
- The isoamyl acetate (IAA) (also known as isopentyl acetate) stock solution is prepared by adding 1 ml of pure IAA to 800 ml of odor-free water in a 1 liter jar, closing the lid and shaking for 30 seconds. A new solution shall be prepared at least weekly.
- The odor test solution is prepared in a second jar by placing 0.4 ml of the stock solution into 500 ml of odor-free water using a clean dropper or pipette. The solution shall be shaken for 30 seconds and allowed to stand for two to three minutes so that the IAA concentration above the liquid may reach equilibrium. This solution shall be used for only one day.
- A test blank shall be prepared in a third jar by adding 500 cc of odor-free water.
- The odor test and test blank jar lids shall be labeled (e.g., 1 and 2) for jar identification. Labels shall be placed on the lids so that they can be peeled off periodically and switched to maintain the integrity of the test.
- The employee shall then be asked to sniff each bottle and indicate which bottle contains an odor.
- If the employee is unable to correctly identify the jar containing the odor test solution, the IAA qualitative fit test shall not be performed.

6.3.4 Isoamyl Acetate (IAA, banana oil) Fit Test Procedure

- The fit test chamber shall be a clear 55-gallon drum liner suspended inverted over a 2-foot diameter frame so that the top of the chamber is about 6 inches above the test subject's head. If no drum liner is available, a similar chamber shall be constructed using plastic sheeting. The inside top center of the chamber shall have a small hook attached.
- After successfully completing the odor threshold test and the positive and negative pressure checks, the employee shall don their respirator prior to moving to the fit testing room. This room shall be separate from the room used for odor threshold screening and respirator selection, and shall be well-ventilated, as by an exhaust fan or lab hood, to prevent general room contamination.
- A copy of the prepared text from which the subject is to read may be taped to the inside of the test chamber or should be provided to the employee to hold.
- Upon entering the test chamber, the employee shall be given a 6-inch by 5-inch piece of paper towel, or other porous, absorbent, single-ply material, folded in half and wetted with 0.75 ml of pure IAA. The test subject shall hang the wet towel on the hook at the top of the chamber. An IAA test swab or ampule may be substituted for the IAA wetted paper towel provided it has been demonstrated that the alternative IAA source will generate an IAA test atmosphere with a concentration equivalent to that generated by the paper towel method.
- Allow two minutes for the IAA test concentration to stabilize before starting the fit test exercises. This would be an appropriate time to talk with the test subject; to explain the fit test, the importance of his/her cooperation, and the purpose for the test exercises; or to demonstrate some of the exercises.

- If at any time during the test, the employee detects the banana-like odor of IAA, the test is failed. The employee shall quickly exit from the test chamber and leave the test area to avoid olfactory fatigue.
- If the test is failed, the employee shall return to the selection room and remove the respirator. The employee shall repeat the odor sensitivity test, select and put on another respirator, return to the test area and again begin the fit test procedure described in (b) (1) through (7) above. The process continues until a respirator that fits well has been found. Should the odor sensitivity test be failed, the employee shall wait at least 5 minutes before retesting. Odor sensitivity will usually have returned by this time.
- If the employee passes the test, the efficiency of the test procedure shall be demonstrated by having the subject break the respirator face seal and take a breath before exiting the chamber.
- When the employee leaves the chamber, they shall remove the saturated towel and return it to the person conducting the test, so that there is no significant IAA concentration buildup in the chamber during subsequent tests. The used towels shall be kept in a self-sealing plastic bag to keep the test area from being contaminated.

6.3.5 Other

- Additional Qualitative fit testing methods may be used provided they adequately test breakthrough or leakage of the respirator and testing is conducted according to manufacturer specifications.
- Qualitative fit testing may be conducted using manufacturer supplied hoods or equivalent test enclosures, and nebulizers using suitable fit testing solutions (e.g. sodium saccharin, Bitrex®, etc.).

7.0 Quantitative Fit Test (QNFT) Protocols

7.1 General

- 7.1.1 A quantitative fit test measures the adequacy of a respirator's fit by numerically measuring the amount of leakage into the respirator. A minimum fit factor of 500, and in some cases 1000, is required for a successful quantitative fit test.
- 7.1.2 AECOM will confirm that persons administering QNFT are able to calibrate equipment and perform tests properly, recognize invalid tests, calculate fit factors properly, and confirm that test equipment is in proper working order.
- 7.1.3 Quantitative fit testing is applicable to all tight fitting respirators. Quantitative fit tests (QNFT) are required for all full-face masks and SCBA and multi-functional SCBA air-line configurations.
- 7.1.4 AECOM will confirm that QNFT equipment is kept clean and is maintained and calibrated according to the manufacturer's instructions so as to operate at the parameters for which it was designed.

7.2 Ambient Aerosol Condensation Nuclei Counter (CNC) Quantitative Fit Testing Protocol

- 7.2.1 The ambient aerosol CNC quantitative fit testing (Portacount™) protocol quantitatively fit tests respirators with the use of a probe. The probed respirator is only used for QNFTs. A probed respirator has a special sampling device installed on the respirator to allow the probe to sample the air from inside the mask. A probed respirator is required for each make, style, model, and size that the employer uses and can be obtained from the respirator manufacturer or distributor. The CNC instrument manufacturer, TSI Inc., also provides probe attachments (TSI sampling adapters) that permit fit testing in an Employee's own respirator. A minimum fit factor pass level of at least 100 is necessary for a half-mask respirator, and a minimum fit factor pass level of at least 500 is required for a full facepiece negative pressure respirator. The entire screening and testing procedure shall be explained to the Employee prior to the conduct of the screening test.

7.2.2 Portacount Fit Test Requirements

- Check the respirator to make sure the sampling probe and line are properly attached to the face piece and that the respirator is fitted with a particulate filter capable of preventing

significant penetration by the ambient particles used for the fit test (e.g., National Institute for Occupational Safety and Health, Title 42 Code of Federal Regulations 84 series 100, series 99, or series 95 particulate filter) according to the manufacturer's instructions.

- Instruct the Employee to be tested to don the respirator for 5 minutes before the fit test starts. This purges the ambient particles trapped inside the respirator and permits the wearer to make certain the respirator is comfortable. This Employee shall already have been trained on how to wear the respirator properly.
- Check the following conditions for the adequacy of the respirator fit: chin properly placed; adequate strap tension, not overly tightened; fit across nose bridge; respirator of proper size to span distance from nose to chin; tendency of the respirator to slip; self-observation in a mirror to evaluate fit and respirator position.
- Have the person wearing the respirator do a user seal check. If leakage is detected, determine the cause. If leakage is from a poorly fitting face piece, try another size of the same model respirator, or another model of respirator.
- Follow the manufacturer's instructions for operating the Portacount and proceed with the test.
- The Employee shall be instructed to perform the exercises in General Test Exercises.
- After the test exercises, the Employee shall be questioned by the test conductor regarding the comfort of the respirator upon completion of the protocol. If it has become unacceptable, another model of respirator shall be tried.

7.2.3 **Portacount Test Instrument**

- The Portacount will automatically stop and calculate the overall fit factor for the entire set of exercises. The overall fit factor is what counts. The Pass or Fail message will indicate whether or not the test was successful. If the test was a Pass, the fit test is over.
- Since the pass or fail criterion of the Portacount is Employee programmable, the test operator shall confirm that the pass or fail criterion meet the requirements for minimum respirator performance.
- A record of the test needs to be kept on file, assuming the fit test was successful. The record shall contain the Employee's name; overall fit factor; make, model, style, and size of respirator used; and date tested.

User Seal Check

S3AM-123-ATT2

1.0 Requirements

- 1.1 The Employee who uses a tight-fitting respirator is to perform a user seal check to confirm that an adequate seal is achieved each time the respirator is put on.
- 1.2 Either the positive and negative pressure checks listed here or the respirator manufacturer's recommended user seal check method shall be used.
- 1.3 User seal checks are not substitutes for qualitative or quantitative fit tests.
- 1.4 If either the positive or negative pressure checks fail, do not use the respirator and mark it as out of service.

2.0 Facepiece Positive and/or Negative Pressure Checks

2.1 Positive pressure check

- Close off the exhalation valve and exhale gently into the facepiece.
- If a slight positive pressure can be built up inside the facepiece without any evidence of outward leakage of air at the seal, the face fit is considered satisfactory
- For some respirators, this method of leak testing requires the wearer to first remove the exhalation valve cover before closing off the exhalation valve and then carefully replacing it after the test.

2.2 Negative pressure check

- Close off the inlet opening of the canister or cartridge(s) by covering with the palm of the hand(s) or by replacing the filter seal(s), inhale gently so that the facepiece collapses slightly, and hold your breath for 10 seconds.
- The design of the inlet opening of some cartridges cannot be effectively covered with the palm of the hand. If this is the case, the test can be performed by covering the inlet opening of the cartridge with a thin latex or nitrile glove.
- If the facepiece remains in its slightly collapsed condition and no inward leakage of air is detected, the tightness of the respirator is considered satisfactory.

3.0 Manufacturer's Recommended User Seal Check Procedures

- 3.1 The respirator manufacturer's recommended procedures for performing a user seal check may be used instead of the positive and/or negative pressure check procedures, provided that the employer demonstrates that the manufacturer's procedures are equally effective.

Respirator Cleaning

S3AM-123-ATT3

1.0 Requirements

- 1.1 These procedures are general in nature. The cleaning recommendations provided by the manufacturer for a respirator may be used, provided such procedures are as effective as those listed here.
- 1.2 Equivalent effectiveness simply means that the procedures used must accomplish the objectives set forth (e.g., confirm that the respirator is properly cleaned and disinfected in a manner that prevents damage to the respirator and does not cause harm to the user).

2.0 Procedures for Cleaning Respirators

- 2.1 Remove filters, cartridges, or canisters. Disassemble facepieces by removing speaking diaphragms, demand and pressure-demand valve assemblies, hoses, or any components recommended by the manufacturer. Discard or repair any defective parts.
- 2.2 Wash components in warm (110 degree Fahrenheit [°F]; 43 degree Celsius [°C] maximum) water with a mild detergent or with a cleaner recommended by the manufacturer. A stiff bristle (not wire) brush may be used to facilitate the removal of dirt.
- 2.3 Rinse components thoroughly in clean, warm (110°F [43°C] maximum), preferably running water. Drain.
- 2.4 When the cleaner used does not contain a disinfecting agent, respirator components should be immersed for 2 minutes in one of the following:
 - Hypochlorite solution (50 parts per million [ppm] of chlorine) made by adding approximately one milliliter of laundry bleach to one liter of water at 110°F (43°C); or,
 - Aqueous solution of iodine (50 ppm iodine) made by adding approximately 0.8 milliliters of tincture of iodine (6-8 grams ammonium and/or potassium iodide/100 cc of 45 percent alcohol) to one liter of water at 110°F (43°C); or,
 - Other commercially available cleansers of equivalent disinfectant quality when used as directed, if their use is recommended or approved by the respirator manufacturer.
- 2.5 Rinse components thoroughly in clean, warm (110°F [43°C] maximum), preferably running water. Drain. The importance of thorough rinsing cannot be overemphasized. Detergents or disinfectants that dry on facepieces may result in dermatitis. In addition, some disinfectants may cause deterioration of rubber or corrosion of metal parts if not completely removed.
- 2.6 Components should be hand dried with a clean, lint-free cloth or air dried.
- 2.7 Reassemble facepiece, replacing filters, cartridges, and canisters where necessary.
- 2.8 Test the respirator to ensure that all components work properly.
- 2.9 After the fit test, wipe down the respirator with a sanitary swab.
- 2.10 Store the respirator according to manufacturer recommendations (e.g., away from direct sunlight, in a proper container to maintain cleanliness, etc.).

Americas

Respiratory Equipment Fit Test

S3AM-123-FM1

Date of Testing:		Respirator Type(s):	
Employee Name:		Respirator Model & Size:	
Method & Testing Agent:			
Corrective lenses needed: <input type="checkbox"/> Yes <input type="checkbox"/> No			
Is the employee medically qualified to wear a respirator? <input type="checkbox"/> Yes <input type="checkbox"/> No Date of last medical exam (if applicable):			
Is the employee trained on the fundamental principles of respiratory protection, use, selection, inspection, cleaning, maintenance, and storage of equipment? <input type="checkbox"/> Yes <input type="checkbox"/> No			
Test Exercise		Test Exercise	
Sensitivity Check	<input type="checkbox"/> Pass <input type="checkbox"/> Fail	Normal Breathing	<input type="checkbox"/> Pass <input type="checkbox"/> Fail
Deep Breathing	<input type="checkbox"/> Pass <input type="checkbox"/> Fail	Turning Head (side to side)	<input type="checkbox"/> Pass <input type="checkbox"/> Fail
Moving Head (up/down)	<input type="checkbox"/> Pass <input type="checkbox"/> Fail	Rainbow Passage*	<input type="checkbox"/> Pass <input type="checkbox"/> Fail
Bending Over	<input type="checkbox"/> Pass <input type="checkbox"/> Fail	Normal Breathing	<input type="checkbox"/> Pass <input type="checkbox"/> Fail
Successful Respirator Fit Determined: <input type="checkbox"/> Yes <input type="checkbox"/> No			
I certify that I have been tested with the respirator(s) listed above. I have also had the opportunity to ask questions and those questions have been answered to my satisfaction. I also understand that the above fit test is voided if respirator limitations are not followed or the respirator is not worn or if conditions (e.g., facial hair) prevent a good face seal.			
Employee Signature:		Date:	
Signature of Tester:		Date:	

***Rainbow Passage.** "When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch with its path high above and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond reach, his friends say he is looking for the pot of gold at the end of the rainbow."

Americas

Voluntary Use of Respirators

S3AM-123-FM2

Instructions: An employee that is opting to use a respirator for non-overexposure conditions shall read this page, and then sign on the bottom of the page. A copy shall be maintained in the employee's training file.

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for employees. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the employee.

Sometimes employees may wear respirators to avoid exposures to hazards, even if the amount of the hazardous substance does not exceed the limits set by regulatory standards. Voluntary masks may be used for nuisance dust, pollen, and sometimes noxious odors. If your employer provides respirators for your own voluntary use, or if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not pose a hazard.

1. Read and follow all instructions provided by the manufacture on use, maintenance, cleaning, and care, and warnings regarding the respirators limitations.
2. Choose respirators certified for use to protect against the contaminant of concern. A label or statement of certification should appear on the respirator or respirator packaging; it will tell you what the respirator is designed for and how it will protect you. "The National Institute for Occupational Safety and Health (NIOSH) certifies respirators in the U.S and Canada."
3. Do not wear your respirator into atmospheres containing contaminants against which your respirator is not designed to protect. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, fumes, smoke, or very small solid particles.
4. Keep track of your respirator so that you do not mistakenly use someone else's respirator.
5. If you have any health conditions (e.g., asthma; high blood pressure; emphysema; heart disease, etc.) that could be aggravated by using a respirator, you should check with your doctor before using one.

I have read and understand this information:

Date: _____

Employee's Name (Please Print):

Employee's Signature:

Americas

Respiratory Equipment Inspection

S3AM-123-FM3

Date:		Inspected by:		
Serial #:				
Examine Face Piece for:		N/A	Pass	Fail
Excessive dirt		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cracks, tears, holes, or distortion from improper storage		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inflexibility (stretch and massage to restore flexibility)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cracked or badly scratched lenses in full facepieces		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Incorrectly mounted full facepiece lens or broken or missing mounting clips		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lens sealed properly in receptacle, retaining clamp secured		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cracked / broken air-purifying element holder(s), badly worn threads, missing gasket(s)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Examine the Head Straps or Head Harness for:				
Breaks		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Loss of elasticity		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Broken or malfunctioning buckles and attachments		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Excessively worn serrations on head harness that might permit slippage (full facepieces only)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tears in headband at cradle attachment		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Examine the Inhalation and Exhalation Valves for:				
Foreign material, such as detergent residue, dust particles, or human hair under the valve seat		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cracks, tears, or distortion in the valve material		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Proper insertion of the valve body in the facepiece		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cracks, breaks, or chips in the valve body, particularly in the sealing surface		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Proper installation of the valve in the valve body		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Missing or defective valve cover		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Examine the Air Purifying Elements for:				
Incorrect cartridge, canister, or filter for the hazard		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Incorrect installation, loose connection, missing / worn gaskets, cross-threading in the holder		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cracks or dents on the outside case of the filter, cartridges or canister, indicated by the absence of sealing material, tape, foil, etc. over the inlet		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Expired shelf life date on cartridge or canister		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Examine PAPR, SCBA and Escape Bottles for:				
Damage or wear evident on the regulator or hoses		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cylinder pitted, dented or otherwise damaged		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cylinder / tank certified to the standard of applicable jurisdiction, hydrostatic test current		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Defects Noted:				
Unit Deemed Suitable for Use		<input type="checkbox"/> Yes	<input type="checkbox"/> No	

1.0 Purpose and Scope

- 1.1 This procedure applies to all AECOM Americas-based employees and operations where corrosive and/or reactive materials are used or stored.
- 1.2 The purpose of this procedure is to protect employees from the hazards of corrosive and reactive materials. This procedure considers a corrosive material as one that has a pH less than 2.0 (acid), or greater than 12.5 (base). A reactive material is a chemical that may be sensitive to shock, or may react with air or water depending upon its makeup.

2.0 Terms and Definitions

- 2.1 None

3.0 References

- 3.1 S3AM-115-PR1 Hazardous Materials Communication
- 3.2 S3AM-116-PR1 Hazardous Materials Shipping
- 3.3 S3AM-123-PR1 Respiratory Protection
- 3.4 S3AM-208-PR1 Personal Protective Equipment

4.0 Procedure

- 4.1 Implementation of this procedure is the responsibility of the Manager directing activities of the facility, site, or project location.
- 4.2 Appoint a responsible person who will:
 - 4.2.1 Inspect storage areas periodically.
 - 4.2.2 Monitor the quantity of corrosive and reactive materials on site, as well as that of incoming materials.
 - 4.2.3 Review work practices that involve corrosive and reactive materials.
- 4.3 Require that all employees working with corrosive or reactive materials, or who may be exposed to such materials, are trained in accordance with *S3AM-115-PR1 – Hazardous Materials Communication*.
- 4.4 Control the use of corrosive and reactive materials by AECOM personnel.
 - 4.4.1 Order only those materials and quantities that are needed to complete a job.
 - 4.4.2 Check incoming corrosive and reactive materials for proper labeling in accordance with *S3AM-115-PR1 Hazardous Materials Communication*.
 - Label materials, if needed, as they arrive on site.
 - Mark reactive materials containers with the date of receipt of the chemical.
 - 4.4.3 Check incoming corrosive and reactive materials for safety data sheets (SDS). If SDSs are not provided or are already on file, order them from the manufacturer, distributor, or vendor.
 - 4.4.4 Add incoming corrosive and reactive chemicals to the hazardous materials inventory, if not already present, following procedures set forth in *S3AM-115-PR1 Hazardous Materials Communication*.

- 4.4.5 Do not store any quantity of corrosive or reactive materials in an office (with the exception of limited quantities of consumer products). These materials are to be stored off site, or at an on-site laboratory or storage area.
- 4.5 Store corrosive and reactive materials as indicated in the MSDS:
 - 4.5.1 In a cool, dry environment, free from extremes of temperature and humidity.
 - 4.5.2 In a manner that separates them from other materials (including flammables and oxidizers) and from each other.
 - Separate acids and bases.
 - Separate reactive materials from acids and bases, and protect from contact with water.
 - 4.5.3 On materials that are acid-resistant (Teflon-coated, plastic, etc.) for small containers.
 - 4.5.4 Covered, not stacked on one another, on acid-resistant material for carboys (approximately 5 gallons/22 liters).
 - 4.5.5 On individual racks or securely blocked on skids, with closure (plug) facing upward to prevent leakage from drums.
- 4.6 Require that labeling and signage are in place.
 - 4.6.1 Label containers with the appropriate warning word to indicate the hazard, such as: DANGER; WARNING; CAUTION; CORROSIVE; OXIDIZER.
- 4.7 Use corrosive and reactive materials appropriately.
 - 4.7.1 Prior to use and in accordance with MSDS, safe-handling procedures shall be developed for each operation, and type and concentration of the chemical. In all cases, review the MSDS and product information before use.
 - 4.7.2 Follow *S3AM-208-PR1 Personal Protective Equipment* when working with or around corrosive and reactive materials. Review the MSDS for the chemical used to determine the specific type of PPE needed, to include at a minimum:
 - Chemical-splash goggles
 - Chemical-resistant gloves
 - Chemical-resistant apron
 - 4.7.3 Obtain medical care immediately in the event of:
 - Skin or eye exposure (e.g., splash) to corrosive liquids
 - Inhalation of vapors of corrosive liquids that cause respiratory discomfort.
 - 4.7.4 Require an eyewash station to be located in all areas where acids or bases are used. Safety showers shall be nearby if significant acid or base quantities are involved.
 - Place emergency eyewashes and showers in accessible locations that require no more than 10 seconds to reach, and are in a travel distance no greater than 25 feet (7.5 meters) from the hazard.
 - Keep the areas surrounding eyewashes and safety showers free of stored materials or debris at all times.
 - Mark emergency eyewashes and showers with a highly visible sign.
 - Require the area around emergency eyewashes and showers to be well lighted and visible.
 - Where portable eyewash units are used, a process shall be in place to change the water and clean the unit, as required by the manufacturer's instructions.
 - Require emergency showers and shower/eyewash combinations connected to a self-contained water supply to deliver a minimum 20 gallons (85 liters) per minute for 15 minutes.

- Require emergency showers and shower/eyewash combinations permanently connected to a potable water supply to deliver at least 30 gallons (127.5 liters) per minute continuously.
 - Require emergency eyewashes to be capable of delivering to the eyes not less than 0.4 gallon (1.5 liters) per minute for 15 minutes.
- 4.8 Be prepared to clean up spills of corrosive and reactive materials.
- 4.8.1 Have a written spill response plan in place before materials are stored on site.
- 4.8.2 Have commercial spill kits available for cleanup of small quantities of materials. At a minimum, kits should contain appropriate protective clothing (including full-body suits, gloves, and boots) and spill control equipment (including absorbents, pillows, shovels, containers, etc.).
- 4.8.3 Where necessary, confirm that appropriate respiratory protection equipment is provided to spill responders. For additional information, see *S3AM-123-PR1 Respiratory Protection*.
- 4.8.4 Clean up or respond to spills promptly.
- 4.8.5 Confirm that personnel responding to a spill have been trained in the hazards associated with the spilled material, as well as use of the spill control equipment, including PPE required for the task.
- 4.8.6 Do not use combustible organic materials such as sawdust, excelsior, wood chips and shavings, paper, rags, or burlap bags to absorb or clean up spills.
- 4.9 Develop a waste management plan and procedures, including procedures for collection, storage, labeling, pick-up and transport, and final disposal.
- 4.10 Dispose of corrosive and reactive materials appropriately.
- 4.10.1 Segregate organic acids, inorganic acids, and basic wastes.
- 4.10.2 Contract hazardous waste disposal services should be obtained, as necessary, to dispose of waste materials. All waste shall be appropriately packaged for off-site transportation, if applicable.
- 4.10.3 Wastes shall be marked, labeled, and shipped in accordance with regulatory requirements. For additional information, see *S3AM-116-PR1 Hazardous Materials Shipping*.
- 4.11 Inspect corrosive and reactive storage and use areas periodically.
- 4.11.1 Inspect office, laboratory, and project settings quarterly.
- 4.11.2 Use the inspection sheet provided as *S3AM-125-FM1 Corrosive & Reactive Materials Inspection* or equivalent, to inspect sites.

5.0 Records

The following information will be maintained in the location or project file:

- 5.1 Completed Corrosive and Reactive Material Inspection Sheets.
- 5.2 Worker Right-to-Know training documentation.
- 5.3 Written Spill Response Plan.
- 5.4 Waste Management Plan.
- 5.5 Documentation of training for spill response personnel.
- 5.6 Documentation of hazard communication training for personnel exposed to corrosive and/or reactive materials.

6.0 Attachments

- 6.1 [S3AM-125-FM1 Corrosive & Reactive Materials Inspection](#)

Americas

Corrosive & Reactive Materials Inspection

S3NA-125-FM1

Location: _____**Name of Inspector:** _____**Date Inspected:** _____**Labeling**

1. Original containers are labeled with: ☐ Yes ☐ No ☐ NA
- Name of chemical
 - Signal word (e.g., DANGER; WARNING; CAUTION, etc.)
 - Manufacturer

Pre-Job Activities

2. Corrosives and reactives are stored in a cool, dry environment, free from temperature extremes ☐ Yes ☐ No ☐ NA
3. Corrosives and reactives are stored in their properly labeled original containers, cushioned against shock, and stored to prevent leaks ☐ Yes ☐ No ☐ NA
4. Corrosives are not stored in the vicinity of oxidizers ☐ Yes ☐ No ☐ NA
5. Hydrofluoric acid is stored only in acid-proof polyethylene- or ceresin-lined containers ☐ Yes ☐ No ☐ NA
6. Corrosives are stored on acid-resistant material ☐ Yes ☐ No ☐ NA
7. Chromic acid, nitric acid, perchloric acid, and potassium permanganate (all oxidizers) are stored separately from other corrosives and flammables ☐ Yes ☐ No ☐ NA

Handling

8. The following minimum required PPE is used when working with corrosives: ☐ Yes ☐ No ☐ NA
- Chemical splash goggles
 - Chemical resistant gloves
 - Chemical resistant apron
9. Bottles or carboys are opened slowly to guard from splashes. ☐ Yes ☐ No ☐ NA
10. The outside of the container is washed off with water after use to clean off any droplets of material. ☐ Yes ☐ No ☐ NA
11. An eyewash is located in all areas where corrosives are used. ☐ Yes ☐ No ☐ NA
12. An eyewash is: ☐ Yes ☐ No ☐ NA
- Within 25 feet (7.62 meters) or 10 seconds of travel ☐ Yes ☐ No ☐ NA
 - Marked with a highly visible sign ☐ Yes ☐ No ☐ NA
 - Well lit and visible ☐ Yes ☐ No ☐ NA
 - Working and delivering a minimum of 1.5 liters of water per minute for 15 minutes ☐ Yes ☐ No ☐ NA
13. Where substantial quantities of corrosives and/or reactives are stored, access to an emergency shower is available. ☐ Yes ☐ No ☐ NA
14. Spill control materials compatible with chemicals are available for emergency use. ☐ Yes ☐ No ☐ NA

Waste Disposal

15. Organic acid, inorganic acid, and basic waste are kept segregated. ☐ Yes ☐ No ☐ NA
16. Corrosive waste is disposed in accordance with regulatory and client requirements. ☐ Yes ☐ No ☐ NA
17. A waste management plan or procedure is in place. ☐ Yes ☐ No ☐ NA
18. Arrangements for waste collection, transport, and disposal are in place. ☐ Yes ☐ No ☐ NA

Comments: _____

1.0 Purpose and Scope

- 1.1 This procedure applies to the operations of AECOM and its subsidiary companies where employees may be exposed to airborne concentrations of hazardous air contaminants potentially exceeding permissible limits. Note that this standard does not cover monitoring for asbestos operations (S3AM-109-PR1), toxic and hazardous substances (S3AM-110-PR1), radiation (S3AM-120-PR1), non-ionizing radiation (S3AM-121-PR1), confined spaces (S3AM-301-PR1), heat stress (S3AM-113-PR1), or noise (S3AM-118-PR1).
- 1.2 The purpose of this procedure is to assist and provide guidance to AECOM personnel who need to conduct personal industrial hygiene monitoring. Monitoring will be conducted to evaluate the potential exposure of AECOM employees to airborne concentrations of hazardous particulates, fibers, gases, vapors, mists, pathogens, hazardous biological agents, or to oxygen-deficient atmospheres.
- 1.3 Personal monitoring shall be conducted under the following conditions:
- 1.3.1 Where directed by a facility or site-specific health and safety plan.
 - 1.3.2 Where employees are exposed to known or suspected human carcinogens (e.g., beryllium, vinyl chloride, etc.).
 - 1.3.3 Where regulations require "initial exposure assessments" (e.g., lead, asbestos, methylene chloride, hexavalent chromium). Certain regulations allow for an exemption to initial exposure assessments when exposure monitoring of similar exposure groups has been conducted under the same site conditions and for equivalent tasks within 1 year prior to the start of work on the current project or site.
 - 1.3.4 When directed by a client or required by contract.
 - 1.3.5 At the direction of a Safety Manager in response to employee concerns or incidents involving chemical exposure.
 - 1.3.6 Co-sampling during regulatory inspections.
 - 1.3.7 Routine monitoring in compliance with regulatory requirements.

2.0 Terms and Definitions

- 2.1 **Action Level (AL)** – An airborne concentration of a potentially toxic or hazardous substance, measured in parts per million by volume (ppm), microgram per cubic meter ($\mu\text{g}/\text{m}^3$) milligram per cubic meter (mg/m^3) or fibres per cubic centimetre (f/cc), that triggers certain provisions as required by the applicable jurisdictional legislation. In many cases the action level is 50% of the established exposure limit.
- 2.2 **Established Exposure Limit** – The maximum regulatory exposure concentration to which an individual may be exposed to for an 8- hour time weighted average (TWA).
- This limit is referred to by different terminology depending upon the given jurisdiction (e.g. Permissible Exposure Limit (PEL), Contamination Limit, Occupational Exposure Limit (OEL), Threshold Limit Value (TLV), etc.).

Acceptable methods of adjusting this limit to correspond to a different exposure period (e.g. 10 hours) vary by jurisdiction and substance

3.0 References

- 3.1 S3AM-109-PR1 Asbestos
- 3.2 S3AM-301-PR1 Confined Spaces

- 3.3 S3AM-113-PR1 Heat Stress
- 3.4 S3AM-118-PR1 Hearing Conservation
- 3.5 S3AM-123-PR1 Respiratory Protection
- 3.6 S3AM-110-PR1 Toxic & Hazardous Substances

4.0 Procedure

- 4.1 Implementation of this standard is the responsibility of the AECOM manager directing activities of the facility, site, or project location.
- 4.2 Procedures for Personal Industrial Hygiene Monitoring
 - 4.2.1 Personal industrial hygiene monitoring documentation shall include accurate and detailed process descriptions of the work activities that each employee being monitored is conducting to evidence monitoring results are tied to the work operations conducted. This permits demonstration that suggested corrective actions are appropriate or adequate to control the exposure.
 - 4.2.2 Maintain, service, and calibrate sampling equipment in accordance with the manufacturer's recommendations and, as applicable, the approved sampling methodology (may include both pre- and post-calibration to confirm consistent flow rates).
 - 4.2.3 Collect samples using current applicable methodologies established by either the National Institute for Occupational Safety and Health (NIOSH) *Manual of Analytical Methods*, U.S. Department of Labor – Occupational Safety and Health Administration (OSHA) *Sampling and Analytical Methods*, or applicable guidelines for the host country.
 - 4.2.4 Select an analytical laboratory accredited by the American Industrial Hygiene Association (AIHA), or equivalent host country certification, licensing, or accreditation, to analyze the personal air samples.
Note: There are several programs under which a laboratory may receive AIHA accreditation. The laboratory shall be currently accredited for the specific program, scope category, and field of testing for the analysis that will be performed, not merely hold AIHA accreditation.
 - 4.2.5 Confirm samples are submitted to the laboratory for analysis in a timely manner to confirm sample viability.
 - 4.2.6 Require the selected laboratory to use the applicable analytical methodologies and document quality control procedures.
 - 4.2.7 Confirm equipment is maintained, serviced, and calibrated in accordance with manufacturer's recommendations.
 - 4.2.8 Document personal monitoring activities and work operations using the appropriate AECOM Industrial Hygiene Monitoring Form; require that all laboratory chain-of-custody forms be properly completed; and confirm samples are sealed and secured according to Quality Assurance procedures.
 - 4.2.9 Confirm workers are being protected (e.g., engineering controls, administrative controls, and PPE, including respiratory protection) during the monitoring phase. Refer to *S3AM-123-PR1 Respiratory Protection* and *S3AM-208-PR1 Personal Protective Equipment*.
 - 4.2.10 Determine whether medical surveillance is required. Refer to jurisdictional requirements and *S3AM-128-PR1 Medical Screening & Surveillance*.
- 4.3 Evaluation of Personal Monitoring Results
 - 4.3.1 Samples sent out for independent laboratory analysis will follow chain of custody requirements.
 - 4.3.2 An AECOM Certified Industrial Hygienist (CIH) approved by a Safety Manager should evaluate the analytical results when feasible.

- 4.3.3 Obtain a written evaluation report from the SH&E manager. If exposures exceed the Action Level and/or Established Exposure Limit for the air contaminant(s) of concern, a verbal report is to be made to the senior facility, project, or site manager immediately, and follow up with the written report within any established timeframe. The evaluation report will include required corrective actions.
- 4.3.4 Complete evaluation reports within 5 working days of the receipt of the analytical results.
- 4.3.5 Results of all personal exposure monitoring will be provided to the SH&E department for inclusion in the employee medical records, refer to *S3AM-017-PR1 Injury & Illness Recordkeeping*.
- 4.4 Procedures for Direct-Read Air Monitoring
 - 4.4.1 Direct-read air monitoring instruments are used primarily as screening tools to provide real-time evaluations of hazardous airborne contaminants at a project site.
 - 4.4.2 Select an appropriate air monitor for the air contaminant to be measured.
 - 4.4.3 Calibrate monitor in accordance with manufacturer's recommendations. Dates of full instrument calibration will be recorded on the direct-read instrument and on any associated calibration data sheets. If instrument calibrations are not performed daily, then daily bump tests (exposure to a known concentration of contaminant) will be performed to verify calibration and confirm alarms are working appropriately.
 - 4.4.4 Conduct air monitoring using techniques identified by the instrument manufacturer and according to any identified methods (e.g. NIOSH, EPA, etc.).
 - 4.4.5 Confirm equipment is maintained, serviced, and calibrated in accordance with manufacturer's recommendations.
 - 4.4.6 Document personal monitoring activities using the appropriate AECOM Industrial Hygiene Monitoring Form.
 - 4.4.7 Confirm workers are being protected (e.g., engineering controls, administrative controls, and PPE, including respiratory protection) during the monitoring phase. Determine whether medical surveillance is required.
 - 4.4.8 Where required by client request or by unique or high hazard areas, individual portable direct-read monitors shall be used.
- 4.5 Evaluation of Personal Monitoring Results
 - 4.5.1 Compare measured results with project-specific Action Levels and/or published Established Exposure Limits. If exposures exceed the Action Level and/or Established Exposure Limit for the air contaminant(s) of concern, take corrective actions as identified in the site-specific SH&E plan. If the SH&E Plan did not account for the identified hazard, or where questions exist about the results, contact the SH&E Manager to evaluate the analytical results for appropriate corrective action (this may involve consultation with a Certified Industrial Hygienist). The SH&E Plan should be updated accordingly.
- 4.6 Communication of Sample Results and Evaluation
 - 4.6.1 Provide copies of the evaluation report to the employee(s) monitored and to employees working in the area for which the exposures could be representative, within 5 days of receipt of lab results.
 - 4.6.2 Exposure results will be posted on site and explained in a safety briefing.
 - 4.6.3 Provide a copy of the evaluation report and monitoring data to the manager directing activities of the facility or site for filing purposes.
 - 4.6.4 Personal identifiers (e.g., name, address, employee number) or information which could reasonably be used to identify specific employees (e.g., exact age, height, weight, race, sex, date of initial

employment, job title), shall be removed from analysis reports before access to the exposure data is provided.

4.7 Corrective Actions

- 4.7.1 Implement required corrective actions immediately.
- 4.7.2 If the exposure hazard cannot be eliminated or otherwise controlled through the use of engineering controls, the reason shall be documented and suitable administrative controls and personal protective equipment requirements developed.
- 4.7.3 Workers who may be exposed above the Established Exposure Limit or Action Limit, shall be appropriately trained and wear respiratory protection in accordance with *S3AM-123-PR1 – Respiratory Protection Program*.

4.8 Exposure Records

- 4.8.1 Exposure records include work activities / process descriptions, workplace monitoring, biological monitoring, material safety data sheets and chemical inventories. Sampling results, the collection methodology (sampling plan), a description of the analytical and mathematical methods used, and a summary of other background data relevant to interpretation of the results obtained, shall be retained for at least thirty (30) years.

5.0 Records

The following documents will be maintained in the project profile:

- 5.1 Calibration data.
- 5.2 Completed IH Monitoring Form(s).
- 5.3 Evaluation Report with sample results (provide copy to affected employee as well).
- 5.4 Corrective actions, including engineering controls.
- 5.5 Relevant prior initial exposure assessments.

6.0 Attachments

- 6.1 [S3AM-127-FM1 General Industrial Hygiene Survey](#)
- 6.2 [S3AM-127-FM2 Industrial Hygiene Sample Field Sheet](#)
- 6.3 [S3AM-127-FM3 Total Dust Industrial Hygiene Sample Field Sheet](#)
- 6.4 [S3AM-127-FM4 Respirable Dust Industrial Hygiene Sample Summary](#)
- 6.5 [S3AM-127-FM5 Detector Tube Industrial Hygiene Sample Summary](#)
- 6.6 [S3AM-127-FM6 Gas/Vapor/Fume/Mist Industrial Hygiene Sample Summary](#)
- 6.7 [S3AM-127-FM7 Toxic Gas Monitor Industrial Hygiene Sample Summary](#)
- 6.8 [S3AM-127-FM8 PID/FID Monitoring Report](#)
- 6.9 [S3AM-127-FM9 Industrial Hygiene Evaluation Form](#)
- 6.10 [S3AM-127-FM10 Instrument Calibration Log](#)

Americas

General Industrial Hygiene Survey

S3AM-127-FM1

Location: _____ Prepared By: _____ Date Prepared: _____ Page _____ of _____

Job Description	No. of Hours Per Day Worked On This Job	Dust, Fume, or Mists	Control Methods	Gases	Vapors	Other	Control Methods	Noise	Control Methods	Radiation, UV Vibration, IR, etc.	Control Methods	Comments

Americas

Industrial Hygiene Sample Field Sheet

S3AM-127-FM2

Sample ID

Date: _____

Hazardous Air Contaminant(s): _____

Site: _____ Sample I.D. No. _____

Person Sampled or Area: _____ Employee No. _____

Job Title/Job #: _____ Job/Area: _____

Sample Type

Cyclone ☐ Impactor ☐ Impinger ☐ Type: _____ Other: _____

Personal ☐ Area ☐ Resp. Dust ☐ Total Dust ☐ Other: _____

Sample ID:	Pump Type:	Pump No:	Other Info:
Cassette/ Media No:	Time On:	Time Off:	Total Time (min):
Filter Type:	(Date) Annual Calibration:	Calibrator Model:	Calibrator Serial No:
Initial Flow/ Reading:	Final Flow/ Reading:	Avg. Flow/ Reading:	Volume:
Sample ID:	Pump Type:	Pump No:	Other Info:
Cassette/ Media No:	Time On:	Time Off:	Total Time (min):
Filter Type:	(Date) Annual Calibration:	Calibrator Model:	Calibrator Serial No:
Initial Flow/ Reading:	Final Flow/ Reading:	Avg. Flow/ Reading:	Volume:
Sample ID:	Pump Type:	Pump No:	Other Info:
Cassette/ Media No:	Time On:	Time Off:	Total Time (min):
Filter Type:	(Date) Annual Calibration:	Calibrator Model:	Calibrator Serial No:
Initial Flow/ Reading:	Final Flow/ Reading:	Avg. Flow/ Reading:	Volume:
Sample ID:	Pump Type:	Pump No:	Other Info:
Cassette/ Media No:	Time On:	Time Off:	Total Time (min):
Filter Type:	(Date) Annual Calibration:	Calibrator Model:	Calibrator Serial No:
Initial Flow/ Reading:	Final Flow/ Reading:	Avg. Flow/ Reading:	Volume:
Sample ID:	Pump Type:	Pump No:	Other Info:
Cassette/ Media No:	Time On:	Time Off:	Total Time (min):
Filter Type:	(Date) Annual Calibration:	Calibrator Model:	Calibrator Serial No:
Initial Flow/ Reading:	Final Flow/ Reading:	Avg. Flow/ Reading:	Volume:

Workplace Conditions

Operations: Normal ☐ Abnormal ☐ Explain _____

Respirator Use: Type _____ % of Time Worn _____

Ventilation: Type _____

Normal ☐ Abnormal ☐ Explain _____

Weather Conditions

Approximate Temperature: _____ °F _____ °C

Sky: Precipitation ☐ Cloudy ☐ Partly Cloudy ☐ Clear ☐

Wind: Calm ☐ Light ☐ Medium ☐ High ☐

Work Description/Comments:

Scheduled Hours per Shift: _____

Special Handling Instructions:

Laboratory Information

Laboratory Name: _____ Date Sent: _____ Results Rec'd (Date): _____

Sampled By (print): _____ **Signature:** _____

S3AM-127-FM3

Date Prepared: _____ **Area:** _____ **Location:** _____ **Per Shift:** _____

[illegible]

Americas

Respirable Dust Industrial Hygiene Sample

S3AM-127-FM4

HAZARDOUS AIR CONTAMINANT (HAC) IN DUST: _____ Page _____ of _____

IDENTIFICATION

SAMPLE TYPE

Exposure Limit: _____ : DUST _____ mg/m³
(identify jurisdiction)

Cyclone
Sampler Type

Prepared By: _____ Personal: _____

ACGIH TLV: DUST _____ mg/m³

Date Prepared: _____ Area: _____ Location: _____ Scheduled Hours
Per Shift: _____

Date	Name or Area	Job Class	Resp Type	Pump Type	Time		Sam Time (min)	Flow (LPM)	Vol (L)	Filter Wt.		HAC %	Concentration		Shift TWA		% PEL or % TLV	
Sample No.	Employee No.	Equipment	% Use	ID No.	On	Off				Dust mg	HAC mg		Dust mg/m ³	HAC mg/m ³	Dust mg/m ³	HAC mg/m ³	Dust mg/m ³	HAC mg/m ³

Americas

Detector Tube Industrial Hygiene Sample Summary

S3AM-127-FM5

GAS/VAPOR:

Page of

IDENTIFICATION

EXPOSURE LIMIT

SAMPLE TYPE

Prepared By: _____ Date: _____ Basis: ACGIH TLV _____ or jurisdiction _____

Area

DETECTOR TUBE

Location: **Personal**

Brand: Type:

Survey

Batch No.: _____ Exp. Date: _____

Sequential

Pump Type: _____ **Serial No.:** _____ **Scheduled Hours Per Shift:** _____ **Leak Test** Yes ☐ No ☐

[illegible]

S3AM-127-FM6

SAMPLE DEVICE

Page of

Brand: **Type:** **Batch No.:** **Exp. Date:**

IDENTIFICATION

SAMPLE TYPE

Prepared By: _____ Personal: _____ Location: _____

Date Prepared: _____ **Area:** _____ **Scheduled Hours Per Shift:** _____

Date	Name or Area	Job Class	Resp Type	Pump Type	Time		Sample Time (min)	Flow (LPM)	Vol (m³)	Lab Results	Air Concentration	Shift TWA	Exposure Limit (PEL/ OEL / TLV, etc.)	% Exp. Limit	Hazardous Air Contaminant
Sample No.	Employee No.	Location	% Use	ID No.	On	Off									

Americas

Toxic Gas Monitor Industrial Hygiene Sample Summary

S3AM-127-FM7

ESTABLISHED EXPOSURE LIMITS

WORKPLACE CONDITIONS

Page _____ of _____

Gas tested for: _____ Gas tested for: _____ Site: _____

Shift TWA: _____ Shift TWA: _____ Operations: Normal ☐ Not Normal ☐ Explain _____

Ceiling: _____ Ceiling: _____ Ventilation Type: _____

STEL: _____ STEL: _____ Normal ☐ Not Normal ☐ Explain _____

ACGIH ☐ ☐ ACGIH ☐ ☐ _____ Serial No.: _____

(ACGIH or identify jurisdiction)

Date	Location	Resp Type	Weather	Gas:			Oxygen %	Gas:			LEL %	Time (Hr)	Comments
Sampled By	Conditions	% Use		Real Time	Shift TWA %TLV/OEL/PEL, etc.	STEL %TLV/OEL/PEL, etc.		Real Time	Shift TWA %TLV/OEL/PEL, etc.	STEL %TLV/OEL/PEL, etc.			

Americas

PID/FID Monitoring Report

S3AM-127-FM8

Location: _____ Page _____ of _____

Prepared By: _____ Calibration: _____

Model: _____ Span Gas: _____ Lamp Voltage: _____

Serial No.: _____ Zero Gas: _____

Date	Location and Conditions	Event No.	Sample Time hour: min	Min (ppm)	AVG (ppm)	Max (ppm)	Alarm		Comments
							Level (ppm)	Status	

Americas

Industrial Hygiene Surveillance Evaluation Form

S3AM-127-FM9

Location Information (Complete separate form with all information for each location)			
Project/Site Name:		U.S. /Canadian Site Code: _____	Date: ____ / ____ / ____
Site Address: _____		Additional Information:	
City: _____	State/Prov. _____	Zip/Post Code _____	
Manager:		SH&E Representative:	

Evaluation Questions: Selecting "Needs Further Evaluation" means that additional assistance is requested / needed beyond site resources.	Yes	No	Needs Further Evaluation	Comments:
The following questions assess employee health and medical surveillance factors (in accordance with Company and Regulatory Requirements). Please answer thoroughly and accurately. All AECOM worksites are subject to local regulations, AECOM SH&E Procedures and any additional customer/client procedures.				
Respiratory Protection				
1 Review S3AM-123-PR1 and complete the form 'Identifying When A Respirator is Needed' and attach to this evaluation.	<input type="checkbox"/> Completed and Attached			
2 Do you have any dust masks, half- or full face respirators, SCBA, or supplied air respirators?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3 Does <u>any</u> employee wear dust masks or respirators on a voluntary basis or perform <u>any</u> work that requires them to wear dust masks or respirators?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4 Are employees who wear dust masks or respirators medically cleared for respirator use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5 Person responsible for and location of medical clearance records:				
6 Are employees who wear dust masks or respirators properly fit tested? Fit tests include qualitative or quantitative fit testing conducted in accordance with specified protocols.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7 Person responsible for and location of fit-test records:				
General Respiratory Hazards (or General Work Processes Potentially Creating Respiratory Hazards)				
8 Does any employee conduct work activities that require hand sanding, powered (air or electric) sanding or grinding, expendable abrasives, using a media blast cabinet or booth, or similar?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
9 Does any employee perform welding activities, such as, MIG or TIG, electric arc welding, acetylene torch, plasma arc, or cleanup of areas where these activities are performed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Evaluation Questions: Selecting "Needs Further Evaluation" means that additional assistance is requested / needed beyond site resources.		Yes	No	Needs Further Evaluation	Comments:
10	Does any employee perform parts cleaning, chemical surface cleaning, or chemical stripping?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
11	Does any employee perform or work near touch-up painting, spray painting (in or out of a paint booth), use paint thinner, ketones, toluene, or any other solvents?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
12	Does any employee perform or work near plating or electroplating operations that use any form of cyanide solution?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Specific Respiratory Hazards					
13	Cadmium – is not addressed in a specific procedure. Please review site-specific SDSs or site knowledge prior to completing this section	<input type="checkbox"/> SDSs and Site Knowledge Reviewed (e.g., site history, environmental data)			
14	Does any employee perform work activities involving cadmium containing -metals or paints that generates dust, fumes or other fine particles? Any work activities involving demolition or salvaging structures, or waste management including recycling?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
15	Chromium – is addressed in S3AM-110-PR1. Please review the procedure prior to completing this section.	<input type="checkbox"/> S3AM-110-PR1 Reviewed			
16	Does any employee perform work activities involving chromium VI (hexavalent chromium) containing -metals or paints that generates dust, other fine particles, or mists?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
17	Asbestos is addressed in S3AM-109-PR1. Please review the procedure prior to completing this section.	<input type="checkbox"/> S3AM-109-PR1Reviewed			
18	Are there any asbestos-containing materials (ACM) or presumed asbestos-containing materials (PACM) at your site?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
19	Do any employees perform intrusive work with asbestos (i.e., sampling, demolition, abatement, etc.)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
20	If ACM or PACM has been identified at the site, is there a designated competent person?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
21	Asbestos Competent Person contact information:				
22	Lead - is addressed in S3AM-110-PR1. Please review the procedure prior to completing this section.	<input type="checkbox"/> S3AM-110-PR1 Reviewed			
23	Do any employees perform scraping, sanding, painting, application, power tool cleaning, lead burning, riveting, or working with collection systems that involve lead containing materials?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
24	Silica - is addressed in S3AM-110-PR1. Please review the procedure prior to completing this section.	<input type="checkbox"/> S3AM-110-PR1 Reviewed			

Evaluation Questions: Selecting "Needs Further Evaluation" means that additional assistance is requested / needed beyond site resources.		Yes	No	Needs Further Evaluation	Comments:	
25	Does any employee perform work on silica-containing materials that generates dust or other fine particles?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
26	Other Specific Substances - are addressed in S3AM-115-PR1, S3AM-125-PR1, and S3AM-126-PR1. Please review the procedures prior to completing this section.	<input type="checkbox"/>	S3AM-115-PR1, S3AM-125-PR1, and S3AM-126-PR1 Reviewed			
27	Mark all of the following products/chemicals that any employees work with or are exposed to: <div style="display: flex; flex-wrap: wrap;"> <div style="width: 33%;"><input type="checkbox"/> Cotton Dust</div> <div style="width: 33%;"><input type="checkbox"/> Xylene</div> <div style="width: 33%;"><input type="checkbox"/> Mould</div> <div style="width: 33%;"><input type="checkbox"/> Coke Oven Emissions</div> <div style="width: 33%;"><input type="checkbox"/> Ethylene Oxide</div> <div style="width: 33%;"><input type="checkbox"/> Vinyl Chloride</div> <div style="width: 33%;"><input type="checkbox"/> Acrylonitrile</div> <div style="width: 33%;"><input type="checkbox"/> 1,2-Dibromo-3-chloropropane</div> <div style="width: 33%;"><input type="checkbox"/> Arsenic</div> <div style="width: 33%;"><input type="checkbox"/> Ethylbenzene</div> <div style="width: 33%;"><input type="checkbox"/> Benzene</div> <div style="width: 33%;"><input type="checkbox"/> Formaldehyde</div> <div style="width: 33%;"><input type="checkbox"/> Butadiene</div> <div style="width: 33%;"><input type="checkbox"/> Methylenedianiline</div> <div style="width: 33%;"><input type="checkbox"/> Methylene Chloride</div> <div style="width: 33%;"><input type="checkbox"/> Suspected Carcinogens</div> <div style="width: 33%;"><input type="checkbox"/> Pesticides/Fungicides / Herbicides</div> <div style="width: 33%;"><input type="checkbox"/> Other</div> <div style="width: 33%;"><input type="checkbox"/> Other</div> </div>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Non-Ionizing and Ionizing Radiation						
Non-Ionizing Radiation – addressed in S3AM-121-PR1.		<input type="checkbox"/>	S3AM-121-PR1 Reviewed			
28	Do any employees work with lasers?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
29	Do any employees work with radiofrequency sealers?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
30	Do any employees work with or near any other devices that actively emit radiofrequency radiation, (e.g., radar systems, high energy microwave systems, etc.)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
31	Ionizing Radiation - is addressed in S3AM-120-PR1 and S3AM-122-PR1. Please review the procedure prior to completing this section.	<input type="checkbox"/>	S3AM-120-PR1 and S3AM-122-PR1 Reviewed			
32	Are employees exposed to ionizing radiation from sources other than a sealed source (e.g., uranium mill tailings)? If yes, are any of the employees on the site classified as a radiation worker?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If yes, identify Radiation Safety Officer (RSO).	
33	Do we possess, control, or use any ionizing radiation sources or devices that generate radiation (e.g., XRF) and/or do we have any employees who transport gauges or sources in vehicles or ship them via air/common carrier?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If yes, identify Radiation Safety Officer (RSO).	
Biohazards						
34	Bloodborne Pathogens/Biohazards - are addressed in S3AM-111-PR1 and S3AM-313-PR1. Please review the procedure prior to completing this section.	<input type="checkbox"/>	S3AM-111-PR1 and S3AM-313-PR1 Reviewed			

Evaluation Questions: Selecting "Needs Further Evaluation" means that additional assistance is requested / needed beyond site resources.		Yes	No	Needs Further Evaluation	Comments:
35	Are any employees required to work with or be potentially exposed to bloodborne pathogens or biohazards (e.g., pathogenic organisms) as part of their job?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Other Potential Exposure Hazards					
36	Are there any other hazardous substances, chemicals, or other sources present in the workplace that could create employee exposure at unsafe levels that were not listed above?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Air Monitoring					
37	Has air monitoring for any potential hazardous substances been done within the last 3 years?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
38	If "Yes" to Question 37, were any substances found above established action or exposure limits?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
39	Person responsible for and location of air monitoring records:				
Waste Operations & Remediation					
40	Hazardous Waste Operations – S3AM-117-PR1. Please review the procedure prior to completing this section.	<input type="checkbox"/> S3AM-117-PR1 Reviewed			
41	Do any employees perform remediation construction activities, field construction sampling, or supervise activities at hazardous waste remediation sites or hazardous waste treatment, storage, or disposal (TSD) facilities in which the employee could be exposed to hazardous substances above permissible exposure levels (e.g., work in exclusion zones)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
42	If Yes, how many days per year?	<input type="checkbox"/> 1-29 Days/year <input type="checkbox"/> 30+ Days/year			
Field & Laboratory					
43	Do any employees work in a chemistry laboratory 30 or more days/year?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
44	Do any employees work on a pilot plant project 30 or more days/year?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
45	Do any employees conduct bench scale chemical operations 30 or more days/year?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Hearing/Noise					
46	Hearing/Noise – is addressed in S3AM-118-PR1. Please review the procedure prior to completing this section.	<input type="checkbox"/> S3AM-118-PR1 Reviewed			
47	Are <u>any</u> employees at any time working around operating machinery or other noisy conditions (loud enough to affect normal conversation)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
48	Is there any intermittent/occasional high noise levels at your work site (as loud as or louder than a chain saw)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Evaluation Questions: Selecting "Needs Further Evaluation" means that additional assistance is requested / needed beyond site resources.		Yes	No	Needs Further Evaluation	Comments:
49	Has noise level monitoring or noise dosimetry been performed within the last 3 years?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
50	Is any hearing protection provided or worn at your work site (ear plugs and/or ear muffs)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
51	Do noise levels equal or exceed an 8-hour time-weighted average of 85 dBA (ceiling of 140dBC) for any employees or subcontractors?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
52	Person responsible for and location of noise level monitoring or dosimetry records:				
53	If "Yes" to Question 50, Is annual training provided to every affected employee? (Training should include the effects of noise, purpose of hearing protectors, selection, fitting, care and use of hearing protectors, and include demonstration of proper use of hearing protection if used).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
54	If "Yes" to Question 50, are annual hearing tests performed on any of the employees at your work site related to noise exposure?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
55	Person responsible for and location of hearing test (audiometry) records :				
Employment Physicals					
56	DOT Physicals - are addressed in S3AM-128-PR1. Please review the procedure before completing this section.	<input type="checkbox"/> S3AM-128-PR1 Reviewed			
57	Do any employees drive a truck with a gross vehicle weight rating of 10,000 pound or more?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
58	Are any employees contractually required to have a DOT exam?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
59	Specific Chemical Hazards – Will employees be exposures to specific chemical hazards (e.g., lead, asbestos, benzene) that will be required as part of an employment physical?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
60	Flight Physical - Are any employees required to obtain a FAA flight physical?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
International Work					
61	Are any employees required to work outside the United States for more than 30 days/yr.?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Diving Operations					
62	Diving – is addressed in S3AM-334-PR1. Please review the procedure prior to completing this section.	<input type="checkbox"/> S3AM-334-PR1 Reviewed			
63	Are any employees performing diving operations?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Anticipated Changes or Future Risks:	Yes	No	Needs Further Evaluation	Comments:
Do you anticipate any changes in work activities or conditions within the next 12 months that could affect the above answers of this questionnaire?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Description:				

Additional Information & Comments:
Information & Comments:

Action Items:
Interim/Immediate Actions:
1.
2.
3.
4.
Long Term Actions:
1.
2.
3.
4.

Completed By:		
Name	Signature	Date
_____	_____	_____
Comments:		

Americas

Instrument Calibration Log

S3AM-127-FM10

Instrument Information	
Instrument Name:	Manufacturer:
Serial Number:	Last Service Date:
Parameter(s):	Calibration Gas:
Calibration Procedure:	
Daily Calibration Results	
Date:	Calibration Result:
Name:	Signature:
Notes:	
Date:	Calibration Result:
Name:	Signature:
Notes:	
Date:	Calibration Result:
Name:	Signature:
Notes:	
Date:	Calibration Result:
Name:	Signature:
Notes:	
Date:	Calibration Result:
Name:	Signature:
Notes:	

Project:

Job No.:

Date:

Operator:

Instrument:

Calibration:

Medical Screening & Surveillance

S3AM-128-PR1

1.0 Purpose and Scope

- 1.1 Provides a streamlined process to determine if employees meet the physical requirements to perform assigned duties as defined by applicable regulations.
- 1.2 Designed to provide a means to collect data relevant to exposure to chemical and physical agents for the protection of the workers and to confirm the effectiveness of health and safety programs.
- 1.3 Applies to all AECOM Americas employees and operations.

2.0 Terms and Definitions

- 2.1 **Employee Exposure Record** - A record containing any of the following kinds of information:
 - Environmental (workplace) monitoring or measuring of a toxic substance or harmful physical agent, including personal, area, grab, wipe or other form of sampling, as well as related collection and analytical methodologies, calculations and other background data relevant to interpretation of the results obtained.
 - Biological monitoring results which directly assess the absorption of a toxic substance or harmful physical agent by body systems (e.g., the level of a chemical in the blood, urine, breath, etc.), but not including results which assess the biological effect of a substance or agent or which assess an employee's use of alcohol or drugs.
 - Safety data sheets indicating that the material may pose a hazard to human health.
 - In the absence of the above, a chemical inventory or any other record which reveals where and when used and the identity (e.g., chemical, common, or trade name) of a toxic substance of harmful physical agent
- 2.2 **Medical Director** – A physician, board-certified in occupational medicine, employed by the Medical Services Provider (MSP). The Medical Director manages the services provided by the MSP and provides to AECOM guidance on medical matters.
- 2.3 **Medical Services Provider (MSP)** – Manages all occupational medical services, including medical surveillance programs, travel medicine, documentation, and injury intervention for first aid support for employees with occupational injuries or illnesses.
- 2.4 **Participating Employee** – Those employees required to participate in the medical screening and surveillance program will be identified by the Supervisor, Operations and SH&E Manager. Medical surveillance is required for employees who are or may be:
 - Exposed to substances at or above the occupational exposure limits.
 - Required to participate by regulatory provisions (e.g., asbestos, lead OSHA standards, designated substances).
 - Fit-tested for or wearing a respirator in the field.
 - Working on sites/projects with specific state, provincial/territorial or federal medical surveillance requirements.
 - Driving a commercial motor vehicle.
 - Performing safety sensitive tasks.

- 2.5 **Physical Activity Restriction** – To prevent aggravation of an existing condition, the Medical Doctor recommends a physical activity restriction to limit exposure to a chemical or class of chemicals (e.g., benzene, lead), a physical agent (e.g., noise), or an activity (e.g., heavy lifting).
- 2.6 **Safety Sensitive** – A task or position is designated as safety sensitive when the task or position is such that an action would endanger the lives of others. Examples, but not a complete list, of positions that may be designated “safety-sensitive” by regulations include:
- Drivers of Commercial Motor Vehicles (CMV)
 - Workers on pipelines carrying fuels or toxic or corrosive substances
 - Workers at nuclear power plants
 - Employees that operate Nuclear Regulatory Commission -regulated devices (nuclear density gauges)
 - Operators of industrial mobile equipment, including: cranes of more than 6,000-pound capacity, forklifts, loaders, etc.
 - Laboratory technicians working with hazardous substances

3.0 References

- 3.1 S3AM-214-PR1 International Travel

4.0 Procedure

4.1 Roles and Responsibilities

4.1.1 Employees

- Ensuring that he/she maintains a current work clearance as required for the performance of assigned work duties.
- All employees designated to participate, called Participating Employees, in the medical surveillance program as a condition of employment or participate voluntarily and will be notified in advance if they will be assigned to a location, project or client which requires a Medical Surveillance and Surveillance program.
- If employee knows or suspects that he/she may have an adverse reaction to completing elements of the physical, (such as blood draws, physical limitation, etc.) then the employee should notify the MSP at the time they schedule the physical so that appropriate safeguards may be taken to protect the health of the employee.
- Communicate any change in medical condition (e.g. medications, pregnancy), to MSP to allow for evaluation of the need for additional precautions.

4.1.2 Supervisors and Operations Managers

- Evaluates the duties of each employee and prospective employee reporting to him or her for potential participation in the medical screening and surveillance program.
- Responsible for ensuring that the employee is enrolled in the medical screening and surveillance program if the employee’s position requires participation. Consult with a SH&E Manager if assistance is needed in determining if an employee is required to participate in the program.
- Assures employees in positions that require medical surveillance in order to meet their job description may not be on site until they have satisfactorily completed the baseline or pre-employment medical examination.

4.1.3 Safety, Health, & Environment (SH&E) Department

- Serves as the primary point of contact between the employee, employee’s supervisor, the MSP and the SH&E Department.
- Provides information regarding medical surveillance documentation, forms, and scheduling of

services.

- Maintains a medical surveillance database and other associated documents (medical records are maintained by the MSP).
- Assists employees with scheduling of exams with the MSP.
- Participates in initial SH&E training and subsequent reviews and updates that will provide guidance on exam protocols.

4.1.4 **SH&E Manager**

- Reviews employee assignments with managers to ensure that all employees who should be participating in the medical surveillance program have been enrolled.
- Provides all assistance necessary to ensure all required information is provided to the Medical Director.
- Report any change in requirements, protocols or concerns with the MSP to the Occupational Health Manager.

4.1.5 **Occupational Health Manager**

- Provide the MSP with appropriate references (e.g., a copy of this procedure, regulations).
- Designate other employees to participate in certain parameters of the medical screening and surveillance program after consultation with the Medical Director.

4.1.6 **Medical Director**

- Requires an exposure-specific examination when he/she has reason.
- Determine the frequency of the exposure-specific medical examinations.
- Consults with the Occupational Health Manager.

4.2 General Requirements

- 4.2.1 All AECOM employees whose work assignments involve potential exposure to harmful chemical and/or physical agents should participate in the medical surveillance program. Guidance as to harmful potential exposures is presented in *S3AM-128-FM1 Medical Surveillance Evaluation (MSE)*. The form provides the primary guidance for determining whether medical screening is required for an employee and the frequency of periodic exams. The MSE is to be completed by the employee and his/her supervisor at the time of hire for any employee who may work outside an office environment. At each annual performance review, the MSE is to be reviewed for accuracy. Other reviews are required whenever there is a change in job tasks.
- 4.2.2 In addition, employees may be requested to participate in the medical surveillance program if they perform a task that requires an assessment for fitness for duty (e.g., lifting, climbing, etc.). The Supervisor, Operations Manager and SH&E Manager will identify activities/tasks that will require fit-for-duty assessments.
- 4.2.3 Medical screening and surveillance will only be performed where required by regulatory requirements or this procedure. Screening and surveillance provided at no cost to employees.
- 4.2.4 For medical screening and surveillance related to international travel, refer to *S3AM-214-PR1 International Travel*.

4.3 Types of Medical Examinations

The medical surveillance program consists of the following types of examinations:

- Baseline (initial)
 - The baseline medical examination is used to identify physical capabilities and medical limitations that may have an impact on the candidate's ability to perform in the position for which he/she is being considered and to provide a baseline against which periodic or project-specific monitoring can be compared. The baseline medical examination is used to determine the suitability of an

existing employee for a new assignment (pre-placement) or a candidate's suitability to be hired (pre-employment) for a particular position.

- Periodic (annual or biennial)
 - The periodic medical examination is used to evaluate an employee's continued fitness for duty and to assess any impact occupational exposures may have on his/her health status. The periodic examination includes an update to the medical and work history, results of any occupational exposure assessments and a detailed medical examination tailored to the job description.
 - The SH&E Manager will assist in determining the frequency of the periodic medical examinations based on regulatory requirements, the position held by the employee, and the level of exposure to physical, chemical, and biological agents.
 - Employees performing work activities on HAZWOPER sites will receive exams based on the following schedule:

Annual	Working in an exclusion zone and the regulatory required exposure limit is exceeded for 30 or more days a year.
Biennial	Working in an exclusion zone more than 30 days a year and the regulatory required exposure limit is not exceeded.

- Exposure-specific
 - The exposure-specific examination consists of medical tests to assess the impact of occupational exposures associated with a particular activity or project. The Medical Director or SH&E Manager will require an exposure-specific examination when he/she has reason to believe occupational exposures are impacting or may be impacting the health of an employee.
- Exit/termination
 - Employees currently participating in an examination program will receive exit exams when they leave their work assignment as identified in *S3AM-128-ATT1 Exit Exam Determination*. In the event an employee declines the exit exam, the employee will be requested to sign *S3AM-128-FM2 Waiver of Exit Medical Surveillance Exam*.
 - An exit medical examination is offered when an employee leaves the medical surveillance program, either because of termination of employment with AECOM or because of reassignment to a position not designated to participate in the medical surveillance program or if conditions in the workplace no longer constitutes the need for the medical surveillance (e.g., change in product).
 - The exit examination assesses any impact occupational exposures may have had on the employee's health status.

4.4 Exam Protocols

4.4.1 *S3AM-128-ATT2 Exam Protocol* identifies the medical exam components of exam.

4.4.2 The evaluation will be confidential and provided during normal business hours. Employees will be offered the opportunity to discuss the results of the evaluation with the MSP. All exam results are considered personal and confidential information, and will not be stored in any unsecured records not transmitted without the employee's permission.

4.5 Participating Employee Guidance and Documentation

4.5.1 When necessary, based on the position being filled, the hiring Supervisor and Human Resources Representative informs the candidate that the offer of employment is contingent on the candidate being physically and medically qualified to perform the duties of the position for which he/she is being hired. The hiring Supervisor and Human Resources Representative may not allow the candidate to begin employment until the conditions of the offer letter have been satisfied.

4.5.2 When designated to participate in the medical surveillance program, the Employee completes and signs the following documents:

- Medical and Work History Questionnaire (provided by the MSP).

- Medical Records Release authorizing MSP to receive the work clearance certificate.
- 4.5.3 Any Employee that has not completed the required medical evaluation after 30 days of an expiration date will be issued a non-qualified statement. The Employee is not permitted to perform the associated task and/or work until the required medical evaluation is completed and a qualified statement is issued by the Medical Director.
- 4.5.4 If an exam becomes due during an employee's pregnancy, it is advised to defer the exam until after delivery and the employee returns to work from family/medical leave status.
- 4.5.5 Human Resources Representative
- Notifies the SH&E Manager or designee to arrange for exit medical examination, upon notification of termination or impending termination from the Supervisor. In the event an employee declines the exit exam, the employee will be requested to sign *S3AM-128-FM2 Waiver of Exit Medical Surveillance Exam*.
 - Place the original waiver in the employee's Human Resources personnel file and send a copy to the MSP.
- 4.5.6 Medical Services Provider (MSP)
- Provides notification approximately 30 days before subsequent periodic or exposure-specific medical examination is due.
 - Notify the employee 30 days before the periodic or exposure-specific medical examination is due.
 - Provides notification of delinquent medical examinations.
- 4.5.7 Operations Manager
- Facilitate the management and exchange of documentation regarding the medical screening and surveillance program between AECOM (typically employee's supervisor) and MSP using the *S3AM-128-FM3 Scheduling Request Form*. If exams for multiple employees is required, the information from page 1 of the Scheduling Request Form and the requested exams can be placed in a spreadsheet and sent to the MSP.
 - Schedule the initial exam for newly hired or re-assigned employees as needed. Special requests should be coordinated with the SH&E Manager, prior to contacting MSP to schedule.
 - Assist employees with scheduling examinations as necessary.
 - Coordinate medical surveillance program information exchange between Human Resources Representative and the MSP as necessary.
 - Notify the candidate's manager and Human Resources upon receipt of the work clearance.
 - Provide information from previous examinations that may not be readily available.
- 4.5.8 SH&E Manager
- Provides such assistance as is requested by the hiring Supervisor to ensure the job description for the position being filled adequately describes the physical, chemical, and biological stresses of the position, and the PPE used or which may be used, including respiratory protection.
 - Provides all necessary assistance to ensure that required and appropriate information is provided with the request and authorization for medical examination.
 - Provides assistance to the hiring Supervisor to interpret physical activity restrictions if such restrictions are noted on the work clearance certificate.
 - Confirms that all relevant exposure assessments have been appropriately annotated to show the applicability to the employee and forwarded to the MSP.

- Confirms that employees on the delinquent medical examination list have been removed from designated assignments.
- Provides assistance to ensure that terminating and reassigned employees are offered the opportunity to take an exit medical examination.

4.5.9 Supervisor

- Arranges work assignments so that the employee is available to take the medical examination before the work clearance certificate expires.
- Removes the employee from the work assignment before the work clearance certificate expires until the medical evaluation is completed and a qualified statement is issued by the Medical Director.
- Contacts the Human Resources Representative, upon notification of termination or reassignment and requests they arrange for the MSP to perform an exit medical examination.
- Releases the terminating or reassigned employee from duties as necessary to complete the exit medical examination.

4.6 Reports

4.6.1 Report of Examination

- The MSP provides AECOM and the employee with a copy of the work clearance certificate, which will include any medical restrictions and address the employee's ability to use personal protective equipment. AECOM requires the employee to preserve the work clearance certificate in a safe place and provide copies to AECOM managers and clients when requested.
- The MSP will mail a confidential letter detailing the results of the exam to the employee's home address within 30 days of the exam date.

4.6.2 Examinations Due Report

- The MSP produces a list by organization code of employees due to be examined 30 days before the expiration of their work clearance certificate. This list is provided to SH&E Department, who ensures each Supervisor is notified of the employees in his/her charge who are due examinations so they may be scheduled appropriately.
- The MSP notifies each employee via email or phone to the office of record 30 days before the periodic or exposure-specific medical examination is due.

4.6.3 Delinquent Examinations Report

- The MSP distributes a report of delinquent medical examinations to the SH&E Department.
- When an employee's name appears on the delinquent examination report for two consecutive months, the SH&E Department must notify the SH&E Manager, who will bring this to the attention of the employee's Supervisor for resolution. If the delinquency issue is not resolved, the employee's regional management will be notified for final resolution.

4.6.4 Physical Activity Restriction Report

- The Supervisor maintains a list of employees who have physical activity restrictions.
- The SH&E Manager shall evaluate locations and projects periodically to ensure employees with physical activity restrictions are not exceeding their limitations. Concerns of an employee exceeding his/her physical activity restriction is brought to the attention of the employee's Supervisor for resolution.

4.6.5 Annual Reports

- The MSP provides annual reports of utilization, medical trends, and statistical analyses. These reports are prepared to improve the service, manage trends, and reduce the cost of the

medical screening and surveillance program.

5.0 Records

- 5.1 Employees who participate in a medical surveillance or physical examination program or had exposure monitoring conducted will have access to all employee exposure and medical records maintained for that employee by AECOM and the MSP.
- 5.2 Upon an employee entering into a medical surveillance or physical examination program, the employee shall be informed of the following:
 - The existence, location and availability of any records covered by this procedure
 - The MSP responsible for maintaining and providing access to records and
 - The employee's right of access to these confidential records.
- 5.3 Employees in medical monitoring programs are notified initially and annually thereafter, of the existence, location and ability to access medical records maintained by the MSP. Upon request, each employee (or designated representative) will have access to the employee's medical records. Prior to the release of health information to the employee (or designated representative), a specific written consent must be signed by the employee. Records will be provided in a reasonable time and manner at no cost to the employee.
- 5.4 Medical records must be preserved and protected in accordance with applicable legislative requirements for the duration of employment plus 30 years, verify local, state or federal regulations to confirm time period. Medical records contain information that is protected by the Privacy Act. To meet the obligations of preserving the medical records and protecting the information they contain, AECOM has arranged for the MSP to manage the medical records.
- 5.5 An employee or designated representative may request to review his/her medical. Such a request must be in writing and be signed and dated. The SH&E Manager or the SH&E Department will forward the request to the MSP, who will provide the employee with a copy of the medical records.

The MSP provides employees with a copy of their results after each physical. If employee would like a copy of their historical records, the MSP will supply the copy within 15 days after the request has been submitted by the employee or designated representative.
- 5.6 MSP performs quality control checks on all medical records to ensure examining physicians appropriately record the findings of the examination and tests.

The MSP has access to all medical records to perform quality assurance checks to ensure proper recording and preservation
- 5.7 Projects that use local clinics or employer/client clinics may store records at that site, but at the termination of the project, all employee medical records must be transferred to long-term record retention.
- 5.8 If in the event AECOM ceases operations, medical records will be transferred to the successor employer. If no successor employer is available, records will be transferred to the National Institute for Occupational Safety and Health.

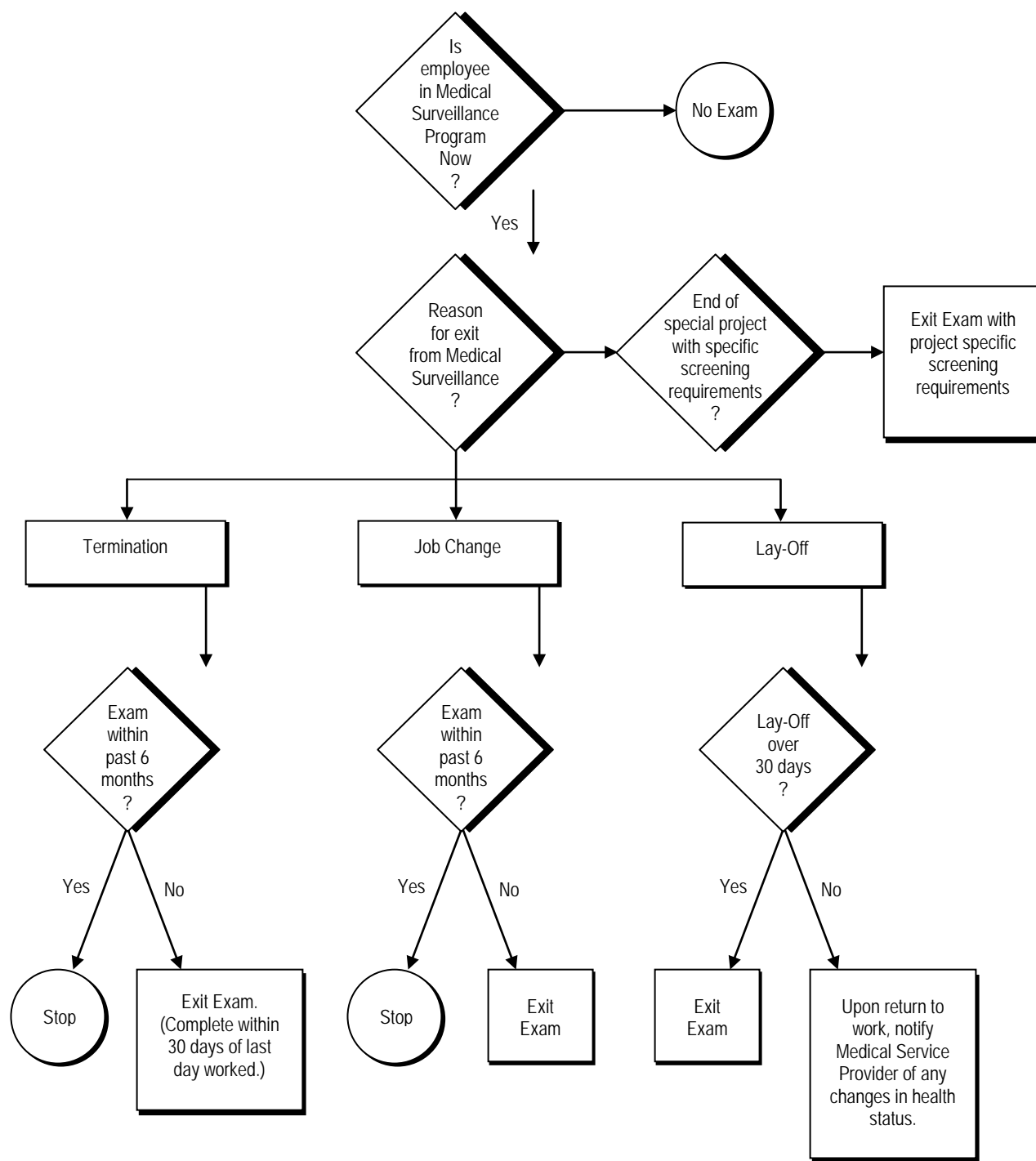
6.0 Attachments

- 6.1 [S3AM-128-ATT1](#) [Exit Exam Determination](#)
- 6.2 [S3AM-128-ATT2](#) [Exam Protocols](#)
- 6.3 [S3AM-128-FM1](#) [Medical Surveillance Evaluation](#)
- 6.4 [S3AM-128-FM2](#) [Waiver of Exit Medical Surveillance Exam](#)
- 6.5 [S3AM-128-FM3](#) [Scheduling Request Form](#)
- 6.6 [S3AM-128-FM4](#) [Waiver of Medical Screening & Surveillance Program](#)

Americas

Exit Exam Determination

S3NA-128-ATT1



Note: Exit exams from Medical Service Provider or previous employer may be used for review as an AECOM baseline exam if completed within the past 3 months. A *WorkCare* Medical History Questionnaire is completed by the employee and submitted with a copy of the previous exam for physician review and approval.

Americas

Exam Protocols

S3NA-128-ATT2

PROTOCOL	HAZWOPER (Baseline or Preassignment Baseline)	HAZWOPER (Annual or Biennial)	HAZWOPER (Exit)	DIVING (Baseline and Biennial)	DOT Driver Certification (Baseline and Biennial)	ASBESTOS (Baseline, Annual, and Exit)	SILICA (Baseline and Biennial)	RESPIRATOR (Baseline and Biennial)
Medical History & Respiratory Questionnaire	X	X	X	X	X	X	X	X
Medical Exam	X	X	X	X	X	X	X	If indicated by questionnaire
Physical Exam (height, weight, pulse, oral temperature, blood pressure)	X	X	X	X	X	X	X	
Vision	X	X	X	X	X	X	X	
Urinalysis	X	X	X	X	X		X	
Audiogram (hearing test)	X	X	X	X	X	If indicated by project noise levels	X	
Spirometry (pulmonary function test)	X	X	X	X		X	X	Every 2 years
Electrocardiogram (EKG)								
< Age 40				Every 2 years				
Age < or = 50	X	Every 4 years		X			Every 4 years	
Age 50+	X	Every 2 years		X			Every 2 years	
Chest x-ray (one view)								
Age < or = 50	X	Every 4 years	If symptomatic or due on periodic	X		Baseline and every 5 years per 1910.1001	Baseline and Annual if 20+ years of silica exposure or Biennial if <20 years silica exposure	
Age 50+	X	Every 2 years	If symptomatic or due on periodic	X		Baseline and every 2-5 years per 1910.1001		
B-reader						X	X	
Complete Blood Count with White Cell Differential	X	X	X	X			X	
Blood Chemistry Panel	X	X	X	X			X	
Other				Sickle Cell (Baseline) Treadmill Stress Test (Baseline & Biennial after age 40)		OSHA Asbestos Questionnaire (Initial/Periodic)	OSHA Silica Questionnaire (Initial/Periodic) TB Skin Test (MSHA regulated sites)	

Americas

Exam Protocols

S3NA-128-ATT2

Note: Additional entry, periodic, and exit biological monitoring or toxicological screening may be indicated in the project-specific health and safety plan. Examples include; blood lead/ZPP, serum/RBC cholinesterase, urine heavy metals (arsenic, cadmium, mercury, chromium, or beryllium), urine radiation (thorium, uranium), biological vaccinations (hepatitis A/B, tetanus), blood benzene, blood beryllium LPT, etc. Substance abuse testing is not included in the medical screening and surveillance program. Please consult the business-specific substance abuse testing program for more information.

PROTOCOL	Hearing Conservation (Annual)	Cadmium (Annual/Exit)	Hexavalent Chromium (Annual/Exit)	Engine Run (Biennial)	Fuel Cell (Annual)	Ground Physical (Every 5 years)	Flight Deck Critical/Non-Critical (Annual)	Flight Deck Critical (Annual)
Medical History & Respiratory Questionnaire		X	X	X	X	X	X	X
Medical Exam		X	X	X	X	X	X	X
Physical Exam (height, weight, pulse, oral temperature, blood pressure)		X	X	X	X	X	X	X
Vision				X	X		X (near/far/depth)	X (Near/far/col or/depth)
Urinalysis		X		x	X			
Audiogram (hearing test)	X			X	X		X	
Spirometry (pulmonary function test)		X	X		X			
Electrocardiogram (EKG)								
< Age 40								
Age < or = 50				X				Age >40
Age 50+				X				
Chest x-ray (one view)								
Age < or = 50				X				
Age 50+				X				
B-reader								
Complete Blood Count with White Cell Differential					X			
Blood Chemistry Panel		X			X			Lipid panel if age >40
Other	Hearing Conservation Questionnaire	Cadmium Panel	Urine Chromium					Ordinance Questionnaire, Drug Screen Tonometry after 40 years of age and if indicated by exam, MD to sign Ordinance card

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Exam Protocols

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PROTOCOL	CRANE OPERATOR (Annual)	AIR TRAFFIC CONTROLLER (Annual)	CDF ORDINANCE Physicals (Annual)	NAVAL ORDINANCE Physicals (biennial)	LASER EYE EXAM	FORKLIFT Physicals (every 3 years)
Medical History & Respiratory Questionnaire	X	X	X	X		X
Medical Exam	X	X	X	X		X
Physical Exam (height, weight, pulse, oral temperature, blood pressure)	X	X	X	X		X
Vision	X (near/far/color/ depth)	X	x	X		X (visual acuity, color, depth, perception and peripheral fields)
Urinalysis	X					X
Audiogram (hearing test)	X	X	X			X
Spirometry (pulmonary function test)			X			X
Electrocardiogram (EKG)						
< Age 40		Baseline only	X			X
Age < or = 50			X	>40		X
Age 50+			X			X
Chest x-ray (one view)						
Age < or = 50		Baseline only	Baseline/exit			
Age 50+			X			
B-reader						
Complete Blood Count with White Cell Differential			X			
Blood Chemistry Panel			X	Lipid panel if age >40		X
Other	Hearing Conservation Questionnaire	Waist circumference Fasting blood sugar, drug screen	Ordinance PPE eval (work in heat), pupil size and reactivity	Ordinance Questionnaire, Drug Screen Tonometry after 40 years of age and if indicated by exam, MD to sign Ordinance card	Retinal Mapping	

Americas

Medical Surveillance Evaluation

S3AM-128-FM1

This information will be used to determine routine medical screening exams for employees who work outside of an office setting. In addition, site-specific health and safety plans may specify project-related medical surveillance for regulated substances.

Please answer each entry:

Date:	_____
Name:	_____
Phone #:	_____
Employee #:	_____
Job Title:	_____
Location:	_____
Business Group:	_____
Business Unit:	_____
Supervisor:	_____
SH&E Manager:	_____

Choose One:

- ☐ New employee
 ☐ Current employee with job change
 ☐ Transfer from _____

The following questions assess medical screenings and surveillance requirements:

Respirator	<input type="checkbox"/> Yes <input type="checkbox"/> No	Does your job require you to wear a respirator or to be certified for respirator use? If yes, how many days per year? <input type="checkbox"/> 1–29 <input type="checkbox"/> 30+
Hearing	<input type="checkbox"/> Yes <input type="checkbox"/> No	Does your job require you to wear hearing protection because you: a) Work in an environment where noise levels equal or exceed an 8-hour time-weighted average of 85 decibels? b) Perform construction activities or work on a construction site around heavy equipment more than 50 percent of the time?
Asbestos	<input type="checkbox"/> Yes <input type="checkbox"/> No	Do you perform intrusive work with asbestos (i.e., sampling, demolition, etc.)?
Silica	<input type="checkbox"/> Yes <input type="checkbox"/> No	Do you perform intrusive work with silica?
Lead	<input type="checkbox"/> Yes <input type="checkbox"/> No	Are you currently performing construction work where you may be exposed to airborne lead concentration at or above the OSHA action level or are you currently in a job that requires you to be in a medical surveillance program for lead (i.e., removal of lead-based paint or other demolition activities)?

Radiation	<input type="checkbox"/> Yes <input type="checkbox"/> No	Are you classified as a radiation worker?
DOT Driver	<input type="checkbox"/> Yes <input type="checkbox"/> No	Do you drive a truck with a gross vehicle weight rating of 10,000 pounds or more during company trips?
Operator	<input type="checkbox"/> Yes <input type="checkbox"/> No	Do you operate a: <input type="checkbox"/> Crane <input type="checkbox"/> Forklift?
Diving	<input type="checkbox"/> Yes <input type="checkbox"/> No	Do you perform diving activities?
Biohazard	<input type="checkbox"/> Yes <input type="checkbox"/> No	Does your job require work with bloodborne pathogens?
Remediation	<input type="checkbox"/> Yes <input type="checkbox"/> No	Do you perform remediation construction activities, field construction sampling, or supervision activities at hazardous waste remediation sites or hazardous waste treatment, storage, or disposal (TSD) facilities that could expose you to hazardous substances above permissible exposure levels (i.e., work in exclusion zones)? If yes, how many days per year? <input type="checkbox"/> 1–29 <input type="checkbox"/> 30+
Field and Lab	<input type="checkbox"/> Yes <input type="checkbox"/> No	Answer Yes if you do ANY of the following: a) Work at HAZWOPER sites 30 or more days per year b) Perform waste disposal activities c) Work in a chemistry laboratory 30 or more days per year d) Work on a pilot plant project 30 or more days per year e) Conduct bench-scale operations 30 or more days per year
Specific Jobs	<input type="checkbox"/> Yes <input type="checkbox"/> No	Do you perform the following job duties: <input type="checkbox"/> Air Traffic Control <input type="checkbox"/> CDF or <input type="checkbox"/> Naval Ordnance <input type="checkbox"/> Engine Run (military locations) <input type="checkbox"/> Fuel Cell (military locations) <input type="checkbox"/> Ground Personnel (military locations)
Other	<input type="checkbox"/> Yes <input type="checkbox"/> No	Site- or project-specific biological monitoring or toxicological screening as specified by the project-specific health and safety plan.

If 'Yes' was answered above, an employee is required to be in the medical screening and surveillance program. Complete *S3AM-128-FM3 Scheduling Request Form* and forward to the MSP. If additional assistance is required, contact an SH&E Manager.

Employee Signature

Date

Supervisor Signature

Date

****The below applies ONLY IF SPECIFICALLY PERMITTED BY THE APPLICABLE JURISDICTION:**

If the employee does not wish to participate in part or all of the medical screening and surveillance program and is permitted by the applicable jurisdiction, the employee must provide a written statement of refusal. *S3AM-128-FM4 Waiver of Medical Screening & Surveillance Program* may be used to fulfill the written statement of refusal requirement.

Americas**Waiver of Exit Medical Surveillance Exam****S3AM-128-FM2**

I have been a participant in AECOM's Medical Screening and Surveillance Program, which entitles me to an exit medical surveillance exam upon reassignment to a position that does not require medical clearance or termination of my employment. I understand that AECOM encourages employees to schedule and complete an exit medical exam; however, I voluntarily relinquish the opportunity to have an exit medical exam.

Name

Employee Number

Date

Employee Signature

Americas

Scheduling Request Form

S3AM-128-FM3

Submit to WorkCare via email: alphateam@workcare.com

Phone: 714-978-7488 / 800-455-6155 Fax: 714-456-2154

If assistance is needed completing this form, contact a SH&E Manager.

REQUESTOR INFORMATION:				Date:	
1.	Requested By:			Email:	
	Phone #:			SH&E Manager:	
	Address:			Business Group:	
	Send Invoice To:				
EMPLOYEE INFORMATION:				Billing Charge No.:	
2.	Employee Name:			Email:	
	Employee ID #:			Work Phone #:	
	Home Phone #:			Cell Phone #:	
	City, State, Zip for the Exam:				
	Please list three dates of availability:				
3.	New Hire/Transfer?	<input type="checkbox"/> Yes <input type="checkbox"/> No			
	Rehire?	<input type="checkbox"/> Yes <input type="checkbox"/> No			
	Existing Employee?	<input type="checkbox"/> Yes <input type="checkbox"/> No			
4.	Drug Screen Needed:	<input type="checkbox"/> Yes <input type="checkbox"/> No (If No, skip to #5)			
	Reason for Drug Screen:	<input type="checkbox"/> DOT <input type="checkbox"/> Client/Contract Requirement		<input type="checkbox"/> Post Incident <input type="checkbox"/> For Cause	
	Drug Screen Type:	<input type="checkbox"/> Non-DOT Type <input type="checkbox"/> Federal DOT Type (Required for DOT Clearance)			
5. EXAM TYPES:					
	A. Commercial Motor Vehicles (>10,000 lbs but < 26,001 lbs) (CMV)	<input type="checkbox"/> Baseline <input type="checkbox"/> Renewal			
	B. Commercial Motor Vehicles (over 26,000 lbs.) (DOT)	<input type="checkbox"/> Baseline <input type="checkbox"/> Renewal (plus enrollment in random drug pool)			
	C. HAZWOPER	<input type="checkbox"/> Baseline <input type="checkbox"/> Annual <input type="checkbox"/> Biennial <input type="checkbox"/> Exit			
	D. Laboratory Technician (Working with Hazardous Chemicals)	<input type="checkbox"/> Baseline <input type="checkbox"/> 3 Year Protocol <input type="checkbox"/> Exit			
	E. Hearing Conservation	<input type="checkbox"/> Baseline <input type="checkbox"/> Annual <input type="checkbox"/> Exit			
	F. Respirator	<input type="checkbox"/> Baseline <input type="checkbox"/> Biennial			

G. Lead	<input type="checkbox"/> Baseline <input type="checkbox"/> Annual <input type="checkbox"/> Exit
H. <input type="checkbox"/> Cadmium <input type="checkbox"/> Hexavalent Chromium <input type="checkbox"/> Benzene <input type="checkbox"/> Mercury <input type="checkbox"/> Other: _____ <input type="checkbox"/> Other: _____	<input type="checkbox"/> Baseline <input type="checkbox"/> Annual <input type="checkbox"/> Exit
I. Asbestos	<input type="checkbox"/> Baseline <input type="checkbox"/> Annual <input type="checkbox"/> Exit
J. Silica	<input type="checkbox"/> Baseline <input type="checkbox"/> Biennial <input type="checkbox"/> Exit
K. Diving	<input type="checkbox"/> Baseline <input type="checkbox"/> Biennial
L. Crane Operator	<input type="checkbox"/> Annual
M. Forklift	<input type="checkbox"/> Every 3 Years
N. Air Traffic Controller	<input type="checkbox"/> Annual
O. CDF Ordinance	<input type="checkbox"/> Annual
P. Naval Ordinance	<input type="checkbox"/> Biennial
Q. Engine Run	<input type="checkbox"/> Biennial
R. FAA Physical	<input type="checkbox"/> Annual
S. Fuel Cell	<input type="checkbox"/> Annual
T. Ground Physical (keep)	<input type="checkbox"/> Every 5 Years
U. Flight Deck (Critical/Non-Critical)	<input type="checkbox"/> Annual
V. Flight Deck (Critical)	<input type="checkbox"/> Annual
W. Immunizations/vaccinations (state which are required)	<input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____
X. Travel - Overseas	<input type="checkbox"/> Location and duration of visit
Y. Records Review	<input type="checkbox"/> Change Frequency of Physicals <input type="checkbox"/> Other (specify in item 6)
6. Other (Note: Requests outside of standard exam need to be approved by the SH&E Manager.) 	

Americas

Waiver of Medical Screening & Surveillance Program

S3AM-128-FM4

****The below applies ONLY IF SPECIFICALLY PERMITTED BY THE APPLICABLE JURISDICTION:**

If the employee does not wish to participate in part or all of the medical screening and surveillance program and is permitted by the applicable jurisdiction, the employee must provide a written statement of refusal.

I have been received the offer to be a participant in AECOM's Medical Screening and Surveillance Program. I do not wish to participate in

☐ **The following parts of the Medical Screening and Surveillance program:**

☐ **All parts of the Medical Screening and Surveillance program:**

I understand that AECOM encourages employees to participate in AECOM's Medical Screening and Surveillance Program; however I voluntarily relinquish the opportunity to participate as described above.

Name

Employee Number

Date

Employee Signature

Competent Person Designation

S3AM-202-PR1

1.0 Purpose and Scope

- 1.1 Outlines the process and minimum requirements necessary for classifying an AECOM employee as a "Competent Person" to oversee and/or self-perform activities involved with tasks listed in this procedure. Employee competency to perform work activities is addressed elsewhere.
- 1.2 This procedure applies to all AECOM Americas-based employees and operations where AECOM is self-performing the identified activities and where AECOM controls projects performing activities requiring a Competent Person. Client-mandated requirements may apply on a project-specific basis and shall be addressed in supplemental documents (e.g. Task Hazard Assessment, SH&E Plan, etc.).
- 1.3 It is recognized that local regulations and legislation may contain alternate definitions for Competent Person and it will be the responsibility of the manager responsible for the work (e.g. Manager, Superintendent) in conjunction with the local SH&E Manager to determine if conflicts exist between AECOM and applicable regulatory/legislative definitions and resolve the conflict.
- 1.4 When a qualified employee within AECOM is not available to be designated as the AECOM Competent Person, the Manager in coordination with their SH&E Manager may designate an appropriately qualified and trained Contractor employee as the Competent Person for the AECOM operations.

2.0 Terms and Definitions

- 2.1 **Competent Person** – An employee, through education, training and experience who has knowledge of applicable regulatory requirements, is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

3.0 References

- 3.1 S3-NA-213-PR1 Subcontractor Management

4.0 Procedure

- 4.1 Roles and Responsibilities

4.1.1 Manager

- Confirm that all assigned personnel, including personnel utilized from other offices to support their operations, comply with the requirements of this procedure. The manager responsible for the work shall:
 - Identify the need for a designated Competent Person or persons based on anticipated work activities.
 - Communicate competent person training/experience requirements with the employee and documenting completion of these requirements using *S3AM-202-FM-1 Competent Person Designation* or equivalent.
 - Identify supplemental employee training needs based on local/client requirements.
- For projects controlled by AECOM, when these activities are contracted to another party:
 - Confirm and secure the identity of the Contractor's Competent Person(s) for its activities. Refer to *S3AM-213-PR1 Subcontractor Management*.
 - *S3AM-202-FM1 Competent Person Designation* or equivalent may be used for this purpose.

- Provide the Contractor with a copy of this SH&E Procedure to verify the Contractor's capability to comply with the requirements within, and obtain documentation to support the designation of the Contractor employee as a Competent Person for AECOM.
- Verify the designation of the Competent Person for a specific activity is documented and effectively communicated to field personnel on site during daily tailgate safety meetings.

4.1.2 **Safety, Health and Environment (SH&E) Manager**

- Assist the Manager responsible for the work in assessing the competency of all designated persons based on specific requirements outlined in this procedure.
- Assist the Manager in:
 - Establishing competent person training/experience requirements and communicating these requirements to the supervisor.
 - Monitoring the overall implementation of this SH&E Procedure.
 - Monitoring field compliance of this procedure.
 - Providing technical assistance/support as requested.
 - Coordinating internal safety training classes as requested.
- Support the Manager in establishing minimum competent person requirements for regulated job activities based on individual job descriptions, applicable regulatory requirements, operational considerations, and management directives.
- Review as requested by designated operations representatives the Competent Person's qualifications for AECOM employees.

4.1.3 **Competent Person**

- Predict, identify, and control hazards when either AECOM self-performs associated field work or oversees and directs the work of subcontractors.
 - For operations where AECOM is providing oversight of subcontractors (e.g. drilling services), it is the subcontractor's employee who shall be designated as the Competent Person.
- Contractor Competent Persons - Unless AECOM is self-performing, the Contractor shall:
 - Determine the safe means and methods of its work activities.
 - Designate its Competent Person(s) for each category of work the Contractor undertakes and/or controls as required by this procedure.
 - If the contractor is unable to designate a Competent Person, AECOM may designate an appropriate AECOM employee as the contractor's Competent Person only if AECOM is contractually responsible for safety oversight of the contractor's activities.
- The Contractor's Competent Person shall:
 - Technically support the Contractor's site operations for the safe execution of its activities. Identify and remove any field hazards
 - Maintain appropriate knowledge about the work activities, the Contractor's work practices and procedures and compliance with the associated safety and health regulations.

4.2 **General Requirements**

- 4.2.1 The AECOM Competent Person project or worksite functions are dependent on the project activities and AECOM's project or worksite function.
- 4.2.2 Refer to each SH&E Procedure for the activities listed below and the associated legislative standards to determine the details of responsibility.

4.2.3 The following activities require an individual to be designated as a Competent Person:

- Asbestos
- Assured Equipment Grounding Conductor
- Blasting & Explosives
- Concrete & Masonry Construction
- Confined Spaces
- Control of Hazardous Energy (Lockout-Tagout)
- Cranes & Derricks
- Crane Assembly / Disassembly
- Demolition
- Electrical Wiring Design & Protections
- Elevated Work Platforms & Aerial Lifts
- Fall Protection
- Hearing Protection
- Heavy Equipment
- Ionizing Radiation
- Lead
- Material Hoists & Personnel Hoists
- Stairways & Ladders
- Respiratory Protection
- Rigging Equipment
- Scaffolds
- Steel Erection
- Trench & Excavations
- Underground Construction
- Welding & Cutting

4.2.4 Generally, it is the responsibility of the Competent Person(s) to be on site at all times when respective staff (AECOM, subcontractor) are performing work governed by this procedure, make daily inspections of the conditions and work activities, and take actions to control any hazards associated with those activities.

4.2.5 The *S3AM-202-FM1 Competent Person Designation* or equivalent shall be used for all programs or on all projects for documenting Competent Person designations. Documentation shall be filled out completely and updated as necessary.

4.2.6 *S3AM-202-ATT1 Competent Persons in General Industry (29 CFR 1910)* and *S3AM-202-ATT2 Competent Persons in Construction (29 CFR 1926)* include descriptions of various U.S. Occupational Safety and Health Administration requirements for competent persons. The list is not comprehensive and as such 29 CFR 1910 and 1926 shall be consulted for any additional competent person requirements.

5.0 Records

- 5.1 AECOM Competent Person Designation forms shall be maintained in the program / project file.
- 5.2 Documentation as to daily inspections and corrective measures by the AECOM Competent Person shall be maintained in the program / project file.

6.0 Attachments

- 6.1 [S3AM-202-FM1 Competent Person Designation](#)
- 6.2 [S3AM-202-ATT1 Competent Persons in General Industry \(29 CFR 1910\)](#)
- 6.3 [S3AM-202-ATT2 Competent Persons in Construction \(29 CFR 1926\)](#)

Americas

Competent Person Designation

S3AM-202-FM1

Company: _____ AECOM Manager: _____

Project Location: _____ Program/ Project No: _____

Designated Competent Person: _____ Employee No: _____

Check the technical activity for which the Designation will apply:

- | | |
|---|---|
| <input type="checkbox"/> Asbestos | <input type="checkbox"/> Heavy Equipment |
| <input type="checkbox"/> Assured Equipment Grounding Conductor | <input type="checkbox"/> Ionizing Radiation |
| <input type="checkbox"/> Blasting & Explosives | <input type="checkbox"/> Lead |
| <input type="checkbox"/> Concrete & Masonry Construction | <input type="checkbox"/> Material Hoists & Personnel Hoists |
| <input type="checkbox"/> Confined Space Entry | <input type="checkbox"/> Stairways & Ladders |
| <input type="checkbox"/> Control of Hazardous Energy (Lockout/Tagout) | <input type="checkbox"/> Respiratory Protection |
| <input type="checkbox"/> Crane Assembly / Dissassembly | <input type="checkbox"/> Rigging Equipment |
| <input type="checkbox"/> Cranes & Derricks | <input type="checkbox"/> Scaffolds |
| <input type="checkbox"/> Demolition | <input type="checkbox"/> Steel Erection |
| <input type="checkbox"/> Electrical Wiring Design & Protections | <input type="checkbox"/> Trench & Excavations |
| <input type="checkbox"/> Elevated work platforms & aerial lifts | <input type="checkbox"/> Underground Construction |
| <input type="checkbox"/> Fall Protection | <input type="checkbox"/> Welding & Cutting |
| <input type="checkbox"/> Hearing Protection | |

Other (Explain):

The AECOM employee identified has been designated as the Competent Person in the technical area specified by the responsible manager (e.g. Project Manager, Operations Manager, Superintendent) identified. This designation is based on the following:

1. The responsible manager is authorizing the Competent Person to allocate whatever resources that are necessary to perform tasks associated with the area of competency to provide a safe work environment and comply with applicable regulatory and legislative requirements, and AECOM SH&E procedures and policies.
2. The Responsible Manager has confirmed that the individual is competent to perform the required tasks by way of:
 - a. Documented training
 - b. Practical experience (hands-on)
 - c. Documented professional experience
 - d. Legislative knowledge

Print name and sign below

Designated by: _____ Date: _____
(AECOM Manager)

Designated by: _____ Date: _____
(AECOM SH&E Manager)

Comments:

Attach any related documentation of training, certifications, insurance coverages, or other related information that supports the designation of the person as Competent.

Americas

Competent Persons in General Industry (29 CFR 1910) S3AM-202-ATT1

This supplement defines and lists various areas within the OSHA Construction Standards where a competent person is required to be part of a particular project activity. This list is not comprehensive and as such 29 CFR 1910 shall be consulted for any additional competent person requirements.

A. Powered Platforms, Manlifts, and Vehicle-Mounted Work Platforms

1. **"Competent person** means a person who, because of training and experience, is capable of identifying hazardous or dangerous conditions in powered platform installations and of training employees to identify such conditions (Subpart F; 29 CFR 1910.66(d))."
2. "Related building supporting structures shall undergo periodic inspection by a **competent person** at intervals not exceeding 12 months (Subpart F; 29 CFR 1910.66(g)(2)(i))."
3. "All parts of the equipment including control systems shall be inspected, and, where necessary, tested by a **competent person** at intervals specified by the manufacturer/supplier, but not to exceed 12 months, to determine that they are in safe operating condition. Parts subject to wear, such as wire ropes, bearings, gears, and governors shall be inspected and/or tested to determine that they have not worn to such an extent as to affect the safe operation of the installation (Subpart F; 29 CFR 1910.66(g)(2)(ii))."
4. "A maintenance inspection and, where necessary, a test shall be made of each platform installation every 30 days, or where the work cycle is less than 30 days such inspection and/or test shall be made prior to each work cycle. This inspection and test shall follow procedures recommended by the manufacturer, and shall be made by a **competent person** (Subpart F; 29 CFR 1910.66(g)(3)(i))."
5. "Inspection of governors and secondary brakes shall be performed by a **competent person** (Subpart F; 29 CFR 1910.66(g)(4(v))."
6. "Suspension wire rope shall be inspected by a **competent person** for visible defects and gross damage to the rope before every use and after each occurrence which might affect the wire rope's integrity (Subpart F; 29 CFR 1910.66(g)(5)(ii))."
7. "A thorough inspection of suspension wire ropes in service shall be made once a month. Suspension wire ropes that have been inactive for 30 days or longer shall have a thorough inspection before they are placed into service. These thorough inspections of suspension wire ropes shall be performed by a **competent person** (Subpart F; 29 CFR 1910.66(g)(5)(iii))."
8. "Any other condition which the **competent person** determines has significantly affected the integrity of the rope (Subpart F; 29 CFR 1910.66(g)(5)(iv)(J))."
9. "Training of employees in the operation and inspection of working platforms shall be done by a **competent person** (Subpart F; 29 CFR 1910.66(i)(1)(iii))."
10. **"Competent person"** means a person who is capable of identifying hazardous or dangerous conditions in the personal fall arrest system or any component thereof, as well as in their application and use with related equipment (Subpart F; 29 CFR 1910.66 App. C, (I)(b))."
11. "Personal fall arrest systems or components subjected to impact loading shall be immediately removed from service and shall not be used again for employee protection unless inspected and determined by a **competent person** to be undamaged and suitable for reuse (Subpart F; 29 CFR 1910.66 App. C, (I)(e)(7))."
12. **"Comment compatibility considerations."** Ideally, a personal fall arrest system is designed, tested, and supplied as a complete system. However, it is common practice for lanyards, connectors, lifelines, deceleration devices, body belts and body harnesses to be interchanged since some components wear out before others. The employer and employee should realize that not all components are interchangeable. For instance, a lanyard should not be connected between a body belt (or harness) and a deceleration device of the self-retracting type since this can result in additional free fall for which the system was not designed. Any substitution or change to a personal fall arrest system should be fully evaluated or tested by a **competent person** to determine that it meets the standard, before the modified system is put in use (Subpart F; 29 CFR 1910.66 App. C, (III)(c))."

B. Explosives and Blasting Agents

1. "Magazines shall be in the charge of a **competent person** at all times and who shall be held responsible for the enforcement of all safety precautions (Subpart H; 29 CFR 1910.109(c)(5)(viii))."
2. "Explosives recovered from blasting misfires shall be placed in a separate magazine until **competent personnel** have determined from the manufacturer the method of disposal. Caps recovered from blasting misfires shall not be reused. Such explosives and caps shall then be disposed of in the manner recommended by the manufacturer (Subpart H; 29 CFR 1910.109(c)(5)(ix))."
3. "Extinguishers shall be filled and ready for immediate use and located near the driver's seat. Extinguishers shall be examined periodically by a **competent person** (Subpart H; 29 CFR 1910.109(d)(2)(iii)(b))."
4. "The distances in the table apply to ammonium nitrate that passes the insensitivity test prescribed in the definition of ammonium nitrate fertilizer promulgated by the National Plant Food Institute; and ammonium nitrate failing to pass said test shall be stored at separation distances determined by **competent persons** (Subpart H, 29 CFR 1910.109, Table H-22, Footnote (3))."
5. "Every warehouse used for the storage of blasting agents shall be under the supervision of a **competent person** (Subpart H, 29 CFR 1910.109(g)(5)(vii))."

C. Helicopters

"Cargo hooks. All electrically operated cargo hooks shall have the electrical activating device so designed and installed as to prevent inadvertent operation. In addition, these cargo hooks shall be equipped with an emergency mechanical control for releasing the load. The employer shall ensure that the hooks are tested prior to each day's operation by a **competent person** to determine that the release functions properly, both electrically and mechanically (Subpart N, 29 CFR 1910.183(d))."

D. Slings

1. "**Inspections.** Each day before being used, the sling and all fastenings and attachments shall be inspected for damage or defects by a **competent person** designated by the employer. Additional inspections shall be performed during sling use, where service conditions warrant. Damaged or defective slings shall be immediately removed from service (Subpart N, 29 CFR 1910.184(d))."
2. "The thorough inspection of alloy steel chain slings shall be performed by a **competent person** designated by the employer, and shall include a thorough inspection for wear, defective welds, deformation and increase in length. Where such defects or deterioration are present, the sling shall be immediately removed from service (Subpart N, 29 CFR 1910.184(e)(3)(iii))."

E. Telecommunications

1. "**Support structures.** No employee, or any material or equipment, may be supported or permitted to be supported on any portion of a pole structure, platform, ladder, walkway or other elevated structure or aerial device unless the employer ensures that the support structure is first inspected by a **competent person** and it is determined to be adequately strong, in good working condition and properly secured in place (Subpart R, 29 CFR 1910.268(b)(6))."
2. "**Tools and personal protective equipment -- Generally.** Personal protective equipment, protective devices and special tools needed for the work of employees shall be provided and the employer shall ensure that they are used by employees. Before each day's use the employer shall ensure that these personal protective devices, tools, and equipment are carefully inspected by a **competent person** to ascertain that they are in good condition (Subpart R, 29 CFR 1910.268(e))."
3. "**General.** Safety belts and straps shall be provided and the employer shall ensure their use when work is performed at positions more than 4 feet above ground, on poles, and on towers, except as provided in paragraphs (n)(7) and (n)(8) of this section. No safety belts, safety straps or lanyards acquired after July 1, 1975 may be used unless they meet the tests set forth in paragraph (g)(2) of this section. The employer shall ensure that all safety belts and straps

- are inspected by a **competent person** prior to each day's use to determine that they are in safe working condition (Subpart R, 29 CFR 1910.268(g)(1))."
4. "The employer shall ensure that pole climbers are inspected by a **competent person** for the following conditions: Fractured or cracked gaffs or leg irons, loose or dull gaffs, broken straps or buckles. If any of these conditions exist, the defect shall be corrected before the climbers are used (Subpart R, 29 CFR 1910.268(g)(3)(ii))."
 5. "The employer shall ensure that no employee nor any material or equipment may be supported or permitted to be supported on any portion of a ladder unless it is first determined, by inspections and checks conducted by a **competent person** that such ladder is adequately strong, in good condition, and properly secured in place, as required in Subpart D of this part and as required in this section (Subpart R, 29 CFR 1910.268(h)(1))."
 6. "The employer shall ensure that visual inspections are made of the equipment by a **competent person** each day the equipment is to be used to ascertain that it is in good condition (Subpart R, 29 CFR 1910.268(j)(1)(i))."
 7. "The employer shall ensure that tests shall be made at the beginning of each shift by a **competent person** to insure the vehicle brakes and operating systems are in proper working condition (Subpart R, 29 CFR 1910.268(j)(1)(ii))."
 8. "The employer shall ensure that the derrick and its associated equipment are inspected by a **competent person** at intervals set by the manufacturer but in no case less than once per year. Records shall be maintained including the dates of inspections, and necessary repairs made, if corrective action was required (Subpart R, 29 CFR 1910.268(j)(4)(iv)(F))."
- F. Electrical (Assured Equipment Grounding Program)
1. "The employer shall designate one or more **competent persons** to implement the program." (Subpart S; 29 CFR 1910.304(b)(3)(ii)(C)(2))

Americas

Competent Persons in Construction (29 CFR 1926)

S3AM-202-ATT2

This supplement defines and lists various areas within the OSHA Construction Standards where a competent person is required to be part of a particular project activity. This list is not comprehensive and as such 29 CFR 1926 shall be consulted for any additional competent person requirements.

A. Definition

A **competent person** is “one who is capable of identifying existing and predictable hazards in the surrounding or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them (Subpart C; 29 CFR 1926.32(f)).”

B. Accident Prevention

“(Accident prevention) programs shall provide for frequent and regular inspections of the job sites, materials, and equipment to be made by **competent persons** designated by the employers (Subpart C; 29 CFR 1926.20(b)(2)).”

C. Ionizing Radiation

“Any activity which involves the use of radioactive materials or X-rays, whether or not under license from the Nuclear Regulatory Commission, shall be performed by **competent persons** specially trained in the proper and safe operation of such equipment. In the case of materials used under Commission license, only persons actually licensed, or **competent persons** under direction and supervision of the licensee, shall perform such work (Subpart D; 29 CFR 1926.53(b)).”

D. Respiratory Protection

“Administrative or engineering controls must first be implemented whenever feasible. When such controls are not feasible to achieve full compliance, protective equipment or other protective measures shall be used to keep the exposure of employees to air contaminants within the limits prescribed in this section. Any equipment and technical measures used for this purpose must first be approved for each particular use by a **competent** industrial hygienist or other technically qualified person (Subpart D; 29 CFR 1926.55(b)).”

E. Lead

“The compliance program shall provide for frequent and regular inspections of job sites, materials, and equipment to be made by a **competent person** (Subpart D; 29 CFR 1926.62(e)(2)(iii)).”

F. Hearing Protection

“Ear protective devices inserted in the ear shall be fitted or determined individually by **competent persons** (Subpart E; 29 CFR 1926.101(b)).”

G. Material Handling

“Each day before being used, the sling and all fastenings and attachments shall be inspected for damage or defects by a **competent person** designated by the employer (Subpart H; 29 CFR 1926.251(a)(6)).”

H. Welding, Cutting, and Heating

“Before welding, cutting, or heating is commenced on any surface covered by a preservative coating whose flammability is not known, a test shall be made by a **competent person** to determine its flammability (Subpart J; 29 CFR 1926.354(a)).”

I. Assured Equipment Grounding Conductor Program

“The employer shall designate one or more **competent persons** to implement the program (Subpart K; 29 CFR 1926.404(b)(1)(iii)(B)).”

J. Scaffolding

1. “Before the scaffold is used, direct connections shall be evaluated by a **competent person** who shall confirm, based on the evaluation, that the supporting surfaces are capable of supporting the loads to be imposed. In addition, an engineer experienced in such scaffold design shall design masons’ multi-point adjustable suspension scaffold connections (Subpart L; 29 CFR 1926.451(d)(3)(i)).” Note that this passage applies to suspension scaffolds only.

2. "The employer shall have each employee who is involved in erecting, disassembling, moving, operating, repairing, maintaining, or inspecting a scaffold trained by a **competent person** to recognize any hazards associated with the work in question (Subpart L; 29 CFR 1926.454(b))." Per the standard, the training should include the following topics, as applicable:
 - a. The nature of scaffold hazards;
 - b. The correct procedures for erecting, disassembling, moving, operating, repairing, inspecting, and maintaining the type of scaffold in question;
 - c. The design criteria, maximum intended load-carrying capacity and intended use of the scaffold; and
 - d. Any other pertinent requirements of 1926 Subpart L.

K. Fall Protection

1. "Personal fall arrest systems and components subjected to impact loading shall be immediately removed from service and shall not be used again for employee protection until inspected and determined by a **competent person** to be undamaged and suitable for reuse (Subpart M; 29 CFR 1926.502(d)(19))."
2. Where safety monitoring systems are employed, "the employer shall designate a **competent person** to monitor the safety of other employees and the employer shall ensure that the safety monitor complies with the following requirements (Subpart M; 29 CFR 1926.502(h)(1))":
 - a. The safety monitor shall be competent to recognize fall hazards;
 - b. The safety monitor shall warn the employee when it appears that the employee is unaware of a fall hazard or is acting in an unsafe manner;
 - c. The safety monitor shall be on the same walking/working surface and within visual sighting distance of the employee being monitored;
 - d. The safety monitor shall be close enough to communicate orally with the employee; and
 - e. The safety monitor shall not have other responsibilities which could take the monitor's attention from the monitoring function."
3. "The implementation of the fall protection plan shall be under the supervision of a **competent person** (Subpart M; 29 CFR 1926.502(k)(4))." This section specifically refers to the implementation of fall protection plans on projects where it is infeasible or it creates a greater hazard to use conventional fall protection equipment.
4. "The employer shall assure that a **competent person** qualified in the following areas has trained each employee, as necessary (Subpart M; 29 CFR 1926.503(a)(2))":
 - a. The nature of fall hazards in the work area;
 - b. The correct procedures for erecting, maintaining, disassembling, and inspecting the fall protection systems to be used;
 - c. The use and operation of guardrail systems, personal fall arrest systems, safety net systems, warning line systems, safety monitoring systems, controlled access zones, and other protection to be used;
 - d. The role of each employee in the safety monitoring system when this system is used;
 - e. The limitations on the use of mechanical equipment during the performance of elevated work;
 - f. The correct procedures for the handling and storage of equipment and materials and the erection of overhead protection;
 - g. The role of employees in fall protection plans, and
 - h. The standards contained in 1926 Subpart M.

L. Material Hoists, Personnel Hoists and Elevators

"Following assembly and erection of hoists, and before being put in service, an inspection and test of all functions and safety devices shall be made under the supervision of a **competent person**. A similar inspection and test is required following major alteration of an existing installation. All hoists shall be inspected and tested at not more than 3-month intervals. The employer shall prepare a certification record which includes the date the inspection and test of all functions and safety devices was performed; the signature of the person who performed the inspection and test; and a serial number, or other identifier, for the hoist that was inspected and tested. The most recent certification record shall be maintained on file (Subpart N; 29 CFR 1926.552(c)(15))."

M. Excavations

1. "Structural ramps that are used solely by employees as a means of access or egress from excavations shall be designed by a **competent person**. Structural ramps used for access or egress of equipment shall be designed by a **competent person** qualified in structural design, and shall be constructed in accordance with the design (Subpart P; 29 CFR 1926.651(c)(1)(i))."
2. "If water is controlled or prevented from accumulating by the use of water removal equipment, the water removal equipment and operations shall be monitored by a **competent person** to ensure proper operation (Subpart P; 29 CFR 1926.651(h)(2))."
3. "If excavation work interrupts the natural drainage of surface water (such as streams), diversion ditches, dikes, or other suitable means shall be used to prevent surface water from entering the excavation and to provide adequate drainage of the area adjacent to the excavation. Excavations subject to runoff from heavy rains will require an inspection by a **competent person** and compliance with paragraphs (h)(1) and (h)(2) of 1926.651 (Subpart P; 29 CFR 1926.651(h)(3))."
4. "Daily inspections of excavations, the adjacent areas, and protective systems shall be made by a **competent person** for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection shall be conducted by the **competent person** prior to the start of work and as needed throughout the shift. Inspections shall also be made after every rainstorm or other hazard-increasing occurrence. These inspections are only required when employee exposure can be reasonably anticipated (Subpart P; 29 CFR 1926.651(k)(1))."
5. "Where the **competent person** finds evidence of a situation that could result in a possible cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions, exposed employees shall be removed from the hazardous area until the necessary precautions have been taken to ensure their safety (Subpart P; 29 CFR 1926.651(k)(2))."
6. Employees shall be protected from cave-ins except where "excavations are less than 5 feet (1.52 m) in depth and examination of the ground by a **competent person** provides no indication of a potential cave-in (Subpart P; 29 CFR 1926.652(a)(1)(ii))."
7. "When material or equipment that is used for protective systems is damaged, a **competent person** shall examine the material or equipment and evaluate its suitability for continued use. If the **competent person** cannot assure the material or equipment is able to support the intended loads or is otherwise suitable for safe use, then such material or equipment shall be removed from service, and shall be evaluated and approved by a registered professional engineer before being returned to service (Subpart P; 29 CFR 1926.652(d)(3))."
8. "Each soil and rock deposit shall be classified by a **competent person** as Stable Rock, Type A, Type B, or Type C in accordance with the definitions set forth in paragraph (b) of this appendix (1926 Subpart P, Appendix A, (a)(2)(C)(1))."
9. "The classification of the deposits shall be made based on the result of at least one visual and at least one manual analysis. Such analyses shall be conducted by a **competent person** using tests described in paragraph (d) of this appendix, or in other recognized methods of soil classification and testing such as those adopted by the American Society for Testing Materials, or the U.S. Department of Agriculture textural classification system (1926 Subpart P, Appendix A, (a)(2)(C)(2))."
10. "If after classifying a deposit, the properties, factors, or conditions affecting its classification change in any way, the changes shall be evaluated by a **competent person**. The deposit shall be reclassified as necessary to reflect the changed circumstances (1926 Subpart P, Appendix A, (a)(2)(C)(5))."

11. "When surcharge loads from stored material or equipment, operating equipment, or traffic are present, a **competent person** shall determine the degree to which the actual slope must be reduced below the maximum allowable slope, and shall assure that such reduction is achieved (1926 Subpart P, Appendix B, (c)(3)(iii))."

N. Lift-Slab Operations

"If leveling is maintained by manual controls, such controls shall be located in a central location and attended by a **competent person** while lifting is in progress. In addition to meeting the definition in 1926.32(f), the **competent person** must be experienced in the lifting operation and with the lifting equipment being used (Subpart Q, 29 CFR 1926.705(i))."

O. Steel Erection - Cranes

1. "Cranes being used in steel erection activities shall be visually inspected prior to each shift by a **competent person**; the inspection shall include observation for deficiencies during operation. At a minimum this inspection shall include the following (Subpart R: 29 CFR 1926.753(c)(1)(i)):
 - a. All control mechanisms for maladjustments;
 - b. Control and drive mechanism for excessive wear of components and contamination by lubricants, water or other foreign matter;
 - c. Safety devices, including but not limited to boom angle indicators, boom stops, boom kick out devices, anti-two block devices, and load moment indicators where required;
 - d. Air, hydraulic, and other pressurized lines for deterioration or leakage, particularly those which flex in normal operation;
 - e. Hooks and latches for deformation, chemical damage, cracks, or wear;
 - f. Wire rope reeving for compliance with hoisting equipment manufacturer's specifications;
 - g. Electrical apparatus for malfunctioning, signs of excessive deterioration, dirt, or moisture accumulation;
 - h. Hydraulic system for proper fluid level;
 - i. Tires for proper inflation and condition;
 - j. Ground conditions around the hoisting equipment for proper support, including ground settling under and around outriggers, ground water accumulation, or similar conditions;
 - k. The hoisting equipment for level position; and
 - l. The hoisting equipment for level position after each move and setup."
2. "If any deficiency is identified, an immediate determination shall be made by the **competent person** as to whether the deficiency constitutes a hazard (Subpart R; 29 CFR 1926.753(c)(1)(ii))."

P. Steel Erection – Structural Steel Assembly

1. "When deemed necessary by a **competent person**, plumbing-up equipment shall be installed in conjunction with the steel erection process to ensure the stability of the structure (Subpart R; 29 CFR 1926.754(d)(1))."
2. "Plumbing-up equipment shall be removed only with the approval of a **competent person** (Subpart R; 29 CFR 1926.754(d)(3))."

Q. Steel Erection – Column Anchorage

"All columns shall be evaluated by a **competent person** to determine whether guying or bracing is needed; if guying or bracing is needed, it shall be installed (Subpart R; 29 CFR 1926.755(a)(4))."

R. Steel Erection – Beams and Columns

"A **competent person** shall determine if more than two bolts are necessary to ensure the stability of cantilevered members; if additional bolts are needed, they shall be installed (Subpart R; 29 CFR 1926.756(a)(2))."

S. Underground Construction

1. "The employer shall assign a **competent person** who shall perform all air monitoring required by this section (Subpart S; 29 CFR 1926.800(j)(1)(i)(A))."
2. "Where this paragraph requires monitoring of airborne contaminants 'as often as necessary,' the **competent person** shall make a reasonable determination as to which substances to monitor and how frequently to monitor (Subpart S; 29 CFR 1926.800(j)(1)(i)(B))." The standard indicates the following factors should be considered:
 - a. Location of jobsite: Proximity to fuel tanks, sewers, gas lines, old landfills, coal deposits, and swamps;
 - b. Geology: Geological studies of the jobsite, particularly involving the soil type and its permeability;
 - c. History: Presence of air contaminants in nearby jobsites, changes in levels of substances monitored on the prior shift; and
 - d. Work practices and jobsite conditions: The use of diesel engines, use of explosives, use of fuel gas, volume and flow of ventilation, visible atmospheric conditions, decompression of the atmosphere, welding, cutting and hot work, and employees' physical reactions to working underground.
3. "When the **competent person** determines, on the basis of air monitoring results or other information, that air contaminants may be present in sufficient quantity to be dangerous to life, the employer shall:
 - a. Prominently post a notice at all entrances to the underground jobsite to inform all entrants of hazardous condition, and
 - b. Ensure that the necessary precautions are taken (Subpart S; 29 CFR 1926.800(j)(1)(iv))."
4. "When ventilation has been reduced to the extent that hazardous levels of methane or flammable gas may have accumulated, a **competent person** shall test all affected areas after ventilation has been restored and shall determine whether the atmosphere is within flammable limits before any power, other than for acceptable equipment, is restored or work is resumed (Subpart S; 29 CFR 1926.800(k)(7))."
5. "A **competent person** shall inspect the roof (back), face, and walls of the work area at the start of each shift and as often as necessary to determine ground stability (Subpart S; 29 CFR 1926.800(o)(3)(i)(A))."
6. "A **competent person** shall determine whether rock bolts meet the necessary torque, and shall determine the testing frequency in light of the bolt system, ground conditions and the distance from vibration sources (Subpart S; 29 CFR 1926.800(o)(3)(iv)(B))."
7. "After blasting operations in shafts, a **competent person** shall determine if the walls, ladders, timbers, blocking, or wedges have loosened. If so, necessary repairs shall be made before employees other than those assigned to make the repairs are allowed in or below the affected areas (Subpart S; 29 CFR 1926.800(o)(4)(iii))."
8. "A **competent person** shall inspect all drilling and associated equipment prior to each use. Equipment defects affecting safety shall be corrected before the equipment is used (Subpart S; 29 CFR 1926.800(q)(1))."
9. "A **competent person** shall inspect haulage equipment before each shift (Subpart S; 29 CFR 1926.800(r)(1)(i))."
10. "A **competent person** shall visually check all hoisting machinery, equipment, anchorages, and hoisting rope at the beginning of each shift and during hoist use, as necessary (Subpart S; 29 CFR 1926.800(t)(3)(ix))."
11. "Each safety device shall be checked by a **competent person** at least weekly during hoist use to ensure suitable operation and safe condition (Subpart S; 29 CFR 1926.800(t)(3)(xx))."

T. Compressed Air

1. "There shall be present, at all times, at least one **competent person** designated by and representing the employer, who shall be familiar with this Subpart in all respects, and responsible for full compliance with these and other applicable subparts (Subpart S; 29 CFR 1926.803(a)(1))."

2. "At all times there shall be a thoroughly experienced, **competent**, and reliable **person** on duty at the air control valves as a gauge tender who shall regulate the pressure in the working areas. During tunneling operations, one gauge tender may regulate the pressure in not more than two headings provided that the gauge and controls are all in one location. In caisson work, there shall be a gauge tender for each caisson (Subpart S; 29 CFR 1926.803(h)(1))."

U. Demolition – Preparatory Operations

"Prior to permitting employees to start demolition operations, an engineering survey shall be made, by a **competent person**, of the structure to determine the condition of the framing, floors, and walls, and possibility of unplanned collapse of any portion of the structure. Any adjacent structure where employees may be exposed shall also be similarly checked. The employer shall have in writing evidence that such a survey has been performed (Subpart T; 29 CFR 1926.850(a))."

V. Mechanical Demolition

"During demolition, continuing inspections by a **competent person** shall be made as the work progresses to detect hazards resulting from weakened or deteriorated floors, or walls, or loosened material. No employee shall be permitted to work where such hazards exist until they are corrected by shoring, bracing, or other effective means (Subpart T; 29 CFR 1926.859(g))."

W. Blasting and the Use of Explosives

1. Precautions taken to prevent the accidental discharge of electric blasting caps shall include "the prominent display of adequate signs, warning against the use of mobile radio transmitters, on all roads within 1,000 feet of blasting operations. Whenever adherence to the 1,000-foot distance would create an operational handicap, a **competent person** shall be consulted to evaluate the particular situation, and alternative provisions may be made which are adequately designed to prevent any premature firing of electric blasting caps. A description of any such alternatives shall be reduced to writing and shall be certified as meeting the purposes of this subdivision by the **competent person** consulted. The description shall be maintained at the construction site during the duration of the work, and shall be available for inspection by representatives of the Secretary Labor (Subpart U; 29 CFR 1926.900(k)(3)(i))."
2. "The blaster shall be knowledgeable and **competent** in the use of each type of blasting method used (Subpart U; 29 CFR 1926.901(e))."

X. Ladders

1. "Ladders shall be inspected by a **competent person** for visible defects on a periodic basis and after any occurrence that could affect their safe use (Subpart X; 29 CFR 1926.1053(b))."
2. "The employer shall ensure that each employee has been trained by a **competent person** in the following areas, as applicable:
 - a. The nature of fall hazards in the work area;
 - b. The correct procedures for erecting, maintaining, and disassembling the fall protection systems to be used;
 - c. The proper construction, use, placement, and care in handling of all stairways and ladders;
 - d. The maximum intended load-carrying capacities of ladders used; and
 - e. The standards contained in this subpart (Subpart X; 29 CFR 1926.1060(a)(1))."

Y. Toxic Substances – Asbestos

1. "**Competent person** means, in addition to the definition in 29 CFR 1926.32 (f), one who is capable of identifying existing asbestos hazards in the workplace and selecting the appropriate control strategy for asbestos exposure, who has the authority to take prompt corrective measures to eliminate them, as specified in 29 CFR 1926.32(f): in addition, for Class I and Class II work who is specially trained in a training course which meets the criteria of EPA's Model Accreditation Plan (40 CFR 763) for supervisor, or its equivalent and, for Class III and Class IV work, who is trained in a manner consistent with EPA requirements for training of local education agency maintenance and custodial staff as set forth at 40 CFR 763.92 (a)(2)." (Subpart Z; 29 CFR 1926.1101(b))

2. "The **competent** person shall examine worksuits worn by employees at least once per workshift for rips or tears that may occur during performance of work (Subpart Z; 29 CFR 1926.1101(i)(4)(i))."
 3. "On all construction worksites covered by this standard, the employer shall designate a **competent person**, having the qualifications and authorities for ensuring worker safety and health required by Subpart C, General Safety and Health Provisions for Construction (Subpart Z; 29 CFR 1926.1101(o)(1))."
 4. "The **competent person** shall make frequent and regular inspections of the job sites, in order to perform the duties set out below in paragraph (o)(3)(i) and (ii) of this section. For Class I jobs, on-site inspections shall be made at least once during each work shift, and at any time at employee request. For Class II, III, and IV jobs, on-site inspections shall be made at intervals sufficient to assess whether conditions have changed, and at any reasonable time at employee request (Subpart Z; 29 CFR 1926.1101(o)(3))."
 5. "On all worksites where employees are engaged in Class I or II asbestos work, the **competent person** shall perform or supervise the following duties, as applicable:
 - a. Set up the regulated area, enclosure, or other containment;
 - b. Ensure (by on-site inspection) the integrity of the enclosure;
 - c. Set up procedures to control entry to and exit from the enclosure and/or area;
 - d. Supervise all employee exposure monitoring required by this section and ensure that it is conducted as required by paragraph (f) of this section;
 - e. Ensure that employees working within the enclosure and/or using glove bags wear respirators and protective clothing as required by paragraphs (h) and (i) of this section;
 - f. Ensure through on-site supervision, that employees set up, use, and remove engineering controls, use work practices and personal protective equipment in compliance with all requirements;
 - g. Ensure that employees use the hygiene facilities and observe the decontamination procedures specified in paragraph (j) of this section;
 - h. Ensure that through on-site inspection, engineering controls are functioning properly and employees are using proper work practices; and,
 - i. Ensure that notification requirement in paragraph (k) of this section are met (Subpart Z; 29 CFR 1926.1101(o)(3)(i))."
 6. "For Class I and II asbestos work the **competent person** shall be trained in all aspects of asbestos removal and handling, including: abatement, installation, removal and handling; the contents of this standard; the identification of asbestos; removal procedures, where appropriate; and other practices for reducing the hazard. Such training shall be obtained in a comprehensive course for supervisors that meets the criteria of EPA's Model Accreditation Plan (40 CFR part 763, subpart E, Appendix C), such as a course conducted by an EPA-approved or state-approved training provider, certified by EPA or a state, or a course equivalent in stringency, content, and length (Subpart Z; 29 CFR 1926.1101(o)(4)(i))."
 7. "For Class III and IV asbestos work, the **competent person** shall be trained in aspects of asbestos handling appropriate for the nature of the work, to include procedures for setting up glove bags and mini-enclosures, practices for reducing asbestos exposures, use of wet methods, the contents of this standard, and the identification of asbestos. Such training shall include successful completion of a course that is consistent with EPA requirements for training of local education agency maintenance and custodial staff as set forth at 40 CFR 763.92(a)(2), or its equivalent in stringency, content and length (Subpart Z; 29 CFR 1926.1101(o)(4)(ii))."
- Z. Toxic Substances – Cadmium
1. "**Competent person**, in accordance with 29 CFR 1926.32 (f), means a person designated by the employer to act on the employer's behalf who is capable of identifying existing and potential cadmium hazards in the workplace and the proper methods to control them in order to protect workers, and has the authority necessary to take prompt corrective measures to eliminate or control such hazards. The duties of a **competent person** include at least the following: Determining prior to the performance of work whether cadmium is present in the workplace; establishing, where necessary, regulated areas and assuring that access to and from those areas is limited to authorized employees; assuring the adequacy of any employee exposure monitoring required by this standard; assuring that all employees exposed to air cadmium levels above the PEL wear appropriate personal protective equipment and are trained in

- the use of appropriate methods of exposure control; assuring that proper hygiene facilities are provided and that workers are trained to use those facilities; and assuring that the engineering controls required by this standard are implemented, maintained in proper operating condition, and functioning properly (Subpart Z; 29 CFR 1926.1127(b)).”
2. “Prior to the performance of any construction work where employees may be potentially exposed to cadmium, the employer shall establish the applicability of this standard by determining whether cadmium is present in the workplace and whether there is the possibility that employee exposures will be at or above the action level. The employer shall designate a **competent person** who shall make this determination. Investigation and material testing techniques shall be used, as appropriate, in the determination. Investigation shall include a review of relevant plans, past reports, material safety data sheets, and other available records, and consultations with the property owner and discussions with appropriate individuals and agencies (Subpart Z; 29 CFR 1926.1127(d)(1)(i)).”
 3. “Where cadmium has been determined to be present in the workplace, and it has been determined that there is a possibility the employee’s exposure will be at or above the action level, the **competent person** shall identify employees potentially exposed to cadmium at or above the action level (Subpart Z; 29 CFR 1926.1127(d)(1)(ii)).”
 4. “The employer also shall institute the exposure monitoring required under paragraphs (d) (2) (i) and (d) (3) of 29 CFR 1926.1127 whenever there has been a change in the raw materials, equipment, personnel, work practices, or finished products that may result in additional employees being exposed to cadmium at or above the action level or in employees already exposed to cadmium at or above the action level being exposed above the PEL, or whenever the employer or **competent person** has any reason to suspect that any other change might result in such further exposure (Subpart Z; 29 CFR 1926.1127(d)(4)).”
 5. “A **competent person** shall review the comprehensive compliance program initially and after each change (Subpart Z; 29 CFR 1926.1127(f)(5)(iii)).”

AA. Toxic Substances – 1,2-Dibromo-3-Chloropropane

“Since many of the duties relating to employee protection are dependent on the results of monitoring and measuring procedures, employers should assure that the evaluation of employee exposures is performed by a **competent** industrial hygienist or other technically qualified **person** (Subpart Z; 29 CFR 1926.1144; makes direct reference to 29 CFR 1910.1044, Appendix B, IV.B).”

BB. Toxic Substances – Acrylonitrile

“Since many of the duties relating to employee exposure are dependent on the results of monitoring and measuring procedures, employers shall assure that the evaluation of employee exposures is performed by a **competent** industrial hygienist or other technically qualified **person** (Subpart Z; 29 CFR 1926.1145; makes direct reference to 29 CFR 1910.1045, Appendix B, IV.B).”

CC. Cranes & Derricks in Construction

1. “Assembly/disassembly must be directed by a person who meets the criteria for both a **competent person** and a qualified person, or by a competent person who is assisted by one or more qualified persons (“A/D director”).” (SubpartCC; 29 CFR 1926.1404(a)(1))
2. “Where the assembly/disassembly is being performed by only one person, that person must meet the criteria for both a **competent person** and a qualified person. For purposes of this standard, that person is considered the A/D director.” (SubpartCC; 29 CFR 1926.1404(a)(2))
3. “A **competent person** must begin a visual inspection prior to each shift the equipment will be used, which must be completed before or during that shift. The inspection must consist of observation for apparent deficiencies. Taking apart equipment components and booming down is not required as part of this inspection unless the results of the visual inspection or trial operation indicate that further investigation necessitating taking apart equipment components or booming down is needed. Determinations made in conducting the inspection must be reassessed in light of observations made during operation.” (SubpartCC; 29 CFR 1926.1412(d)(1))

“If any deficiency in paragraphs (d)(1)(i) through (xiii) of this section (or in additional inspection items required to be checked for specific types of equipment in accordance with other sections of this standard) is identified, an immediate determination must be made by the **competent person** as to whether the deficiency constitutes a safety hazard. If the deficiency is determined to constitute a safety

hazard, the equipment must be taken out of service until it has been corrected.” (SubpartCC; 29 CFR 1926.1412(d)(2))

4. “The operator must not leave the controls while the load is suspended, except where all of the following are met:...

The **competent person** determines that it is safe to do so and implements measures necessary to restrain the boom hoist and telescoping, load, swing, and outrigger or stabilizer functions.” (SubpartCC; 29 CFR 1926.1417(e)(1)(iii))

“When a local storm warning has been issued, the **competent person** must determine whether it is necessary to implement manufacturer recommendations for securing the equipment.” (SubpartCC; 29 CFR 1926.1417(h))

5. “If the **competent person** determines that there is a slack rope condition requiring re-spooling of the rope, it must be verified (before starting to lift) that the rope is seated on the drum and in the sheaves as the slack is removed.” (SubpartCC; 29 CFR 1926.1417(m))
6. “The **competent person** must adjust the equipment and/or operations to address the effect of wind, ice, and snow on equipment stability and rated capacity.” (SubpartCC; 29 CFR 1926.1417(n))
7. “A **competent person** supervises the operation, determines if it is necessary to reduce rated capacity, and makes determinations regarding load position, boom location, ground support, travel route, overhead obstructions, and speed of movement necessary to ensure safety.” (SubpartCC; 29 CFR 1926.1417(u)(2)(i))
8. The multiple-crane/derrick lift must be directed by a person who meets the criteria for both a **competent person** and a qualified person, or by a competent person who is assisted by one or more qualified persons (lift director).” (SubpartCC; 29 CFR 1926.1432(b)(1))
9. “*Dangerous areas (self-erecting tower cranes)*. In addition to the requirements in § 1926.1404(e), for self-erecting tower cranes, the following applies: Employees must not be in or under the tower, jib, or rotating portion of the crane during erecting, climbing and dismantling operations until the crane is secured in a locked position and the **competent person** in charge indicates it is safe to enter this area, unless the manufacturer's instructions direct otherwise and only the necessary personnel are permitted in this area.” (SubpartCC; 29 CFR 1926.1435(b)(2))
10. “The hoist must not be used unless a **competent person** determines that the test has been passed.” (SubpartCC; 29 CFR 1926.1436(e)(2)(iv)(C))
11. “*Functional test*. Prior to initial use, new or reinstalled derricks must be tested by a **competent person** with no hook load to verify proper operation.” (SubpartCC; 29 CFR 1926.1436(g)(2))
12. “*Load test*. Prior to initial use, new or reinstalled derricks must be load tested by a **competent person**.” (SubpartCC; 29 CFR 1926.1436(g)(3))
13. “Derrick operations must be supervised by a **competent person**.” (SubpartCC; 29 CFR 1926.1436(o))
14. “*Wind speed and direction indicator*. A **competent person** must determine if wind is a factor that needs to be considered; if wind needs to be considered, a wind speed and direction indicator must be used.” (SubpartCC; 29 CFR 1926.1437(e)(3))
15. “The shift and monthly inspections are conducted by a **competent person**.” (SubpartCC; 29 CFR 1926.1437(e)(3))

Environmental Compliance

S3AM-204-PR1

1.0 Purpose and Scope

- 1.1 This procedure establishes a process for assuring compliance with applicable environmental laws and regulations.
- 1.2 This procedure applies to all AECOM America-based employees and operations.

2.0 Terms and Definitions

The terms and definitions relating to environmental compliance and hazardous waste management are included in the respective laws and regulations in Canada, Latin America and the United States.

- 2.1 **Applicable Environmental and Hazardous Waste Management Laws and Regulations** – The specific legal requirements that apply to an AECOM office or project. Laws and regulations vary considerably throughout the Americas.
- 2.2 **Compliance Map** – a document defining and detailing the actions necessary to assure compliance with applicable environmental legal requirements.
- 2.3 **Reportable Quantity (RQ)** – quantities of hazardous substances, which when released to the environment require notification to the appropriate authorities / agencies (i.e. National Response Center, local police, coast guard, etc.). Multiple agencies and regulations have established RQs; RQs may differ by agency.
- 2.4 **Subject Matter Expert** – a person who is an expert in a particular topic or area based on experience, technical/regulatory knowledge, and/or training.
- 2.5 **Hazardous Wastes** – Hazardous waste laws and regulations are complex and vary considerably throughout the Americas. For example, based on the Canadian Environmental Protection Act of 1999, in Canada hazardous wastes and hazardous recyclable materials are defined as those with properties such as flammability, corrosiveness or inherent toxicity. According to EPA regulations, a hazardous waste is a waste with properties that make it dangerous or potentially harmful to human health or the environment. Hazardous waste can take many physical forms and may be solid, semi-solid, liquid, or even contained gases. Hazardous wastes fall into the categories of listed wastes and characteristic wastes. The characteristic wastes exhibit one of more of the following characteristics: ignitability, corrosivity, reactivity and toxicity.
- 2.6 **Generator of Hazardous Wastes** – For example, based on the Resource Conservation and Recovery Act (RCRA) and Environmental Protection Agency (EPA) regulations in the United States, a hazardous waste generator is any person or site whose processes and actions create hazardous waste. Generators are divided into three categories based on the quantity of waste they produce. Large quantity generators generate 1,000 kilograms per month or more of hazardous waste, more than 1 kilogram per month of acutely hazardous waste, or more than 100 kilograms per month of acute spill residue or soil. Small quantity generators generate more than 100 kilograms, but less than 1,000 kilograms, of hazardous waste per month. Conditionally Exempt Small Quantity Generators generate 100 kilograms or less per month of hazardous waste, or 1 kilogram or less per month of acutely hazardous waste, or less than 100 kilograms per month of acute spill residue or soil.
- 2.7 **Storage** – Per EPA regulations, storage is defined as the temporary holding of waste before the waste is treated, disposed of or stored somewhere else.
- 2.8 **Treatment and Disposal** – Per EPA regulations, treatment and disposal is any process that changes the physical, chemical or biological characteristics of a waste to minimize its threat to the environment.

3.0 References

- 3.1 AECOM Safety, Health and Environment Policy Statement
- 3.2 S3AM-004-PR1 Incident Reporting, Notifications & Investigation
- 3.3 S3AM-017-PR1 Injury & Illness Recordkeeping
- 3.4 S3AM-109-PR1 Asbestos
- 3.5 S3AM-110-PR1 Laboratories
- 3.6 S3AM-116-PR1 Hazardous Materials Shipping
- 3.7 S3AM-209-PR1 Risk Assessment & Management
- 3.8 S3AM-216-PR1 Compliance Assurance

4.0 Procedure

Subject matter experts knowledgeable in Canada, Latin Americas and the United States environmental and hazardous waste laws and regulations should be consulted for clarification of the requirements. Hazardous waste laws and regulation may vary by provinces in Canada, countries in Latin Americas and states in the United States. It is critical to understand the specific requirements in the various offices and project locations in the Americas.

4.1 Roles and Responsibilities

4.1.1 Managers (Operations) directing activities of the facility, site, or project location

- Ensure the areas they manage are in compliance with applicable environmental and hazardous waste laws and regulations. The SH&E Plan shall identify all applicable SH&E requirements the particular project/location is responsible for meeting.
- Participate in assessing the applicable activities, products or services for associated environmental impacts. Refer to *S3AM-204-ATT2 Aspects and Environmental Impacts Assessment* as a guideline.
- Ensure the necessary resources exist to comply with these requirements and is responsible for working with the SH&E team to audit compliance.
- Consult subject matter experts on an ongoing basis to ensure up-to-date specific requirements of applicable legislation and regulation are met.
- Ensure relevant information and compliance requirements are communicated to all affected personnel. As applicable, refer to *S3AM-204-ATT3 Environmental Management Plan (Sample)*.

4.1.2 Project / Location Manager

- Identifying and implementing the actions necessary to ensure compliance with the project / location's applicable environmental and hazardous waste requirements. As applicable, this may include:
 - Participating in the assessment of applicable activities, products or services for associated environmental impacts. Refer to *S3AM-204-ATT2 Aspects and Environmental Impacts Assessment* as a guideline.
 - Ensuring procedures for conducting any activities that could have a significant environmental impact are established.
 - Ensuring procedures for identification of significant environmental aspects of goods and services used by AECOM are established.
 - Identifying and understanding the applicable legal requirements that applies to the project / location's activities.

- Verifying that staff have the appropriate environmental and hazardous waste management training prior to performing assigned activities.
- Budgeting the necessary resources into each project / location to achieve compliance with applicable legal requirements.
- As applicable, verifying that Legal Counsel and Office of Risk Management (ORM) have reviewed and approved the signed client's Agency Agreement authorizing AECOM to sign a waste manifest or sign shipping papers "as an agent of that client." NOTE: It is AECOM's policy that AECOM personnel will not sign client waste manifests or shipping papers unless authorized to do so by AECOM Legal Counsel and ORM.
- Obtaining all applicable environmental permits prior to the start of any regulatory permitted activity, including those permits held by the client which may impact AECOM's activities.
- Assessing the compliance status of AECOM's activities.
- Implementing any identified corrective actions relative to noted potential environmental compliance deficiencies.
- Identifying environmental regulatory noncompliance or near misses to AECOM's incident report system
- Ensuring project / location-specific environmental compliance plan is developed and documented in the form of Environmental Management Plans (EMP) or equivalent (refer to *S3AM-204-ATT3 Environmental Management Plan (Sample)* as a guideline and to *S3AM-204-ATT1 Environmental Compliance Maps* for examples of Compliance Maps).
- Consult subject matter experts on an ongoing basis to ensure up-to-date specific requirements of environmental legislation and regulation are met.
- Ensure relevant information and compliance requirements are communicated to all affected staff.

4.1.3 Employees

- Reporting all environmental releases or permit exceedances immediately as per *S3AM-004-PR1 Incident Reporting, Notifications & Investigation*.
- Performing all project-related tasks in compliance with applicable environmental legal requirements.
- Signing waste manifests only if authorized by the Project Manager and Region Counsel. Refer to *S3AM-116-PR1 Hazardous Materials Shipping*.

4.1.4 SH&E Manager

- Assisting operations personnel in assuring that activities undertaken by Operations are in compliance with environmental legal requirements, including but not limited to:
 - Assisting operations in identifying applicable environmental and hazardous waste laws and regulations and Subject Matter Experts.
 - Supporting compliance assessments of operations activities as needed. Refer to *S3AM-204-ATT2 Aspects and Environmental Impacts Assessment* as a guideline.
 - Reporting regulatory potential noncompliance events that result in a notice of violation, notice of noncompliance, or other indication of noncompliance to both management and region counsel.
 - Reporting to management and legal counsel, as applicable, on the status of identified corrective actions.

4.1.5 Legal Counsel

- Reviewing, commenting on, and approving a client's signed Agency Agreement letter authorizing AECOM to sign a waste manifest or shipping papers "as an agent of the client."
- Taking appropriate action upon notification that AECOM received a notice of violation or any other written notice of noncompliance, or becoming aware of a noncompliance situation.
- Supporting operation's response to notices of violation or any other written notice of noncompliance issued to AECOM from a regulatory agency.

4.1.6 America's Office of Risk Management

- Reviewing, commenting on, and approving a client's signed Agency Agreement letter authorizing AECOM to sign a waste manifest or shipping papers "as an agent of the client."

4.2 Office Compliance

4.2.1 Overall – AECOM offices must comply with the applicable environmental and hazardous waste laws and regulations. This section describes some potential office related activities that can be subject to environmental laws and regulations.

4.2.2 Shipping Materials – The shipping and manifesting of hazardous materials from an AECOM office is subject to *S3AM-116-PR1 Hazardous Materials Shipping* procedure. Employees associated with shipping (such as with Federal Express, UPS and others) must be trained in their responsibilities and ensure they comply with the applicable shipping and manifesting requirements.

4.2.3 Storage of Chemicals and Wastes - Some AECOM offices may store chemicals and wastes. If so, these offices must comply with the applicable laws and regulations governing these activities.

4.2.4 Applicable Permits – Most AECOM offices will not require an air or water permit for discharges. If hazardous wastes are present in AECOM offices, they should be properly disposed of within 90 days. The off-site disposal of hazardous waste from AECOM offices must be properly manifested and both the waste hauler and the disposal facility must be permitted by the applicable environmental agencies. If hazardous waste is stored for greater than 90 days, a hazardous waste storage permit would be required.

4.3 Project Compliance

4.3.1 Obtaining Necessary Permits

4.3.1.1 Air Permits – If a project will result in emissions to the air, the project will likely require an air permit. It is important to work closely with the client as the permit may need to be applied for by the client.

4.3.1.2 Water Permits – For projects that involve discharges to receiving bodies of water (rivers, streams, etc.), storm sewers and sanitary sewers, AECOM needs to work closely with our clients to ensure all water related permits are obtained prior to start-up of the projects.

4.3.1.3 Waste Management and Waste Storage Permits – Federal, state, provincial and local environmental agencies have many regulations related to proper waste management (i.e. approval of spill containment plans, wastes placed in drums and containers must be properly labeled, etc.). Ensure appropriate approvals and permits are in place where required (i.e. British Columbia – approval of Operational Plan; United States – permit required for hazardous wastes stored on project sites for periods greater than 90 days). This may require working closely with the client to obtain required approvals and/or permits.

4.3.1.4 For projects where a client is authorizing AECOM to manage their waste, AECOM Employees must never sign a waste manifest indicating AECOM is the generator of the waste unless approved to do so by AECOM Legal Counsel and Americas Office of Risk Management.

- 4.3.2 Incident Reporting – Employees must promptly report to the client and work closely with the client in reporting to regulatory agencies any spills or releases into the environment. This includes: discharges of contaminated groundwater to a sanitary sewer or storm water sewer system unless authorized by the regulatory agencies involved to do so; spills of oil, petroleum products, or other chemicals to the ground or water bodies; and any release of hazardous substances in amounts greater than their “reportable quantities –as defined by regulations. Employees must also report these incidents into AECOM’s incident reporting system.
- 4.3.3 Laboratory Operations – Where AECOM has laboratory operations, the disposal of laboratory chemicals into laboratory drains is not allowed. Water discharges from laboratory operations must meet applicable environmental legal requirements.
- 4.3.4 Asbestos Management – There are many regulations governing asbestos management. Regulations may include implementing an Asbestos Management Plan; providing notice to air and other regulatory agencies relating to asbestos abatement plans prior to the start of any abatement operations; and the abatement and disposal of asbestos. Refer to *S3AM-109-PR1 Asbestos*.
- 4.3.5 Environmental Management Plan (EMP) or equivalent – Documented at the site/office and project level, to ensure proper planning of operations with respect to the environment (as determined by the aspects and impacts assessment). Refer to *S3AM-204-ATT3 Environmental Management Plan (Sample)*.
- Initial steps in developing the EMP includes assessing environmental impacts of the activities, products or services to be undertaken. Refer to *S3AM-204-ATT2 Aspects and Environmental Impacts Assessment* as a guideline. This completed assessment may be included in the EMP.
 - As required, each office / project must identify and document applicable environmental regulatory requirements in their EMP, or equivalent.
 - It is advisable to develop a Compliance Map for those projects where AECOM is a permit holder or where AECOM is operating under a client’s permit. Compliance maps can indicate the applicable actions, limits, records retention requirements, and applicable submittals to ensure compliance with applicable environmental legal requirements, refer to *S3AM-204-ATT1 Environmental Compliance Maps* for examples of Compliance Maps.
 - EMP (or equivalent) shall include documented procedures for conducting any activities that could have a significant environmental impact (e.g., remodeling activities, laboratory operations).
 - EMP shall identify required records management with respect to any environmental-related monitoring equipment (e.g., tank monitoring equipment, pH meters used prior to discharge to sanitary sewers, etc.).
 - As applicable, the EMP, or equivalent, shall include procedures for identification of significant environmental aspects of goods and services used by AECOM (e.g., office supplies, utilities, subcontractors, commuting, and project- and overhead-related travel).
 - If customer, client, or facility owner EMP fully encompasses AECOM operations, it is not necessary to create an AECOM - specific EMP.
 - If not already included in SH&E Plans and Emergency Response plans, the EMP or equivalent shall include procedures to identify the potential for and response to upsets, incidents, and emergency situations. These plans also include procedures for preventing and mitigating the negative impacts of any emergencies.
 - EMP (or equivalent) shall include provisions for a commitment to conduct (at least annually) an evaluation of compliance with relevant environmental legislation, as well as opportunities for improvements.
 - *S3AM-204-ATT3 Environmental Management Plan* may be used as a template to prepare an EMP.

- 4.3.6 Releases/Spills – Where the possibility of an environmental release exists due to AECOM activities, the Reportable Quantity for regulated substances must be identified prior to the start of work. Any release or spill must be immediately reported to the client and depending on the material and quantity of material released or spilled, reported to regulatory agencies.
- 4.3.7 Subject Matter Experts – When necessary, project teams will consult with Subject Matter Experts to identify the necessary permitting/licensing and/or applicable regulations governing the planned scope of work. Example guiding questions that project teams may use to initially assess their project's environmental compliance needs include, but are not limited to:
- Will AECOM's activities have the potential to discharge any hazardous or other regulated chemicals/materials to the air?
 - Is there any equipment on site that has an air permit or similar regulatory requirement governing air discharges to the environment? Note: This should include client-owned equipment that AECOM will operate and have contractual regulatory liability for during the planned scope of work.
 - Will AECOM manage characteristic or listed hazardous waste for the client?
 - Will AECOM activities generate nonhazardous, universal, or hazardous waste subject to requirements?
 - Is this a site or facility where AECOM will perform activities under the Resource Conservation and Recovery Act (RCRA – United States), Canadian Environmental Protection Act (CEPA – Canada), a Consent Order or any other applicable jurisdictional regulatory body?
 - Is the site or facility a hazardous waste generator (i.e., large quantity, small quantity, or conditionally-exempt small quantity)?
 - What oil storage capacity does the site or facility have (count containers/equipment with capacities of 55 gal or greater)?
 - Will AECOM's activities create a discharge into a surface water body?
 - Will AECOM's activities disturb ≥ 1 acre of land surface area?
 - Will AECOM's activities physically disturb or impact a wetland?
- 4.4 Environmental Compliance Assessments
- 4.4.1 AECOM will periodically assess its operations (offices and project sites) and activities to verify ongoing activities comply with applicable environmental legal requirements. Assessments shall be conducted, as a minimum, on an annual basis. The frequency of these documented environmental compliance assessments should be based on the complexity of the project/size of the office and the associated environmental compliance risks to AECOM.
- 4.4.2 The Managers (Operations) or Project/Location Managers will conduct the assessment or designate a qualified individual to conduct the assessment.
- 4.4.3 The environmental compliance assessment, refer to *S3AM-204-FM1 Office/Project Environmental Compliance Assessment Checklist*, will provide information to AECOM management on the environmental compliance performance of specific operations.
- 4.4.4 The assessment can be combined into a periodic, comprehensive audit; typically, a business systems audit incorporating quality assurance, health and safety, and environmental components.
- 4.5 Environmental Incident or Non-Compliance
- 4.5.1 Should an assessment identify non-compliance issues or an environmental incident occurs, the severity level must be assessed for appropriate response. Refer to *S3AM-004-PR1 Incident Reporting, Notifications & Investigation*. Ensure the parties appropriate to the severity are contacted and involved with issue resolution (e.g. Legal Counsel).

- 4.5.2 If a regulatory Notice of Violation (NOV) is received by an AECOM facility or project, Legal Counsel shall be contacted and involved with issue resolution.
- 4.5.3 The issue or incident must be investigated and will be documented and tracked. Refer to *S3AM-004-PR1 Incident Reporting, Notifications & Investigation*. The documented investigation must:
 - Identify the cause (root cause).
 - Identify corrective actions.
 - Assign responsibility to implement or modify controls to prevent reoccurrences and establish scheduled date of completion.
 - Identify methods to inform impacted staff of any revisions to written procedures.
- 4.5.4 The documentation must be reviewed for actual completion and effectiveness of controls.
- 4.5.5 Document, review, and communicate appropriate lessons learned for incidents and near misses (including environmental).

5.0 Records

- 5.1 Comply with *S3AM-017-PR1 Injury & Illness Recordkeeping* requirements.
- 5.2 Maintain or keep accessible the following additional records/documentation:
 - 5.2.1 Relevant laws and regulations (may be accessed via the web).
 - 5.2.2 Facility and project non-compliance records.
 - 5.2.3 Training records (maintained at the facility level, with the exception of modules tracked in computer-based training).
 - 5.2.4 Required equipment inspections, waste storage area inspections, maintenance, and calibration information (in accordance with site EMP).
 - 5.2.5 Relevant contractor/supplier information (in accordance with the site EMP or project-specific waste management plans) with respect to waste disposal vendors, transportation companies, etc.
 - 5.2.6 Agency citations/Notice of Violations and any supporting information.
 - 5.2.7 Information on emergency preparation and response.
 - 5.2.8 Copies of Environmental Aspect and Impact Assessments (maintained by the safety representative for office locations or in the project files for project-related assessments). Refer to *S3AM-204-ATT2 Aspects and Environmental Impacts Assessment*.
 - 5.2.9 Completed Compliance Assessment checklists and audit results.

6.0 Attachments

- 6.1 [S3AM-204-FM1 Office/Project Environmental Compliance Assessment Checklist](#)
- 6.2 [S3AM-204-ATT1 Environmental Compliance Maps](#)
- 6.3 [S3AM-204-ATT2 Aspects and Environmental Impacts Assessment](#)
- 6.4 [S3AM-204-ATT3 Environmental Management Plan \(Sample\)](#)

Americas

Office/Project Environmental Compliance Assessment Checklist

S3AM-204-FM1

This form applies to all Americas-based AECOM employees involved with the assessment of Office and Project / Location environmental compliance.

It is recommended to use this checklist to assess the environmental compliance status of an office or project location. Assess all printing rooms, laboratories, maintenance areas, garages, or any other area where equipment or activities generate, store, treat, or dispose of wastewater, raw chemicals, air emissions, or solid waste.

After completion of the assessment, discuss findings with the Office / Project / Location Manager and document the findings/deficiencies in the applicable tracking system. Upon completion, submit this assessment to the SH&E Manager.

Office Location / Project Name:

Office Facilitator / Project / Location Manager:

Subject Matter Expert (as applicable):

EMP (Compliance Map) Completed: Yes ☐ No ☐ NA ☐ Date Last Reviewed? _____

SH&E Manager:

Compliance Assessment Completed By:

Date Completed:

i. Are environmental hazards (e.g., lab chemicals, petroleum products, radioactive materials, gas cylinders, etc.) stored at this office or project location? Yes ☐ No ☐ If yes, complete the table below

Hazardous Material	Volume	How Stored	Where & is Safety Data Sheet available
1.			
2.			
3.			
4.			
5.			
Comments:			

- ii. Are any liquid or solid waste products (e.g., waste oil, waste solvents, toner cartridges, paints, used batteries, degreasing sludge, etc.) generated, stored, treated, recycled, or disposed of at this office or project location? Yes ☐ No ☐ *If yes, complete the table below*

Waste	Volume/yr	How Stored	Disposed (Y/N)	Recycled (Y/N)
1.				
2.				
3.				
4.				

Comments:

- iii. For recycled or disposed waste products defined above, identify the recycling/disposal company or facility. For material sent to a recycler, have you required and/or received a statement from the recycler that the material will be properly managed? Yes ☐ No ☐ *If yes, complete the table below*

Recycling/Disposal Company	Company Location	Recycling/Disposal Statement (Y/N)
1.		
2.		
3.		

Comments:

- iv. Do site-generated wastewaters (other than domestic wastewater) enter a sewer line, a pollutant discharge elimination system, or a drainage ditch/retention pond? This includes vehicle wash water, oil and grease, antifreeze, lab chemicals, etc. Yes ☐ No ☐ *If yes, complete the table below*

Waste Type	Discharge Point	Volume/yr	Permit Req'd (Y/N)
1.			
2.			
3.			

Comments:

v. Is this office or project involved with hazardous material (HzM) shipping via ground and/or air? Yes <input type="checkbox"/> No <input type="checkbox"/> <i>If yes, complete the table below</i>		
Typical HzM	Typical Frequency/Volume	Typical Destination
1.		
2.		
3.		
Comments:		
vi. If the answer to Item v. is yes, has the appropriate training as per the identified hazards and jurisdiction been conducted for applicable employees (i.e. TDG, DOT Level 2 shipper, etc.)? Yes <input type="checkbox"/> No <input type="checkbox"/> <i>If yes, complete the table below (no need to list every person with this training)</i>		
Employee Name	Training Date	
1.		
2.		
3.		
Comments:		
vii. If the answer to Item v. is yes, are records of HzM shipments available for review by regulatory auditors or inspectors as required (retained for 3 years on-site – United States; retained for 2 years and available within 15 days of request – Canada)? Yes <input type="checkbox"/> No <input type="checkbox"/> <i>If yes, complete the table below (no need to list every person with this training)</i>		
Shipment Date	HzM Shipped	HzM Shipper
1.		
2.		
3.		
Comments:		

viii. Does this office or project site store potentially contaminated samples (e.g. soil and groundwater samples)? Yes <input type="checkbox"/> No <input type="checkbox"/> <i>If yes, complete the table below</i>			
Where Stored		How Stored	How Disposed
1.			
2.			
3.			
Comments:			
ix. Does this office or project operate equipment which generates air emissions through a vented hood or other point source? Yes <input type="checkbox"/> No <input type="checkbox"/> <i>If yes, complete the table below</i>			
Process	Air Emission Characteristics	Operation Frequency	Permit Req'd (Y/N)
1.			
2.			
3.			
Comments:			
x. Are ground maintenance activities self-performed by this office or project location? Yes <input type="checkbox"/> No <input type="checkbox"/> <i>If yes, complete the table below</i>			
Products Used		Approximate Quantities/yr	
1.			
2.			
3.			
Comments:			

xi. Are underground storage tanks owned or operated at this office or project site?

Yes ☐ No ☐ *If yes, complete the table below*

Number & Volume	Material Stored	Waste (Y/N)	Leak Detection (Y/N)	Registered (Y/N)	Released (Y/N)
1.					
2.					
3.					

Comments:

xii. Are aboveground storage tanks owned or operated at this office or project site?

Yes ☐ No ☐ *If yes, complete the table below*

Number & Volume	Registration #	Material Stored	Waste? (Y/N)	Permit? (Y/N)	Secondary Containment (Y/N)	Release? (Y/N)
1.						
2.						
3.						

Comments:

xiii. Does this office or project site own or operate a potable water well, septic system, stormwater discharge, or water softening process? Yes ☐ No ☐ *If yes, complete the table below*

Type	Description	Permitted? (Y/N)
1.		
2.		
3.		

Comments:

xiv. Does this office or project site operate under any EPA, State or local permit conditions?

Yes ☐ No ☐ If yes, complete the table below

Type	Purpose	Permit No.	Expiration	Noncompliance Issues
1.				
2.				
3.				

Comments:

xv. Does this office or project site generate hazardous wastes requiring an EPA or state ID Number?

Yes ☐ No ☐ If yes, complete the table below

ID Number	Company Name associated with ID	Process Covered by the ID Number	Agency who Issued the ID Number
1.			
2.			
3.			

Comments:

Environmental Compliance Maps

S3AM-204-ATT1

1.0 Recommendation

- 1.1 The Environmental Compliance Map provides information required in an Environmental Management Plan, or equivalent, and can subsequently be inserted directly into the Plan. Refer to *S3AM-204-ATT3 Environmental Management Plan (Sample)*.
- 1.2 Project teams supporting complex projects requiring environmental/regulatory permitting, Operation & Maintenance (O&M) of client- or AECOM-permitted systems, or other licensing of processes or equipment should develop a *Compliance Map* to identify the associated permits, licenses, or applicable environmental requirements including defined actions, limits, and records retention requirements.
- 1.3 The project team should confirm the accuracy of a Compliance Map with an appropriate Subject Matter Expert.
- 1.4 The project team should review the Compliance Map at least annually or when a change in regulations, permit, equipment, or process occurs to verify continuing compliance with the associated permit, license, and applicable environmental requirements.
- 1.5 The project team should authorize an individual to take prompt corrective measures when a potential deviation from the Compliance Map is reported. A potential deviation resulting in a known or possible state of regulatory non-compliance involving AECOM will be immediately reported per *S3AM-004-PR1 Incident Reporting, Notifications & Investigations*. The project team will contact Legal Counsel and ascertain the need to further report the known or potential non-compliance event to the client and/or applicable regulatory agency. If AECOM is not the designated permittee or licensed organization, AECOM should not report a known or possible state of regulatory non-compliance without first notifying the client and receiving verbal or written communication directing AECOM to report the event to the applicable regulatory agency.

2.0 Examples of Typical Compliance Maps

This section presents some example compliance maps. One is for environmental sampling of a National Pollutant Discharge Elimination System (NPDES) outfall. The other is for Nuclear Density/Moisture Gauge Radioactive Materials License.

2.1 Environmental Sampling for a National Pollutant Discharge Elimination System (NPDES) Outfall

Topic	Task	Task Description	Frequency	Regulatory Citation
Storm Water	Sample Outfall 001 for benzene and pH	Quarterly sample Outfall 001 for benzene and pH. Limit is 5 ug/L and 6.5 - 9 s.u. Record inspector, location, date and time of sampling using Form 3. Maintain records for at least 3 years.	Quarterly by December 31, March 31, June 30 and October 31.	Part A.3 in NPDES Permit
Storm Water	Collect weekly flow measurements from Outfall 001	Record inspector, location, date and time of sampling using Form 4. Maintain records for at least 3 years.	Weekly.	Part A.4 in NPDES Permit
Storm Water	Submit the Discharge Monitoring Report (DMR) Form	Complete the agency DMR form and have client or responsible party sign and certify DMR. If outfall did not have a discharge, fill out form stating as such. If additional monitoring is performed, submit those results also. Submit by the 28th of the month following the end of the quarter. Maintain records for at least 3 years.	Quarterly by January 28, April 28, July 28 and October 28.	Part B.2 in NPDES Permit

2.2 Nuclear Density/Moisture Gauge Radioactive Materials License

Requirement	Due Date	Submit To	Requiring Document (State of Florida, Radioactive Materials License No.: xxxx-1, Amendment No.: 7)	Comments
Authorized storage location is [insert address]	As required	State of Florida DOH	Conditions 10.B.	If the office relocates, the RSO must submit the change to the State of Florida and request Amendment No.: 8.
Maintenance of training for NDMG users	Quarterly	File	Conditions 12.A.	NDMG operator and DOT shipping training must be maintained for the duration of employment of the individual or 5 years, whichever is greater. Training certificates should be uploaded into LMS.
Leak test on moisture/density gauges	At least every 12 months	File	Conditions 16.	Leak test should be scheduled no later than the 10 th month following the most recent leak test.
Physical inventory and inspection of all sealed sources received/possessed under License No.: xxxx-1	At least every 6 months	File	Conditions 17.	
Maintenance of inventory records	Quarterly	File	Conditions 17.	Inventory records will be filed for 3 years from the date of the inventory inspection. The inventory records must include the following: <ol style="list-style-type: none"> 1. Manufacturer's name 2. Model and Serial Nos. of each sealed source 3. Identify of each sealed source's radionuclide and it's estimated activity 4. The location of each sealed source 5. The date the inventory was completed 6. RSO's signature

Americas

Aspects and Environmental Impacts Assessment

S3AM-204-ATT2

Aspects are the activities, products or services associated with the applicable operations that interact with the environment. This includes energy use, water use, materials use and purchase, waste production and vegetation clearance.

Impacts are the changes in the environment caused by these activities, products or services, including the emissions of greenhouse gases, land degradation, biodiversity loss, water, and air and soil pollution.

Start by listing the different activities and functional units. Then assess their associated environmental aspects and impacts. As an example, the following list provides information gathered from departments on their identified environmental aspects and impacts.

Aspects	Potential impacts	Aspects	Potential impacts
Energy use	<ul style="list-style-type: none"> Greenhouse gas emissions Air quality Consumption of non-renewable resources Biodiversity impacts Water quality impacts 	Emissions of volatile organic compounds	<ul style="list-style-type: none"> Land health and productivity Greenhouse gas emissions Air quality Biodiversity impacts Water quality impacts
Waste to landfill	<ul style="list-style-type: none"> Consumption of non-renewable resources Greenhouse gas emissions Biodiversity impacts Water quality impacts Land health and productivity 	Discharges to stream	<ul style="list-style-type: none"> Depletion of non-renewable resources Water quality impacts Biodiversity impacts Land health and productivity
Water use	<ul style="list-style-type: none"> Consumption of non-renewable resources Water quality Land health and productivity Greenhouse gas emissions Biodiversity impacts 	Chemical spills and leaks	<ul style="list-style-type: none"> Land health and productivity Depletion of non-renewable resources Water quality impacts Biodiversity impacts
Raw material and resource use	<ul style="list-style-type: none"> Depletion of non-renewable resources Loss of habitat Biodiversity impacts Water quality impacts Greenhouse gas emissions Land health and productivity 	Land clearing	<ul style="list-style-type: none"> Water quality impacts Biodiversity impacts Land health and productivity
Use of paper	<ul style="list-style-type: none"> Depletion of non-renewable resources Water quality impacts Biodiversity impacts Greenhouse gas emissions Land health and productivity 	Product development	<ul style="list-style-type: none"> Depletion of non-renewable resources Greenhouse gas emissions Air quality impacts Water quality impacts Biodiversity impacts Land health and productivity

Develop a table of the different environmental aspects and impacts associated with the functions and activities of your location. Try to be as specific and accurate as possible, as the next steps will be to determine what data can be collected to measure these and whether they are a priority for your agency.

For example:

Location Aspects and Impacts Assessment

Create Date		Update Date	
Site	Activity	Aspect	Impacts
Dallas Depot	Lighting	Energy use Resource use – light bulbs	<ul style="list-style-type: none"> Greenhouse gas emissions Air quality Consumption of non-renewable resources.
	Motor vehicle use	Petrol consumption Oil consumption Materials/servicing	<ul style="list-style-type: none"> Greenhouse gas emissions Air quality Consumption of non-renewable resources Soil, air and water pollution.
	Printing	Energy use Paper consumption Waste generation	<ul style="list-style-type: none"> Consumption of non-renewable resources Greenhouse gas emissions Biodiversity impacts Water quality impacts Land health and productivity.

NOTE: If your location is considering the ISO 14001 accreditation, this process of identifying aspects and impacts is an integral part of the documentation required.

Your completed table may be used in developing an Environmental Management Plan. Refer to *S3AM-204-ATT3 Environmental Management Plan (Sample)*. It is expected that office / project / location management and SH&E management will participate in and/or support the initial development and annual updates to this table.

The table should be reviewed and updated on an annual basis. This table can be tracked as a separate locally controlled document or as part of the location specific Plan.

Americas**Environmental Management Plan (Sample)****S3AM-204-ATT3**

This example Environmental Management Plan (EMP) Table of Contents is provided as an aid in developing a site plan. Not all elements will be applicable for all types of operations. It is not necessary to include all sections listed if they are not relevant to the scope of activities at the site. Do not overlook situations where AECOM is involved in maintenance activities, owns and operates vehicles, has laboratory or bench scale operations, has been issued any environmental permits, has onsite storage tanks, etc. If AECOM operations are housed within a client facility, the content of this plan must align with any client site wide EMPs.

Initial steps in developing the Environmental Management Plan includes assessing environmental impacts of the activities, products or services to be undertaken. Refer to *S3AM-204-ATT2 Aspects and Environmental Impacts Assessment* as a guideline. This completed assessment may be included in the Environmental Management Plan.

It is advisable to develop a Compliance Map for those projects where AECOM is a permit holder or where AECOM is operating under a client's permit. Compliance maps can indicate the applicable actions, limits, records retention requirements, and applicable submittals to ensure compliance with applicable environmental legal requirements, refer to *S3AM-204-ATT1 Environmental Compliance Maps* for examples of Compliance Maps. The Environmental Compliance Map provides information required in an Environmental Management Plan, and can subsequently be inserted directly into the Plan.

Table of Contents Template (Include as Applicable to Site Operations)

Table of Contents
 Environmental Management Plan (EMP) Approval
 List of Significant Changes

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Permits to Install or Operate	
Special Requirements (Refrigerants and Halon Fire Fighting Agents)	
Fugitive Emissions and Dust Control	
SOLID WASTE AND RECYCLING	
Solid Waste Management	
Paper and Compostable Materials	
Scrap Metal and Concrete	
Used Tires and Batteries Collection and Disposal	
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Incident Reporting, Notification & Investigation	
Responsibilities	
Spill Response Management	
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Identification of Hazardous Material Storage Areas	
Storage of Flammable/Combustible Liquids	
Storage of Compressed Gas and Compressed Flammable Gas Cylinders	
Unauthorized Storage and Disposal	
Hazardous Material/Waste Minimization	
Record Keeping	
HAZARDOUS WASTE, UNIVERSAL WASTE, AND CONTROLLED MATERIAL	
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Identification of Hazardous Waste, Universal Waste, and Controlled Material	
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Storage Requirements	
Safe Drum Handling and Storage Practices	
Spill Kits, Personal Protective Equipment (PPE) and Other Equipment Requirements	
Segregation of Hazardous Waste, Universal Waste, and Controlled Material Containers, Spill Containment	
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Maintenance and Cleaning Materials	
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Aerosol Cans	
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Asbestos and Asbestos Containing Materials - Identification and Management	
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Closed Loop Re-Refining Oil Program	
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Hazardous Materials Management
Hazardous Waste, Universal Waste and Controlled Material
Spills Management
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Community Noise Control from Operations

TRAINING
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INSPECTIONS
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Permitted Facility Inspections
Solid Waste Inspections
Stormwater Inspections
On-site and Off-site Dust Control Observations
Storage Tank Inspections
Hazardous Waste Storage Area Inspections

APPENDICES (As Needed/Relevant)

Appendix A	Refrigerant Recovery and Recycle Compliance Inspection Report
Appendix B	Building Hazardous Chemical Inventory Instructions
Appendix C	List of Items Authorized for Disposal
Appendix D	Universal Waste and Controlled Material Accumulation Points
Appendix E	Hazardous Materials/Hazardous Waste Storage Incompatibility Chart
Appendix F	Sample Handling Procedures Form
Appendix G	Disposition of Hazardous and Universal Waste and Controlled Material
Appendix H	Environmental Site File Table of Contents

Appendix I	Organization Weekly Multi-Media Inspection Checklist
Appendix J	Best Management Practice (BMP) Checklist/Stormwater Inspection
Appendix K	Site Guide to Recycling
Appendix L	Safety Data Sheets (SDS) for Chemicals and Products in Inventory
Appendix M	Regulatory Notification and Emergency Contact List

ENVIRONMENTAL MANAGEMENT PLAN APPROVAL

This plan has been approved with authority to commit the necessary resources to implement this Environmental Management Plan.

Developed By:

SH&E Manager

Date

Approved By:

Office / Project / Location Manager

Date

Personal Protective Equipment

S3AM-208-PR1

1.0 Purpose and Scope

- 1.1 Provide an effective Personal Protective Equipment (PPE) Program to protect AECOM employees from potential workplace safety and health hazards.
- 1.2 This procedure applies to all AECOM Americas-based employees and operations.
- 1.3 The proper use of appropriate PPE, in combination with effective engineering and administrative controls, can provide AECOM employees with protection against potential workplace hazards and can reduce the potential for workplace injury and illness.

2.0 Terms and Definitions

- 2.1 **ANSI** – American National Standards Institute
- 2.2 **CSA** – Canadian Standards Association
- 2.3 **PPE** – Personal Protective Equipment
- 2.4 **SDS** – Safety Data Sheets
- 2.5 **THA** – Task Hazard Assessment

3.0 References

- 3.1 S3AM-123-PR1 Respiratory Protection
- 3.2 S3AM-209-PR1 Risk Assessment & Management
- 3.3 S3AM-301-PR1 Confined Spaces
- 3.4 S3AM-304-PR1 Fall Protection
- 3.5 S3AM-315-PR1 Working On & Near Water
- 3.6 S3AM-317-PR1 Hand Safety

4.0 Procedure

- 4.1 Roles and Responsibilities
 - 4.1.1 **Managers or Supervisors**
 - Confirm the location specific SH&E Plan documents required hazard controls.
 - Confirm Task Hazard Assessments (THAs) are conducted and hazards identified are eliminated through substitution, engineering, or administrative controls first before assigning PPE for hazard mitigation.
 - Confirm appropriate subject matter experts, manufacturer's specifications, and regulatory requirements are consulted as necessary to assist with proper PPE selection.
 - Match the appropriate PPE to those hazards that cannot be eliminated; support employees in exercising Stop Work Authority if the task is too hazardous to be mitigated
 - Provide and document employee training on use and care of PPE.
 - Determine which staff requires employee-issued PPE.

- If applicable, manage medical monitoring of employees using PPE (e.g. respirators, hearing protection, radiation, etc.).
- Approve the purchase of company-issued PPE.
- Confirm that appropriate PPE is utilized by employees when required or necessary. This may periodically be documented using *S3AM-208-FM2 Personal Protective Equipment Inspection*.
- Exercise Stop Work Authority if PPE is inadequate to address hazards

4.1.2 **SH&E Managers**

- Provide guidance to Managers, Supervisors, and staff on the assessment of hazards and the selection of PPE.
- Provide training materials to Managers and Supervisors for employee training

4.1.3 **Employee**

- Review all relevant SH&E Plans, THAs and applicable SDS prior to commencing work.
- Exercise Stop Work Authority if the task is too hazardous.
- In accordance with training and instructions, utilize appropriate PPE that has been issued when required or necessary.
- Inspect PPE prior to and after use to confirm that it is functional, and maintain PPE in a clean and functional condition.
- Follow instructions and manufacturers' guidance on the care, use, and storage of PPE.
- Replace PPE when worn out, expired or damaged.
- Refrain from wearing PPE outside of the work area for which it is required if doing so would constitute a hazard.

4.2 Hazard Assessment

- 4.2.1 The location specific SH&E plan and THA shall assess the hazards and identify the necessary control measures. Refer to *S3AM-209-PR1 Risk Assessment & Management*.
- 4.2.2 These control measures shall include direction and guidance concerning the appropriate PPE required as the last line of defense to the anticipated hazards of the specific operations and tasks. A PPE specific assessment may assist in identifying PPE requirements. *S3AM-208-FM1 Personal Protective Equipment Assessment* may be completed and included in the SH&E Plan.
- 4.2.3 Various tasks and operations, including but not limited to, demolition, remediation, spill response, asbestos abatement, and lead removal, may require additional direction concerning selection, use, care, and disposal of PPE from a subject matter expert (e.g. protector manufacturer, industrial hygienist, asbestos professional, etc.).
 - Obtained direction shall be included in the SH&E Plan.
 - Consultation with subject matters may be limited to the planning phase or they may be retained to provide technical assistance for a portion of or duration of the project.

4.3 Training

- 4.3.1 All employees shall be informed of their right to Stop Work if the task is too hazardous to mitigate through use of elimination, substitution, engineering controls, administrative controls, and PPE.
- 4.3.2 Staff will receive adequate instruction on the correct use, limitations, and assigned maintenance duties for the equipment to be used. The following information, at a minimum, will be covered during PPE training:
 - What PPE is required.

- When it is required.
 - Why it is required.
 - How to properly don, doff, adjust, and wear the PPE described.
 - The limitations of the PPE, including its expected useful life.
 - How to properly care for, maintain, and dispose of the PPE.
- 4.3.3 Retraining may be required as applicable (e.g., observed non-compliance, changes in procedure, etc.).
- 4.3.4 Staff are responsible for confirming that they have reviewed the operation manual/instructions for the PPE before work commences.
- 4.3.5 All staff will receive a location specific orientation to the hazards on the job site as well as appropriate PPE requirements.
- 4.4 Determining the Need for PPE
- 4.4.1 Prior to beginning work, the SH&E plan shall be consulted and THAs developed to identify the PPE requirements.
- 4.4.2 After the hazard assessments have been completed, the manager and/or employee shall select the appropriate PPE for each job category or task, as necessary. PPE will be provided to each employee appropriate for the hazards present. All PPE selected, purchased and used by AECOM will meet or exceed the appropriate ANSI/CSA standards or other standards as determined by federal, provincial, territorial, or state legislation
- 4.4.3 If the hazard can be mitigated through using appropriate PPE shall:
- Properly fit the employee's body.
 - Be selected and used in accordance with recognized standards and provide effective protection.
 - Not in itself create a hazard to the wearer (e.g., scratched safety glasses which could cause impaired vision should be replaced with clear safety glasses).
 - Be compatible so that one item of PPE does not interfere with other PPE.
 - Be maintained in good working order and in a sanitary condition.
 - Not be altered in any way.
- 4.4.4 Prior to entering any controlled or restricted work area, employees shall review the SH&E plan and corresponding THA(s) to confirm that they are equipped with the applicable ANSI/CSA-approved PPE, appropriate to the specific work area's hazards.
- 4.5 Eye and Face Protection
- 4.5.1 AECOM employees shall use appropriate eye and face protection when eye or face hazards are present or potential from flying particles, molten metal, liquid chemicals, acid and caustic liquids, chemical gases or vapors, or injurious light radiation.
- 4.5.2 Safety glasses with side protection is the minimum eye protection requirement. Additional eye protection shall be suitable to the anticipated hazards (e.g. goggles, safety glasses with a face-shield, welder's helmet, etc.). Refer to *S3AM-208-ATT1 Eye & Face Protection*.
- 4.6 Head Protection
- 4.6.1 Appropriate protective hardhats are required when employees are working in areas where there is any potential for injury to the head.

- 4.6.2 Head protection shall be suitable to the anticipated hazards (e.g. working near exposed electrical conductors requires hardhats designed to reduce electrical shock). Refer to *S3AM-208-ATT2 Head Protection*.
- 4.7 Foot Protection
- 4.7.1 AECOM employees shall use appropriate foot protection when hazards to feet are present or potential; including impact, puncture, cut, electrical, thermal or chemical hazards.
- 4.7.2 Refer to *S3AM-208-ATT3 Foot Protection*.
- 4.8 Hand Protection
- 4.8.1 Appropriate hand protection is required when employee's hands are exposed to hazards such as those from skin absorption of harmful substances, cuts and lacerations, abrasions, punctures, chemical burns, thermal burns, electricity, or harmful temperature extremes.
- 4.8.2 Refer to *S3AM-208-ATT4 Hand Protection* and *S3AM-317-PR1 Hand Safety*.
- 4.9 Chemically Resistant Clothing
- 4.9.1 Chemically resistant clothing is required when there is significant potential for the employee to come in direct contact with the chemicals being handled. Tasks that involve chemical handling will be evaluated for potential splashing or spilling. Refer to *S3AM-208-ATT5 Limb & Body Protection*.
- 4.9.2 The process for selecting chemical resistant clothing will be similar for the selection of chemical resistant gloves (refer to *S3AM-208-ATT4-Hand Protection* and *S3AM-317-PR1 Hand Safety*).
- 4.10 High-Visibility Apparel
- 4.10.1 "High visibility safety apparel" means personal protective safety clothing that is intended to provide conspicuity during both daytime and nighttime usage and that meets the Performance Class II or III requirements of ANSI/CSA standards. Refer to *S3AM-208-ATT6 High Visibility Safety Apparel*.
- 4.10.2 Color of apparel (orange or lime) may be client/project-specific. If there is a specific need to be visible to the passing public, to machine operators, or to other crew members, high visibility vests shall be worn (and retro-reflective striping on arms and legs at night).
- 4.10.3 Work conducted at night may require that the minimum level of apparel worn be, at minimum, ANSI/CSA Class III, and in accordance with the governing legislation.
- 4.11 Personal Clothing
- 4.11.1 Employees on a project site shall wear full length trousers and shirts that cover shoulders.
- 4.11.2 For personal safety on the job site, do not wear
- Loose or unsecured clothing or loose fitting cuffs;
 - Greasy or oily clothing, gloves, or boots; or
 - Torn or ragged clothing.
 - Jewelry (e.g. rings, bracelets, neck chains) when working with moving parts or there is a risk or entanglement.
- 4.11.3 Long hair shall be tied back or otherwise confined when working with moving parts or there is a risk of entanglement.
- 4.11.4 Clothing made of synthetic fibers can be readily ignited and melted by electric flash or extreme heat sources. Cotton or wool fabrics are recommended for general use.
- 4.11.5 Footwear shall be suitable for the site conditions and task requirements. No athletic shoes, sandals, flip flops, permitted on active job sites.

- 4.11.6 It is recommended to use clothing with sun protection properties when working in high sun UV exposure

4.12 Specialized PPE

- 4.12.1 In addition to basic PPE, additional specialized PPE may be required to provide appropriate protection to the employee. Refer to applicable legislation and related SH&E procedures for additional information on PPE requirements.
- Fall Protection – Only full-body harnesses with shock-absorbing lanyards will be used for personal fall arrest. Refer to *S3AM-304-PR1 Fall Protection*.
 - Respiratory Protection – Respiratory protection shall be selected based on the contaminant and concentration to which the employee will be exposed. Refer to *S3AM-123-PR1 Respiratory Protection*, the task- or project-specific hazard assessments and the applicable SDSs for specific requirements.
 - Fire Resistant Clothing (FRC) – Approved fire-resistant outer clothing may be required at work locations with flammable or explosive materials or environments. Refer to *S3AM-208-ATT5 Limb & Body Protection*.
 - Other Head Protection – Operators and passengers (if trained and permitted) of all-terrain vehicles and snowmobiles will wear approved helmets. Refer to *S3AM-208-ATT2 Head Protection*.
 - Protection from Drowning – Appropriate personal floatation devices shall be worn when work working over and near water. Refer to *S3AM-315 Working On & Near Water*.
 - Temperature Extremes – Work in cold environments may require additional layers and insulated clothing, gloves, boots and accessories such as balaclavas, hardhat liners. Confirm these items are approved and do not introduce additional unacceptable hazards (e.g. insufficient visibility, conductivity, etc.).
 - Hearing Protection – Noise levels in the work environment that cannot be eliminated or reduced to acceptable levels requires worker be protected from exposure. Refer to *S3AM-118-PR1 Hearing Conservation*.
 - Traction Devices – Traction devices applied to the base of work boots may be necessary if the employee may be walking on icy surfaces. Refer to *S3AM-208-ATT3 Foot Protection*.
 - Rescue – Confined spaces hazards may necessitate the use of specific harnesses attached to retrieval lines to facilitate rescue. Refer to *S3AM-301-PR1 Confined Spaces*.

4.13 Maintaining PPE Supplies

- 4.13.1 Employees shall inspect their required PPE prior to use. Defective equipment shall be removed from service and replaced.
- 4.13.2 Each AECOM location will maintain a supply of safety equipment of appropriate types and sizes, including hard hats, high visibility vests, safety glasses, gloves, hearing protection and chemically resistant clothing based on the nature of their field activities. The Manager or designee will be responsible for maintaining this inventory.
- 4.13.3 Use of PPE by employees and adequacy of protection should be evaluated on a routine basis. This may periodically be documented using *S3AM-208-FM2 Personal Protective Equipment Inspection*.
- 4.13.4 At a minimum, locations will review their PPE program annually.

4.14 Obtaining Personalized Safety Gear

- 4.14.1 Employees are not expected to provide their own general PPE. Most basic PPE will be provided to the employee at no charge (e.g. safety glasses, hard hat, gloves, hearing protection, etc.) with the exception of the below personalized safety equipment (prescription safety glasses, safety-toed boots, any washable coveralls).

- 4.14.2 Certain personalized safety gear such as prescription safety glasses, safety-toed (capped) boots, and any washable coveralls will be ordered and sized specifically by the user. A partial cost reimbursement to the employee may be made if their location provides a specialized PPE purchase program.
- 4.14.3 All specialized PPE (e.g. fall protection equipment, respirators, helmets, etc.) will be provided by AECOM for employee use at no charge to the employee, with the exception of the above personalized safety equipment (prescription safety glasses, safety-toed boots, any washable coveralls).

5.0 Records

- 5.1 Completed SH&E plans, THAs documenting PPE requirements, and as applicable, PPE assessments and PPE inspections, will be maintained in the location's safety files.

6.0 Attachments

- 6.1 [S3AM-208-ATT1 Eye & Face Protection](#)
- 6.2 [S3AM-208-ATT2 Head Protection](#)
- 6.3 [S3AM-208-ATT3 Foot Protection](#)
- 6.4 [S3AM-208-ATT4 Hand Protection](#)
- 6.5 [S3AM-208-ATT5 Limb & Body Protection](#)
- 6.6 [S3AM-208-ATT6 High Visibility Safety Apparel](#)
- 6.7 [S3AM-208-FM1 Personal Protective Equipment Assessment](#)
- 6.8 [S3AM-208-FM2 Personal Protective Equipment Inspection](#)

Eye & Face Protection

S3AM-208-ATT1

1.0 Introduction

- 1.1 This fact sheet has been developed to inform employees about why eye and face protection is needed, when it should be worn, how to wear and adjust it properly, the limits of this type of PPE, and how to properly maintain and clean the eye and face protection issued.
- 1.2 AECOM will provide ANSI or CSA-approved (as appropriate to the jurisdiction) eye and face protection appropriate to the anticipated eye and face hazards and as required by client or site requirements. Employees shall wear the appropriate eye and face protection while engaged in activities where a risk of injury to the eyes or face may exist.
- 1.3 Safety glasses may be identified by the manufacturer or supplier logo, but shall contain the applicable standard marked (or etched) on all components (lenses, frames [front and temple], removable side shields, and any other parts of the glasses, goggles, or helmets).
- 1.4 Supervisors are responsible for ensuring that crews have access to the eye and face protection and confirming they are worn.

2.0 Types of Eye and Face Protection

- 2.1 There are three major types of eye and face protection:

2.1.1 Primary Protection

- Safety Glasses (side shields required)
- Safety goggles
 - Vented goggles—impact only
 - Indirectly vented—chemical splash and impact, dust
 - Non-vented—chemical fumes

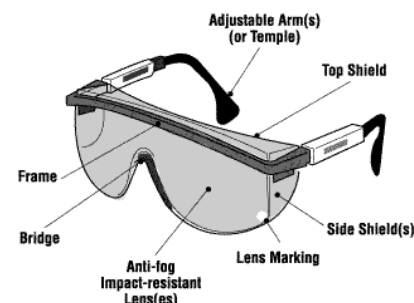
2.1.2 Faceshields

2.1.3 Radiation protection / welding helmets

2.2 Safety Glasses and Safety Goggles

- 2.2.1 The most widely used form of eye protection is safety glasses. To prevent lateral exposure to impact fragments, safety glasses are often equipped with side shields. Depending on the hazard, side shields can be either a cup-type or flat-folded. The cup-type provides more complete protection. At a minimum, AECOM will provide safety glasses with permanently attached side-shields or directly vented goggles to all employees whose work may present any eye or face hazard.

- In some cases such as moderate dust levels, safety glasses may include foam seals on frames to improve sealing against dust. If dust irritation of the eyes is an issue, the employee should contact the supervisor to evaluate the condition and provide more protective or better fitting safety eyewear (e.g. goggles).
- The frames of safety glasses are stronger than everyday eyewear frames, are often heat resistant, and designed to prevent the lenses from being pushed into the eyes.
- High impact eye protection utilizes plastic polycarbonate lenses which are stronger than regular lenses, are impact-resistant, and come in prescription and non-prescription forms.



- 2.2.2 Goggles form a complete seal around the eye area, providing more coverage than safety glasses and are more appropriate for chemical hazards and conducting tasks such as power washing. Goggles are required when working in an area or at a process that involves high dust or particulate concentrations.
- Direct vented goggles only provide impact resistance, but afford comfort due to air flow and reduction of fogging.
 - Indirect vented goggles are also impact resistant, but have capped vents to allow air flow while also protecting against splashes or flying particles. Restricted air flow may result in fogging.
 - Non-vented and indirectly vented goggles will be worn when employees are handling chemicals.
- 2.2.3 Manufacturers may apply anti-fogging and uv coatings to lenses of safety eyewear. Consider the use an anti-fogging agent if fogging of lenses is an issue.

2.3 Faceshields

- 2.3.1 Wear faceshields when there is a severe danger from impact from flying particles or chemical splash. Faceshields are secondary protectors and shall be worn over safety glasses or goggles.
- 2.3.2 Face shields shall be made available or installed whenever they may be required.

2.4 Radiation Protection / Welding Helmet

- 2.4.1 When welding, employees shall use equipment with filter lenses that has a shade number appropriate for protection against injurious light radiation.
- 2.4.2 When exposed to hazards such as lasers or beta radiation, employees shall use equipment with filter lenses that afford appropriate for protection against the laser or radiation hazard.

3.0 Prescription Glasses/Contact Lenses

- 3.1 If you wear corrective lenses, contact your SH&E coordinator for information about how to obtain prescription safety glasses. Prescription safety glasses shall be worn with appropriate side shields.
- 3.2 Regular prescription eyeglasses and sport glasses shall not be substituted for safety eyeglasses. Regular eyeglasses do not offer the same impact resistance of the lens and frame assembly as safety glasses and are not American National Standards Institute (ANSI)/Canadian Standards Association (CSA) approved.
- 3.3 Contact lenses are not recommended for any industrial job. Dust caught underneath the lens can cause painful abrasions. Some chemicals can react with your contacts to cause permanent injury.
- 3.3.1 When contact lenses are worn (and where a hazard exists), extra precautions are required to reduce the potential for injury. PPE for contact lens wearers includes splash or dust-resistant goggles, and safety glasses.

4.0 Cleaning and Maintaining Safety Eyewear

- 4.1 Clean lenses and frames regularly with mild soap and water and according to manufacturer's recommendations. Store protective eyewear in a clean, dry area.
- 4.2 Replace scratched, pitted, cracked, or broken safety eyewear immediately.

5.0 Proper Fit/Adjusting Glasses

- 5.1 PPE that fits poorly will not afford the necessary protection. When fitting devices for eye protection against dust and chemical splashes, be sure that the devices are sealed to the face. Confirm safety glasses fit properly. The arms or temples fit comfortably over the ears, the frame is as close to the face as possible and adequately supported by the bridge of the nose. If the temple bars of the glasses are too long, the glasses will have a tendency to fall forward and slide down your nose. Check with your SH&E representative if you require glasses with adjustable temple bars. Standard safety glasses are 2 ¼ inches (58 millimeters); however, smaller sizes (2 ⅛ inches [2.54 millimeters]) are also available.

WHEN TO WEAR PROTECTION











Hazard	Concern	Glasses	Goggles	Faceshield
Impact	Flying fragments from front/sides.	Safety glasses with sideshields.	Vented goggles.	Severe danger from impact. Wear with glasses/goggles.
Chemicals	Splash.		Indirectly vented.	Severe splash. Wear with goggles.
Chemicals	Fumes.		Non-vented.	
Dust	Dust entering the eye.	Safety glasses with sideshields.	Vented goggles.	
Optical Radiation	Bright Light		Welding goggles with appropriate shaded lens.	Welding helmet with appropriate shaded lens.
	Ultra Violet			
	Infra-red (Heat)			
	Visible Light (Glare)			

Notes: Information provided by UVEX.

6.0 Guidelines

- 6.1 Dual eye protection – face shields shall be worn in addition to safety glasses or goggles when using chipping, grinding or buffing tools. Hazards associated with drilling or operations involving striking should be assessed for the need for dual eye protection.
- 6.2 Eye protection shall be worn when handling (e.g. transferring, spraying, applying, etc.) hazardous liquid or powder chemicals, and when draining or breaking joints on any pressure vessel, line, or equipment. In some situations, a face shield should be used in conjunction with goggles for additional eye and face protection.
 - 6.2.1 Awkward positions, working overhead, or windy conditions may require retraining straps, mono-goggles or sealed eye wear.
 - 6.2.2 Comfort and fit are very important in the selection of safety eyewear. Lens coatings, venting, or fittings may be needed to prevent fogging or to fit with regular prescription eyeglasses.
 - 6.2.3 Safety sunglasses shall be worn when glare is a concern. Glare from sun and snow or water should be taken seriously as it can cause reduced vision and fatigue.
 - 6.2.4 A combination of types of PPE may be necessary if more than one type of hazard exists. For example, where the potential hazards are chemical splashes and flying objects, chemical splash goggles used in combination with safety glasses may be required.
 - 6.2.5 Lens color shall be appropriate to the environment and task. Use the below chart as a guideline only; always consult the manufacturer guidelines and specifications.

Safety Glasses Lens Color

	Clear Safety Glasses General indoor use
	Grey Safety Glasses Outdoor use where light and glare can cause eye strain and fatigue. Provides good color recognition.
	Clear with Slight Mirror Coating Safety Glasses Indoor / outdoor use. Serves same purpose as grey lens, but lets more visible light through. Reduces glare from artificial light.
	Gold, Blue, Silver Mirror Safety Glasses Outdoor use where light and glare can cause eye strain and fatigue. Provides good color recognition. Mirror reflects light, reducing the amount of light that passes through the lens.
	Dark Green Safety Glasses General purpose protection from glare and UV radiation.
	Brown/Esspresso Safety Glasses Outdoor use where sunlight and glare cause eye strain and fatigue. Meets color traffic signal recognition requirements.
	Vermilion Safety Glasses Enhances contrast while reducing all color equality for best color recognition. Ideal for indoor inspection.
	Amber Safety Glasses Blocks blue portion of light spectrum while letting in red and green, creating high contrast. Hazardous at night when eye needs blue light to process visual information.
	SCT Safety Glasses (various tints) Spectrum control technology (SCT) lens is designed to absorb select wavelengths of light into the polycarbonate lens.
	Filter Shades (Glasses, Goggles, Helmets) Protects against ultraviolet and infrared radiation when working with molten metal, welding, cutting, soldering and brazing. (See Lens Shade Chart in Electric Arc Welding section of this document)

- 6.2.6 Brushing hair or removing clothing, eyewear, hard hats, etc. may release accumulated dust and/or metal particles. Bowing head and closing the eyes when removing these articles can prevent the particles from inadvertently entering the eyes.
- 6.2.7 Confirm an eyewash station is available in case flushing the eye becomes necessary
- 6.2.8 DO
- Replace pitted, scratched, bent, and poorly fitted PPE (damaged face/eye protection interferes with vision and will not provide the protection it was designed to deliver).
 - Wear proper fitting eye protection (close to the face).
 - Clean safety glasses daily, or more often if needed.
 - Store safety glasses in a safe, clean, dry place when not in use.
- 6.2.9 DON'T
- Modify eye/face protection.
 - Use eye/face protection that does not have ANSI/CSA certification.

Head Protection

S3AM-208-ATT2

1.0 Introduction

- 1.1 This fact sheet has been developed to inform employees about why head protection is needed, when it should be worn, how to wear and adjust it properly, the limits of this type of PPE, and how to properly maintain head protection issued.
- 1.2 Use hard hats in areas where there is the possible danger of head injury from the impact of falling or flying objects, striking against objects, electrical shock and/or burns, or any combination of these hazards. Hard hats will be worn when required by site safety procedures, client/site requirements, or when posted as an entry requirement.
- 1.3 The main type of head protector is the hardhat. Hardhats are designed to protect from impact and penetration caused by objects hitting your head and from limited electrical shock or burns. The shell of the hardhat is designed to absorb some of the impact. The suspension, which consists of a headband and strapping, not only holds the hardhat in place but is critical for absorbing and distributing impact shock loads. AECOM recommends ratchet style suspension for rapid adjustment during changing site conditions.
- 1.4 Helmets are required when operating or as a passenger of All-Terrain Vehicles, Snowmobiles or motorcycles. Helmets to be worn shall have a chinstrap that can affix snugly under the operators chin and the helmet shall be certified by the appropriate jurisdictional body. It is an offence in certain jurisdictions to not wear helmets for off-road vehicles.
- 1.5 Supervisors are responsible for confirming that employees have the appropriate ANSI/CSA -approved protective headwear necessary for their safety. This may include, as required by the specific job task and associated hazards:
 - 1.5.1 Hard hat, or
 - 1.5.2 Helmet.

2.0 Hard Hat Impact Types

- 2.1 Type I Hard Hats
 - 2.1.1 Type I hard hats provide crown protection from penetration and impact. These hard hats are intended to reduce the force resulting from a blow only to the top (crown) of the head.
- 2.2 Type II Hard Hats
 - 2.2.1 Type II hard hats provide crown and lateral penetration and impact protection. These hard hats are intended to reduce the force resulting from a blow that may be received off center or to the top of the head. A Type II hard hat typically is lined on the inside with thick, high-density foam.
- 2.3 Electrical Classes
 - 2.3.1 Class G (General) – Class G hard hats are intended to reduce the danger of contact exposure to low voltage conductors. Test samples are proof-tested at 2,200 volts (phase to ground). However, this voltage is not intended as an indication of the voltage at which the hard hat protects the wearer. Please note: Class G hard hats were formerly known as Class A.
 - 2.3.2 Class E (Electrical) – Class E hard hats are intended to reduce the danger of exposure to high voltage conductors. Test samples are proof-tested at 20,000 volts (phase to ground). However, this voltage is not intended as an indication of the voltage at which the hardhat protects the wearer. Please note: Class E hard hats were formerly known as Class B.
 - 2.3.3 Class C (Conductive) – Class C hard hats are not intended to provide protection against contact with electrical conductors.

- 2.4 Do not use bump caps as protection against head injury, except when the only potential hazard is striking against objects and the use has been approved by a Manager.
- 2.5 No cowboy-style hard hats are permitted.
- 2.6 For tasks requiring face protection using face shields, hard hats designed for face shield attachment should be used. Some hard hats include attachment slots for hearing protection muffs.

3.0 Proper Fit / Maintenance

- 3.1 The suspension of the hard hat shall be adjusted to fit the wearer and to keep the shell a minimum distance of 1-1.5 inches (3 centimeters) above the wearer's head. Periodically inspect the suspension of your hard hat. Look for loose or torn cradle straps, loose rivets, broken sewing lines, or other defects. Replace the hat after a major impact.
- 3.2 Do not store materials in the suspension. Cold weather liners and perspiration control bands may be utilized within the hard hat unless specifically excluded by the manufacturer.
- 3.3 Any head covering worn under a hard hat should not contain any metal components, be close fitting, and not compromise the fit or stability of the hard hat in any manner. Baseball caps are prohibited from being worn under a hard hat.
- 3.4 Wear hard hats in the forward position unless written verification and instructions from the hard hat manufacturer indicate your hard hat model has been tested and found to be compliant when worn backwards.

4.0 Guidelines

- 4.1 On all construction projects and in the event that an overhead hazard exists, a four-point or six point suspension Type II, Class G or E hard hat will be provided to affected employees.
- 4.2 ANSI/CSA -approved industrial protective headwear that is appropriate to the hazards and meets applicable legislative requirements shall be worn by all personnel while engaged in construction, operation, maintenance, or other activities where there exists a foreseeable danger of injury to a worker's head at a work site and/or a significant possibility of lateral impact to the head.
- 4.3 Visitors to areas where the above activities are being conducted shall comply with the hard hat requirement.
- 4.4 Hardhats, hard hats, and hard hat accessories (as required) shall be provided by AECOM and shall be appropriate to the anticipated hazards (e.g. fire resistant, arc rated, etc.)
- 4.5 Wear integral chinstraps when there is a risk of the hard hat dislodging, when working in high-wind conditions, working overhead or near helicopters.
- 4.6 Proper care is required for headgear to perform efficiently. The service life is affected by many factors including temperature, chemicals, sunlight, and ultraviolet radiation (welding). The usual maintenance for headgear is simply washing with a mild detergent and rinsing thoroughly.
- 4.7 Do not store a hard hat in direct sunlight (e.g. vehicle back window) as it will be subjected to unnecessary UV exposure. A hard hat with a chalky appearance rather than having a glossy finish or flaking of the shell indicates UV damage.
- 4.8 Some insect repellants can degrade hard hat materials. Consult the manufacturer's recommendations and avoid any contact of the hard hat with insect repellant.
- 4.9 Do not alter hard hats in a way that will downgrade their efficiency. Typical prohibited alterations include painting, drilling holes in shell, application of metal jewelry, etc. Replace hats with these alterations or with excessive scratches.

- 4.10 Do not apply unapproved stickers to a hard hat. Placement of approved stickers on hardhats shall not hamper the ability to conduct a proper pre-use inspection. No stickers or reflective tape shall be placed within $\frac{3}{4}$ of an inch of the hard hat edge to prevent the risk of a decal acting as a conductor.
- 4.11 Inspect hard hats before use.
- 4.11.1 Remove from service if pitting, cracking, tearing, fraying, chalking, flaking, unapproved modifications or damaged suspension systems are observed.
- 4.11.2 Remove hard hats and their components from service and replace as recommended by the manufacturer. Hard hats shall be replaced after no more than 5 years.
- 4.11.3 Replacement suspensions are available for most hard hats. Note: Such things as hair oils, perspiration, hairspray and insect repellent can cause deterioration of the suspension.
- 4.11.4 DO
- Replace headgear that has been subjected to a blow even though damage cannot be seen.
 - Remove from service any headgear if its serviceability is in doubt.
 - Replace headgear and components according to manufacturers' instructions.
 - Consult the Safety, Health and Environment team or your supplier for information on headgear.
- 4.11.5 DON'T
- Drill, remove peaks, or alter the shell or suspension in any way.
 - Put chin straps over the brims of Class E headgear.
 - Use any liner that contains metal or conductive material.
 - Carry anything in the hard hat while wearing the hard hat.

Foot Protection

S3AM-208-ATT3

1.0 Introduction

- 1.1 AECOM employees shall use appropriate foot protection when hazards to feet are present or potential.
- 1.2 Foot injuries may occur if feet are unprotected, due to, but not limited to the following:
- Impact from heavy objects falling or rolling across the foot.
 - Puncture or cuts – sharp objects falling, stepped on otherwise contacted.
 - Puncture or cuts – high pressure water or equipment such as chainsaws, compacting equipment, snow blowers or ground brushing machines.
 - Improper ankle support when walking on uneven surfaces.
 - Electrical contact.
 - Extreme heat or cold – immersion or contact with extremely hot or cold materials or substances.
 - Chemical / hazardous substance contact - hazardous chemicals / products that can cause skin injury or irritation such as cement and petroleum products may contact feet and legs. Immersion in contaminated water. Snake bites.

2.0 Guidelines

- 2.1 ANSI/ASTM or CSA -approved (as appropriate to the given jurisdiction) safety-toed (steel or composite) boots with a minimum of 6 inch (15.2 centimeters) ankle support, an oil-resistant sole, and a distinctive heel, shall be the minimum footwear requirement of all employees engaged in construction, operation, maintenance, or other activities where a risk of injury to the feet may exist.
- 2.1.1 Supervisors are responsible for confirming that employees have and additional foot protection necessary to ensure their safety. This may include the following types or combination thereof, as required by the specific job task:
- Caulk / Cork boots – spike-soled boots generally utilized in logging or timber operations.
 - Boots providing metatarsal protection – provide above-the-toe protection from rolling or crushing hazards (e.g. railroad track work), as well as punctures or cuts from equipment such as chainsaws, compacting equipment, snow blowers or ground brushing machines.
 - Acid and/or chemical-resistant boots – provide protection from chemicals or chemical products that could cause injury or irritation.
 - Chemical-resistant boot covers – may be utilized for visitors, workers not routinely involved in the task or when potentially exposed to radiation hazards.
 - Insulated boots – provide protection from extreme hot or cold.
 - Rubber boots and non-slip wading boots – provide traction and immersion protection.
 - Electric shock resistant – provide protection from electricity that may be conducted through the feet.
- Note:** Electric shock resistant soles deteriorate with wear and in wet conditions. Static dissipative soles without toe protection are not certified by CSA.
- Traction devices – provide traction in icy conditions. Confirm the addition of ice cleats or other traction devices do not pose additional hazards (e.g. ice cleats made of conductive or sparking material in a flammable environment; loss of traction on concrete, etc.).

- 2.2 Employees assigned to field projects who are not required to wear specified protective footwear (e.g., steel-toed boots, metatarsal protection, rubber boots, chemical resistant boots, insulated boots, etc.) will wear substantial leather, high-sided work boots. Shoes (leather, canvas, tennis, deck, or other types of material), sandals, high-heeled shoes, etc., are not allowed on field project sites. In some cases protective over-boots may be required for specific-site access.
- 2.3 Employees are responsible for confirming their footwear is in good working condition and is appropriate to the conditions before work commences.
- Footwear must be, be fully laced and have adequate tread to maintain traction.
 - Replace footwear that is defective (e.g. exposed toe-caps).
 - Do not modify protective footwear.

3.0 Standards

- 3.1 Safety boots must meet the regulated standard.
- Safety boots are made with a steel or composite-reinforced box toe to protect the foot from being pierced or crushed by a falling object.
 - Safety boots with flexible steel insoles provide puncture resistance. They will stop or deflect nails or other objects that have penetrated the sole of the boot.
 - Oil-resistant soles provide the added safety feature of preventing slips and trips on slippery work floors.
- 3.2 The following standards apply to foot protection equipment:
- 3.2.1 Safety footwear may contain the following safety symbols denoting the protection offered:
- Green Triangle indicates that it is a class 1 toe cap with puncture resistant sole.
 - Yellow Triangle indicates that it is a class 2 toe cap with puncture resistant sole.
 - White Rectangle (with orange omega symbol) indicates electrical protection.
 - Yellow Square (with green SD) indicates anti-static protection.
 - Red Square (with black C) indicates electrically conductive.
 - Fir Tree indicates protection against chain-saws.
- 3.2.2 ASTM footwear may be labeled in the following manner: ASTM F2413- 05 M/I/75/C/75
- The ASTM F2413- 05 indicates compliance with the standard
 - M stands for "Male" (or F for "Female")
 - I/75 indicates impact rating of 75 pounds
 - C/75 indicates compression rating of 75 (75 = 2500lbs of pressure, 50 = 1750lbs of pressure)
- 3.2.3 Examples of symbols:
-
- 3.2.4 When required by the regulations or the client, AECOM will provide affected employees with safety-toed boots that meet the requirements of the applicable ANSI/CSA standard.
- 3.2.5 The purchase of normal footwear for work is the responsibility of the employee.

4.0 Proper Fit

- 4.1 With most PPE, the more comfortable it is to use, the more likely to be used. The fit of the safety boot is of the utmost importance. Try safety boots on before purchasing. When selecting boots, be sure that they are American National Standard (ANSI), American Society for Testing and Materials (ASTM), or Canadian Standards Association (CSA) approved, as appropriate to the jurisdiction. Consult with your supervisor about how to obtain safety boots.
- 4.2 The former ANSI standard for protective footwear has been replaced by ASTM standards. Footwear certified to the former ANSI Z41 1999 standard does not require replacement unless user inspection identifies safety deficiencies.

Hand Protection

S3AM-208-ATT4

1.0 Introduction

- 1.1 This fact sheet will inform employees about why and when hand protection is needed, the limits of gloves, and how to properly clean and dispose of gloves. Refer to *S3AM-317-PR1 Hand Safety* for additional information and guidance.
- 1.1.1 Gloves most commonly used in the construction industry are made from:
- Kevlar (or engineered fabrics).
 - Leather.
 - Cotton.
 - Rubber.
 - Synthetic rubbers and other manmade materials.
- 1.2 All personnel shall have gloves in their immediate possession 100% of the time when in a shop or on a work site. Appropriate gloves shall be worn when employees work with or near any materials or equipment that present the potential for hand injury due to sharp edges, corrosives, flammable and irritating materials, extreme temperatures, splinters, etc.

2.0 Types of Hand Protection

- 2.1 After physical guards, gloves provide the most common hand protection. There is no glove that protects against all hand hazards. The information below can assist the employee in selecting the appropriate glove for the hazardous condition. In all cases, the gloves should meet testing standards for the appropriate hazard they are protecting against.
- 2.2 As a general rule, always consult the manufacturer for specifications to ensure the gloves will provide the appropriate hand protection needed.
- 2.3 When selecting appropriate gloves, cuff design (open or closed) and glove length should also be considered.
- 2.4 Skin absorption of harmful substances
- 2.4.1 Nitrile offers good resistance to certain chemicals, but they tear and rip easily when sharp objects are handled.
- 2.4.2 The AECOM manager and employee shall consult the Safety Data Sheet (SDS) of the material being handled and, as appropriate, subject matter experts to appropriately select the chemical resistant glove.
- 2.4.3 The glove selection and any applicable liner gloves shall be based on proposed use and the manufacturer's chemical compatibility data, which indicates how each glove material performed in breakthrough time tests against certain chemicals. Examples:
- Butyl, polyethylene, or Silver Shield/4H gloves should be used for painting where significant potential for skin exposure to isocyanates exists.
 - Porous painters or mechanics gloves should have butyl, polyethylene, or nitrile gloves worn underneath and are only appropriate for activities with incidental chemical contact and short-term use.
 - Butyl or Silver Shield®/4H® gloves should be worn for adequate skin protection from acetone or methyl ethyl ketone (MEK). Nitrile gloves are not recommended.

- 2.4.4 In some cases, inner disposable chemical gloves (e.g., nitrile) will be required for protection of hands during removal of contaminated gloves.
- 2.4.5 Do not substitute another type of glove for the appropriately identified chemical resistant gloves that have been selected for the hazard; they may not offer adequate protection for the chemicals you handle.
- 2.4.6 Chemical gloves and chemical protective clothing often require taping the glove to the clothing to prevent gaps.
- 2.5 Severe cuts lacerations and punctures
 - 2.5.1 Gloves providing cut resistance may be constructed of leather, synthetic materials (e.g. polyester, nylon), high performance materials (e.g. Kevlar), and metal mesh.
 - 2.5.2 Leather gloves offer very little cut and puncture protection, however, they do offer some abrasion protection (see abrasion protection below). If cut or laceration hazards are present, an appropriate ANSI cut resistant rated glove should be used (Canada does not identify cut resistant ratings).
 - 2.5.3 ANSI provides cut resistant ratings for various gloves to assist the user in selecting the right type of protection. The ratings are based upon how well the glove withstands ASTM testing methods.
 - 2.5.4 Please note not all gloves that provide good cut/laceration resistance provide equal puncture resistance. When selecting a glove for puncture protection, please look at the manufacturer's specifications specific to puncturing. When selecting a glove for cut/laceration resistance, the information below can be used as a guide:
 - **ANSI Level 1: Lowest cut hazard potential.** For example, paper cuts, parts assembly, light material handling, paper, assembling cardboard boxes, etc.
 - **ANSI Level 2: Low cut hazard potential.** For example, packaging, light rope handling, moving office supplies, mechanical assembly work.
 - **ANSI Level 3: Medium cut hazard potential.** For example, light glass handling, glass bottle/sample jar handling, light sheet metal handling, medium rope handling, and light utility knife handling.
 - **ANSI Level 4: High cut hazard potential.** For example, thin sheet metal handling, rope handling, working around sharp edges, and medium utility knife handling.
 - **ANSI Level 5: Highest cut hazard potential.** For example, thin sheet metal handling, working around sharp edges, heavy utility knife handling, and picking up broken glass.
- 2.6 Abrasions
 - 2.6.1 Leather gloves offer some abrasion protection, but should only be selected for light abrasion protection. Appropriate activities for leather gloves may include moving light equipment where cut and lacerations are of minimal concern.
 - 2.6.2 If cut or laceration hazards are present, an appropriate ANSI cut resistant rated glove should be selected. If medium to high abrasion protection is needed, select a glove that is approved to the appropriate level.
 - 2.6.3 Gloves manufacturer with abrasion resistant surfaces in high contact areas (e.g. knuckles, palm) should be considered for tasks involving high potential for abrasion hazards (e.g. construction activities, mechanics, etc.).
- 2.7 Vibration
 - 2.7.1 Gloves that meet the applicable ANSI standard for vibration reduction (also known as Anti-Vibration gloves) should be selected if performing activities that require handling vibrating tools (e.g. chainsaw, jackhammer, grinder, etc.).
 - 2.7.2 Match the glove type to the hazard. Consult the glove manufacturer for guidance on selecting the right glove for the task. All Anti-Vibration gloves should completely cover the fingers.

2.8 Electrical Protection

- 2.8.1 Electrically insulated gloves used to protect from electrical hazards must be appropriately rated for the anticipated voltage.
- Insulated gloves and protectors must be inspected, tested and maintained according to manufacturer's specifications. Metal splinters, punctures or tears and cracking from ozone damage can all provide a path to conduct electricity
 - Leather protectors must always be worn over insulated gloves worn for electrical protection. Never wear leather protectors without insulated gloves
- 2.8.2 Do not rely on glove color for identification of type and protection as color coding can be inconsistent. Ensure labels and manufacturer specifications are consulted to correctly identify glove type.
- 2.8.3 Do not wear hand PPE with metal parts near electrical equipment.

2.9 Temperature extremes and other hazards

- 2.9.1 Heat/flame resistant: depending on the activity and hazard, gloves or mittens that have been tested in accordance to ASTM standards should be selected when handling hot materials. Match the glove to the appropriate heat exposure level. The glove manufacturer may need to be contacted to help determine if the glove will meet and exceed hand protection.
- 2.9.2 Cold resistant: depending on the activity and hazard, insulated gloves or mittens should be used to protect the user's hands from cold conditions.
- 2.9.3 Wet gloves will diminish any insulating properties increasing the risk of frostbite in cold conditions. Conductivity is also increased when gloves become wet and pose a significant hazard in the presence of electricity.
- 2.9.4 Welding requires gloves that are fire resistant (e.g. leather) and extend up the forearm.
- 2.9.5 Employees subjected to radiation hazards may require lead-lined rubber, plastic or leather gloves.

2.10 Dexterity and Slip Resistance

- 2.10.1 Gloves should be selected according to the level of contact the user requires to conduct work tasks. Some work activities require more finger dexterity to safely do the work while other tasks or applications have a high risk/potential for cuts and abrasions to the hands. The protection selected must be appropriate to the type of hazard, but in the event of any discrepancies the protection required for the highest risk will prevail.
- 2.10.2 Gloves made of slip resistance of material may be required (e.g. climbing rung ladders, handling slippery objects).
- 2.10.3 Synthetic cut protection material such as Kevlar and Dyneema can be very slippery. A coating is often applied to provide grip.

3.0 Proper Fit/Cleaning Disposal

3.1 Use gloves that fit properly.

- 3.1.1 Tight-fitting gloves can cause fatigue while loose-fitting gloves can be hazardous. Always select the right size of glove.
- 3.1.2 Measure the circumference of your hand around the palm area. This measurement, in inches, is closest to your actual glove size. For example, 7" is equal to a size 7 glove. Always select the right size glove.
- 3.1.3 Form fitting gloves should be worn when working with moving machinery; bulky gloves can get caught or tangled in equipment.

- 3.2 When protective factors are not negatively impacted, glove liners or approved powder may be used to reduce friction that could be encountered.
- 3.3 Dispose of chemically resistant gloves in accordance with the established protocols at the site or office. The product SDS will need to be consulted if the glove is contaminated from chemical handling.
- 3.4 As applicable and appropriate to the glove type, wash all chemicals and fluids off gloves before removing hand PPE.
- 3.5 Gloves will deteriorate over time depending on the type of work and amount of chemicals gloves are exposed to. Remove excessive chemical residue that builds up on the glove. Replace cracked, ripped, or torn gloves or when breakthrough occurs. Breakthrough is the time between initial contact of the chemical on the glove surface and the detection of the chemical on the inside of the glove.
- 3.6 Follow manufacturer's instructions on the care and use of the hand PPE you are using.

4.0 Additional Points to Remember

- 4.1 Consult applicable SDSs, the SH&E Manager, and/or subject matter experts for questions related to the selection, use and maintenance of hand PPE.
- 4.2 Consideration must be given to allergies and alternatives shall be provided if necessary.
- 4.3 Always review performance characteristics as listed by the manufacturer.
- 4.4 The user shall inspect and test hand protection daily to determine if any deficiencies exist, such as holes, rips, excessive wear and tear, and saturation with water, oil or other substances that diminish the protection offered by the glove.
 - 4.4.1 Effort must be made to keep gloves from becoming soiled with oil or other hydrocarbons. These can pose a fire hazard particularly when exposed to high concentrations of oxygen.
 - 4.4.2 All rubber and synthetic gloves shall be tested for leaks prior to use. Inflate the glove by swinging it out a few times to trap air. Grasp the cuff to prevent the air from escaping and squeeze to cause the glove to expand allowing any escaping air to identify holes or tears.

Limb & Body Protection

S3AM-208-ATT5

1.0 Introduction

- 1.1 If there is a danger that a worker's hand, arm, leg or torso may be injured, the appropriate and properly fitting hand, arm, leg or body protection equipment is worn for the hazard identified.
- 1.2 Workers shall wear the appropriate chainsaw chaps when operating a chainsaw and snake chaps if potentially exposed to snake bites.
- 1.3 Limb and body protection should not be modified without manufacturer's approval as the protective qualities may be compromised (e.g. slits cut in coveralls or protective suits to access pockets can result in increased susceptibility to exposure; materials used for secondary stitching may conduct electricity or melt upon high temperature exposures).

2.0 Chemical Resistant Clothing

- 2.1 The need for chemical resistant clothing will be determined by the Manager after consulting the products SDS, any necessary subject matter experts, and the SH&E Manager. The Manager will issue the required clothing to the employee.
- 2.2 Like gloves, the objective of whole body protection is to separate the person from a contaminating or hazardous material. Disposable garments, such as Tyvek coveralls or aprons, provide this type of barrier.
 - Uncoated Tyvek coveralls are made of a porous fabric and are designed to prevent contact with particulates.
 - Coated Tyvek coveralls provide a nonporous barrier to protect the worker from chemical splash and vapors.
 - Protective aprons are made from nitrile or neoprene rubber like that used to make chemical resistant gloves.
- 2.3 Whenever there is a potential for chemical splashing, disposable, chemical resistant clothing, such as a coated Tyvek coverall or apron will be worn. The following tasks are examples where chemical resistant clothing should be used:
 - Cleaning of spills (large or small).
 - Handling materials that are hazardous to skin.
 - Sampling hazardous liquids/material.
 - Equipment decontamination.
 - Non-routine tasks involving the use of chemicals.
 - The transfer of large quantities of chemicals from large containers to smaller ones.

3.0 Fire Retardant & Flame Resistant Clothing (FRC)

- 3.1 The terms 'Fire' and 'Flame', and 'Retardant' and 'Resistant', in reference to FRC are often used interchangeably and definitions can vary considerably. Regardless of the term used, it is important to know how the particular clothing provides protection.
- 3.2 Fabric used in FRC may be composed of fibers that resist ignition and withstand heat while other fabric may be treated with a chemical to provide flame resistance.
- 3.3 Some chemical treatments (such as Proban) can begin to lose effectiveness after 25 to 35 washes, whereas fabric composed of FRC fibers will not lose effectiveness due to washing.
- 3.4 If FRC is soiled the protection afforded is severely diminished. In some cases the residue, such as hydrocarbons, may be flammable.
- 3.5 Tears or holes in clothing can diminish its protective capacity and possibly pose a snagging hazard.

- 3.6 Do not roll up sleeves or pant legs, or neglect to fasten the front (zipper, snap) as intended.
- 3.7 Ensure the manufacturer's instructions and recommendations are followed when laundering or mending FR clothing.
- 3.8 Do not use fabric softener or bleach on FRC.
- 3.9 Wash on low temperature separately from other garments.
- 3.10 If a worker may be exposed to a flash fire or electrical equipment flashover, workers shall wear the appropriate rated outerwear and use other PPE appropriate to the hazard.
- 3.11 If FRC is to be worn, the clothing beneath the outerwear and against the skin shall be made of FRC fabrics or of natural fibers that will not melt when exposed to heat. Synthetic clothing is prohibited.
- 3.12 Situations requiring FRC include, but are not limited to:
 - Risk of fire or explosion.
 - Ground disturbance over or near live pressurized lines containing hydrocarbons.
 - Work conducted within 165ft (50m) of a live facility.
 - Jurisdictional requirements.
 - Customer requirements.
 - SDS or Task Hazard Assessments identify as necessary.
- 3.13 If static charge is an ignition concern work wear with anti-static properties may be required.
- 3.14 Clothing shall cover potentially exposed areas as completely as possible.

4.0 Arc Rated Clothing

- 4.1 Arc rated clothing has been tested for exposure to an electric arc. Note: If FRC does not have an arc rating it has not been tested for exposure to an electric arc.
- 4.2 Arc rated clothing is issued the lower value of either an ATPV or EBT value.
 - ATPV – arc thermal performance value
 - EBT – break open threshold
- 4.3 The arc rating is expressed in cal/cm².
- 4.4 An arc flash hazard analysis shall be conducted by a competent person to determine the appropriate rating required for protective clothing and when it shall be worn. Refer to *S3AM-302-PR1 Electrical Safety*.
- 4.5 When arc rated clothing is worn it shall cover all affected parts of the body as well as any other clothing. The arc rated clothing shall be the outermost layer when arc protection is required.
- 4.6 Areas or electrical equipment may be labeled indicating the required PPE and the minimum arc rating for clothing.
- 4.7 Clothing that is not arc rated, but worn in conjunction with arc rated clothing shall not be used to increase the arc rating of the clothing system.

High Visibility Safety Apparel

S3AM-208-ATT6

1.0 Class 1 Safety Apparel

- 1.1 Class 1 safety apparel provides the minimum amount of required material to differentiate the wearer from the work environment.
- 1.2 At a minimum, this shall include 217 square inches (in²), or 0.14 square meters (m²), of fluorescent yellow-green, orange-red, or red background materials combined with 155 in² (0.10 m²) retro-reflective material. As an alternative, the apparel can have 310 in² (0.20 m²) of combined-performance material (i.e., materials that are both retro-reflective and fluorescent).
- 1.3 Class 1 safety apparel typically consists of a sleeveless traffic vest with retro-reflective bands no less than 0.98 inches (25 mm) in width.
- 1.4 Those occupational activities under which Class 1 safety apparel is typically used:
 - 1.4.1 Permit full and undivided attention to approaching traffic;
 - 1.4.2 Provide ample separation of the pedestrian worker from conflicting vehicle traffic; and
 - 1.4.3 Permit optimum conspicuity in backgrounds that are not complex with vehicle and moving equipment speeds not exceeding 25 miles per hour (mph), or 40 kilometers per hour (kph).
- 1.5 Examples of pedestrian workers who could work in these situations may include:
 - 1.5.1 Workers directing vehicle operators to parking/service locations;
 - 1.5.2 Workers exposed to the hazards of warehouse equipment traffic;
 - 1.5.3 Roadside "right-of-way" or sidewalk maintenance workers; and
 - 1.5.4 Delivery vehicle drivers.

2.0 Class 2 Safety Apparel

- 2.1 Class 2 safety apparel provides superior visibility for the wearers by the additional coverage of the torso and is more conspicuous than Class 1.
- 2.2 At a minimum, this shall include 775 in² (0.50 m²) of fluorescent yellow-green, orange-red, or red background materials combined with 201 in² (0.13 m²) retro-reflective material. Combined-performance materials may not be used without background materials in Class 2.
- 2.3 Class 2 safety apparel typically consists of a full-torso sleeveless traffic vest with retro-reflective bands no less than 1.38 inches (35 mm) in width.
- 2.4 Those occupational activities under which Class 2 safety apparel is typically used:
 - 2.4.1 Greater visibility is desired during inclement weather conditions;
 - 2.4.2 Complex backgrounds are present;
 - 2.4.3 Employees are performing tasks which divert attention from approaching vehicle traffic;
 - 2.4.4 Work activities take place in close proximity to vehicle traffic; and
 - 2.4.5 Vehicle and moving equipment speeds exceed 25 mph (40 kph).
- 2.5 Examples of pedestrian workers who could work in these situations may include:
 - 2.5.1 Roadway construction workers;
 - 2.5.2 Utility workers;
 - 2.5.3 Survey crews;
 - 2.5.4 Railway workers;
 - 2.5.5 Forestry workers;

- 2.5.6 Parking and/or toll gate personnel;
- 2.5.7 Airport baggage handlers/ground crew;
- 2.5.8 Emergency response personnel;
- 2.5.9 Law enforcement personnel; and
- 2.5.10 Accident site investigators.

3.0 Class 3 Safety Apparel

- 3.1 Class 3 safety apparel offers greater visibility to the wearer in both complex backgrounds and through a full range of body movements. Visibility is enhanced beyond Class 2 by the enhancement of background and reflective materials to the arms and/or legs.
- 3.2 At a minimum, this shall include 1240 in² (0.80 m²) of fluorescent yellow-green, orange-red, or red background materials combined with 310 in² (0.20 m²) retro-reflective material. Combined-performance materials may not be used without background materials in Class 3.
- 3.3 Class 3 safety apparel typically consists of a coveralls, jumpsuits, long or short-sleeved jackets, or long-sleeved shirts with retro-reflective bands no less than 1.97 inches (50 mm) in width. A sleeveless garment or vest alone shall not be considered Class 3 apparel.
- 3.4 Those occupational activities under which Class 3 safety apparel is typically used:
 - 3.4.1 Workers are exposed to significantly high vehicle speeds and/or reduced sight distances (note that several sources have interpreted the vehicle speed requirements as 50 mph (80 kph) or more);
 - 3.4.2 The worker and vehicle operator have high task loads, clearly placing the worker in danger; or
 - 3.4.3 The wearer must be conspicuous through a full range of body motions at a minimum of 1280 feet (390 m) and must be identifiable as a person.
- 3.5 Examples of pedestrian workers who could work in these situations may include:
 - 3.5.1 Roadway construction personnel;
 - 3.5.2 Utility workers;
 - 3.5.3 Survey crews;
 - 3.5.4 Emergency response personnel; and
 - 3.5.5 Flagging crews.

4.0 Class E Safety Apparel

- 4.1 Class E apparel includes trousers or shorts which are part of a Class 3 apparel ensemble. Frequently a Class 2 vest is paired with Class E trousers, creating an overall ensemble which meets Class 3 apparel requirements. Class E garments are not intended to be worn without Class 2 or 3 garments.
- 4.2 At a minimum, Class E trousers shall have 465 in² (0.30 m²) of fluorescent yellow-green, orange-red, or red background materials combined with 108 in² (0.07 m²) retro-reflective material. Retro-reflective material shall encircle each leg (360° of visibility) and be placed not less than 1.97 inches (50 mm) above the bottom leg of the trouser.
- 4.3 At a minimum, Class E shorts shall have 465 in² (0.30 m²) of fluorescent yellow-green, orange-red, or red background materials combined with 108 in² (0.07 m²) retro-reflective material. Retro-reflective material shall encircle each leg.

5.0 Headwear

- 5.1 Headwear is considered an important accessory and compliments the overall visibility of the wearer. High-visibility headwear enhances visibility to the head of a moving worker in daylight and helps define the shape of the human form during nighttime exposures.
- 5.2 At a minimum, high-visibility headwear shall have 78 in² (0.05 m²) of fluorescent yellow-green, orange-red, or red background materials combined with 10 in² (0.0065 m²) retro-reflective material. As an alternative, the headwear can have 78 in² (0.05 m²) of combined-performance material.

Risk Assessment & Management

S3AM-209-PR1

1.0 Purpose and Scope

- 1.1 This procedure requires hazard identification, risk evaluation, control measures, and documentation to manage safety, health and environment (SH&E) risks associated with work activities.
- 1.2 The objective is to establish and enhance SH&E performance, to mitigate and reduce losses due to injury, illness, property damage, or environmental impairment incident, and maintain regulatory compliance.
- 1.3 This procedure applies to all AECOM Americas-based employees and operations.

2.0 Terms and Definitions

- 2.1 **Control Measure** - Actions that can be taken to reduce the potential of exposure to the hazard. The control measure could be to remove the hazard or to reduce the likelihood of the risk of the exposure to that hazard being realized.
- 2.2 **Hazard** - An object, condition or behavior that has the potential to cause human injury or illness, property damage, damage to the environment, business interruption, or a combination of these.
- 2.3 **Risk** – The possibility of loss or injury.
- 2.4 **Task Hazard Assessment (THA)** – A THA is a tool for evaluating work activities for the purpose of:
 - Identifying the SH&E hazards and risks associated with the activity being performed;
 - Identifying and implementing control measures to eliminate or reduce hazards and risks; and,
 - Evaluating the effectiveness of control measures and making modifications as needed.

3.0 References

- 3.1 S3AM-002-PR1 Stop Work Authority
- 3.2 S3AM-010-PR1 Emergency Response Planning

4.0 Procedure

4.1 Roles & Responsibilities

4.1.1 SH&E Manager

- Assisting management personnel to identify any necessary SH&E planning documentation required.
- Assisting in the preparation of necessary SH&E risk assessment documentation.
- Reviewing and approving SH&E risk assessment documentation prior to its implementation for work activities.
- Providing SH&E technical and regulatory input as necessary.

4.1.2 Manager

- Confirming the completion of SH&E risk assessment documentation as required, that addresses the full range of work activities, SH&E risks and that all requirements and procedures are implemented and enforced during the work activities.
- Confirming SH&E requirements are implemented successfully, including but not limited to:
 - Subcontractor evaluations

- SH&E training
- Personal protective equipment
- First aid and emergency response
- Client requirements
- Contacting the SH&E Manager to discuss SH&E risk assessment documentation needs/ requirements at the start of each new project involving AECOM and at designated intervals or:
 - When changes occur to the work operations or work location/ conditions
 - When work activities are modified/ changed, or
 - When additional tasks are added to the work scope.
- Confirming that the SH&E Plan has been reviewed and approved by the SH&E Manager prior to its use by AECOM personnel or prior to release to clients, outside agencies or organizations.
- Making appropriate resources available to protect the health and safety of AECOM employees, the environment and to comply with occupational health and safety, and environmental legislation and for the effective implementation of this procedure.
- Identifying and reporting to a Manager/Supervisor when changes occur to the work operations or work location/conditions.
- Identifying appropriate and applicable SH&E regulatory requirements, and implement into respective SH&E Plan.

4.1.3 Employee

- Obtaining necessary training identified in the SH&E Plan and associated documents.
- Understanding the potential hazards and controls of the task before work commences.
- Complying with all required controls as identified in the SH&E Plan and associated documents. Reporting any program, SH&E plan or regulatory variances to their Supervisor.

4.2 Risk Assessment Strategy

4.2.1 Hazard Identification

Hazard identification is the precursor to being able to assess risk. Before undertaking any activity, the hazards shall be identified by persons competent to recognize them using professional experience and training including the following:

- a. Utilization of a formal hazard identification process;
- b. Information from review and improvement processes;
- c. Consideration of hazardous materials required for task(s);
- d. Location of work and proximity to outside hazards or equipment;
- e. Anticipation or possible change of conditions;
- f. Consideration of risk of human error;
- g. Identifying level of training required for task; and
- h. Any other factors that can introduce hazard or risk into the activity.

4.2.2 Hazard identification should consider:

- a. Routine and non-routine activities;
- b. Activities of all persons having access to the workplace (including contractors and visitors);
- c. Human behavior, capabilities and other human factors;

- d. Identified hazards originating outside the workplace capable of adversely affecting the health and safety of persons under the control of AECOM within the workplace;
- e. Hazards created in the vicinity of the workplace by work-related activities under the control of AECOM and neighboring activities not under AECOM control;
- f. Infrastructure, equipment, and materials at the workplace, whether provided by AECOM or others;
- g. Changes or proposed changes in the organization of AECOM, its activities, or materials;
- h. Modification to the SH&E management system, including temporary changes, and their impacts on operations, processes, and activities;
- i. Any applicable legal obligations relating to risk assessment and implementation of necessary controls;
- j. The design of work areas, processes, installations, machinery/equipment, operating procedures, and work organization, including their adaptation to human capabilities; and
- k. Driving and travel activities.

4.2.3 Risk Assessment

- a. Evaluate the work area for hazards as defined above. This applies to field, office, and travel settings.
- b. Determine whether identified hazards could affect employees, subcontractors, members of the public, visitors, or others.
- c. Assess the severity and probability of any identified hazard occurring. This is generally based on experience, although incident statistics are available for most industries. The assessment of probability must also take into consideration the frequency with which exposure to a particular hazard will take place (e.g., the probability of occurrence is much greater if the activity is a daily event involving a number of individuals, compared with the same activity carried out twice a year by few individuals as part of a maintenance procedure).
- d. Severity

Be realistic when considering how severe the result of exposure to a hazard could be. For example, it is remotely possible that someone tripping over a cable in an office may be killed, but the most probable result is bruising or a fractured bone. If, however, the cable is trailing across the top of a very busy stairway, a more severe injury is possible.

The following table shall be used to evaluate severity:

Severity – Potential Consequences				
	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>\$1M USD, Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>\$250K to \$1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost Time /Restricted Work	> \$10K to \$250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> \$1K to \$10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</\$1K USD	Small chemical release contained onsite	Individual complaint

e. Probability

Determining the probability of a hazard actually causing harm can be much more difficult than determining the severity. The factors affecting the analysis of probability are:

- The number of times the situation occurs
- The position of the hazards
- Distractions
- The duration of exposure
- Quantities of materials involved
- Environmental conditions
- Competence of the people involved
- Condition of equipment.

In analyzing the probability of harm, it will be necessary to take into account the possibility of the control measures not being used because of human error, lack of maintenance, difficulty in compliance, complexity, etc.

The following table shall be used to determine probability:

Probability		
Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1,000
Improbable	Highly unlikely to occur, but possible during task/activity	1/10,000

4.2.4 Risk Matrix

A quantitative risk rating can be derived for each hazard using the following table.

Probability	Severity				
	5 - Catastrophic	4 – Critical	3 – Major	2 – Moderate	1 - Minor
5 – Frequent	25	20	15	10	5
4 – Probable	20	16	12	8	4
3 – Occasional	15	12	9	6	3
2 – Remote	10	8	6	4	2
1 - Improbable	5	4	3	2	1

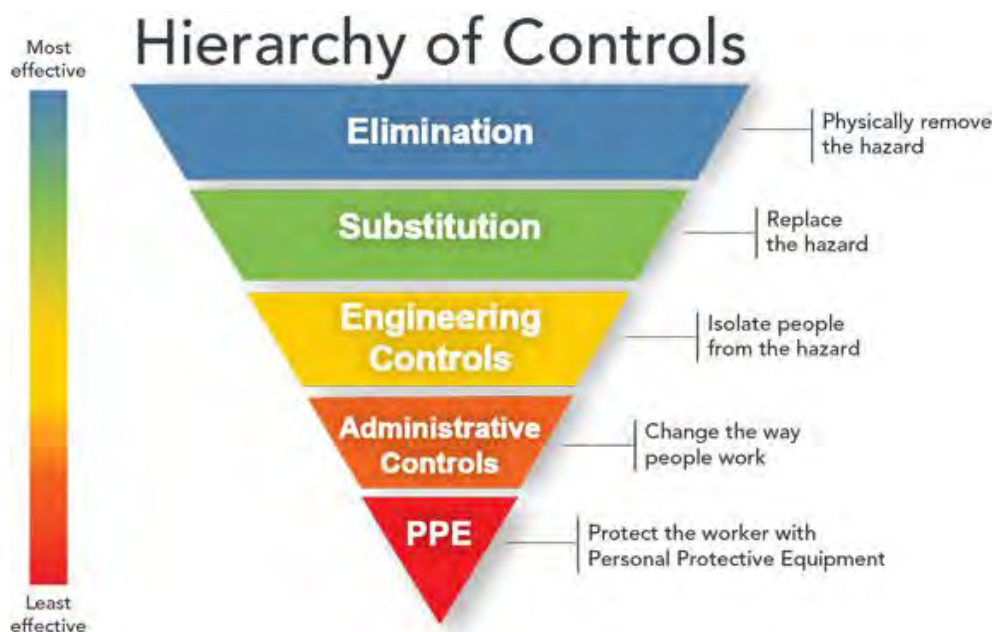
Use of the quantitative risk table shown above can help to determine whether or not the level of risk is tolerable. This can assist in deciding priorities for action. In general, higher risks (yellow and red) may require the provision of considerable additional resources involving special equipment, training, high levels of supervision, and consideration of the most effective methods of eliminating or controlling hazards. Lower-level risks may be considered as acceptable, but actions should still be taken to try to reduce them further, if possible. The risk rating for a project should be revised if the scope of work changes and at a minimum, the risk rating should be re-assessed on an annually basis.

Risk Rating (Probability x Severity)	Risk Acceptance Authority
1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Operations Lead/Supervisor & SH&E Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & SH&E Director

4.2.5 Hierarchy of Controls

Controlling exposures to hazards is the fundamental method of protecting workers. Traditionally, a hierarchy of controls has been used as a means of determining how to implement feasible and effective control solutions.

The idea behind this hierarchy is that the control methods at the top of graphic are potentially more effective and protective than those at the bottom. Following this hierarchy normally leads to the implementation of inherently safer systems, where the risk of illness or injury has been substantially reduced.



Source: <http://www.cdc.gov/niosh/topics/hierarchy/>

Eliminating a hazard is the most effective means to manage a hazard. Substitution and engineering strategies include replacing a hazardous substance with a safer one, reducing the hazard (e.g., ventilation), or isolating it from where employees are working (e.g., enclosing a noisy machine).

Administrative controls include policies, training, job rotation, signage, or temporary barriers to warn of a hazard or describe safe procedures.

Personal protective equipment (PPE) such as safety glasses and hardhats place a barrier between the worker and the hazard, but do not prevent the occurrence of the incident. PPE is considered the least effective method of controlling a hazard because it depends on proper selection and fit, employee compliance, and availability.

4.3 Preplanning for Development of Risk Assessment Documentation

- 4.3.1 Coordination must be made by management with representatives of the client, regulatory authorities (if needed), and other appropriate personnel to determine and coordinate such items as:
- Measures to protect the public and/or other persons exposed to the work operations.
 - Client requirements and local, state, and/or federal laws and regulations that are applicable to the project.
 - Procedures for handling and reporting incidents, property damage, and other emergencies.
 - Disciplinary policies and management of restricted access for company employees and subcontractors/vendors.
- 4.3.2 As soon as possible, conduct an initial review of the work location and review the proposed work activity to determine, to the extent possible, existing or probable hazardous conditions and restricted areas.

4.4 Risk Assessment Documentation

Risk assessment documentation includes SH&E Plans, Pre-Job Hazard Assessments, Daily Tailgate Meetings and Task Hazard Assessments.

- 4.4.1 **SH&E Plan.** All AECOM office locations are required to prepare an SH&E Plan using *S3AM-209-FM1 Office SH&E Plan Template*. A SH&E Plan is required for work activities outside of an AECOM office. The SH&E Plan is often required by regulation, insurance policy requirements, or client requirement. A template is provided in *S3AM-209-FM2 Industrial Site / Project SH&E Plan Template* and in *S3AM-209-FM2-A Short Term SH&E Plan Template*.
- 4.4.2 *S3AM-209-FM2-A Short Visit SH&E Plan Template* is intended for low risk site visits only. It is only appropriate if the scope of work is limited to driving, walking, taking notes, and taking photographs, for a duration of time no longer than 3 days. It should not be used if the conditions at the site being visited are hazardous or high risk. Use at an active construction site is acceptable if escorted by the Client, or General Contractor (or similar).
- 4.4.3 A typical SH&E Plan includes the following components:
- Descriptions of roles and responsibilities for the activity.
 - Hazard analysis for each task and operation found in the work plan (*S3AM-209-FM4 Pre-Job Hazard Assessment*).
 - Attached AECOM procedures applicable to the scope of work. Utilize *S3AM-209-FM3 Procedure Checklist* to assist in determining which AECOM procedures apply.
 - Supplementary information to the attached procedures (e.g., jurisdiction-specific requirements, client requirements, etc.)
 - Supervision.
 - Training requirements.
 - Personal protective equipment requirements for the separate tasks or operating areas.
 - Medical surveillance requirements (for chemical exposure, noise, radiation, etc.).
 - Frequency and types of monitoring for physical and chemical hazards.
 - Pre-entry briefings requirements for visitors and workers.
 - Location-specific Emergency Response Plan. Refer to *S3AM-010-PR1 Emergency Response Planning*.
 - Client requirements that are more stringent than AECOM's SH&E requirements.
 - In California, the SH&E Plan must also address the Injury Illness Prevention Program. Refer to *S3AM-209-ATT1* for additional information.
 - A SH&E Plan for hazardous waste operations may also include:

- Site access and control measures.
 - Site specific information on chemical, biological or radiation hazards.
 - Decontamination procedures.
 - Confined Space Entry plan.
 - Spill containment plan.
 - Waste management.
- o. A SH&E Plan for construction activities may also include:
- Traffic plan and site access controls.
 - Electrical and machinery protective measures.
 - Trench and excavation safety.
 - Fall protection and rescue plans.
 - Storage for combustible and flammable materials.
 - Sediment and community noise control plans.
- p. A SH&E Plan for a demolition project may also include:
- Materials movement plan.
 - Critical task sequencing.
 - Explosives safety.
 - Dust control measures.
 - Removal of asbestos and lead-containing materials.

4.4.4 **Pre-Job Hazard Assessment.** Pre-Job Hazard Assessment is essential to ensure that hazards and risks are recognized. A Pre-Job Hazard Assessment describes the task being performed, the inherent risks, and the control measures for those risks.

- Pre-Job Hazard Assessments are completed before the work activities commence and are updated based on lessons learned.
- Workers involved in the task should participate in the hazard assessment process so that best practices are shared and all possible hazards of the task are identified.

Pre-job Hazard Assessments are performed by:

- Identifying the principle steps of each task being performed.
- Potential hazards are identified for each step and the initial risk rating is determined using the Risk Matrix.
- Control measures are then identified including PPE for each hazard.
- Each hazard is then re-evaluated and assigned a final risk rating using the Risk Matrix.
- If the final risk rating is a 5-9 (medium risk) or 10-25 (high risk), additional hazard controls shall be identified and applied until the final risk rating is reduced to 4 or below. If the final risk rating cannot be reduced to 4 or lower, additional approvals are needed before the activity can begin.

Pre-Job Hazard Assessments may be completed as a stand-alone document, or may be incorporated into an SH&E Plan. Pre-Job Hazard Assessments are similar to Activity Hazard Analysis (AHA), Job Hazard Analysis (JHA), Job Safety Analysis (JSA) and other terms and formats; however, unless otherwise indicated by client requirement, *S3AM-209-FM4 Pre-Job Hazard Assessment* shall be utilized.

Information collected during the Pre-Job Hazard Assessment must be referenced as part of the site- specific SH&E Plan. In addition Pre-Job Hazard Assessments must be communicated to employees and subcontractors on-site. Copies of the Pre-Job Hazard Assessments will be kept on-site for review.

- 4.4.5 **Daily Tailgate Meeting.** A tailgate meeting for all project personnel will be held daily (excluding fixed-facility locations where AECOM employees permanently work full time). A record of the meetings will include the name of all attendees, items discussed, and date/time of meeting. *S3AM-209-FM5 Daily Tailgate Meeting Form* may be used to document the meeting.

At a minimum, the meeting will involve representatives from all organizations with a direct contractual relationship with AECOM on the project site. Other contractors working in the area of AECOM's activities should also be invited to the meeting when possible. All members of the meeting should be engaged and encouraged to participate and provide input and feedback. Objectives for the meeting should include:

- Eliminating injuries, illnesses, and damage to the environment or property.
- Review planned work activities.
- Clarify roles and responsibilities.
- Confirm work crew is fit-for-duty.
- Assess, identify and mitigate hazards.
- Share lessons learned and observations.
- Review simultaneous operations with other non-AECOM controlled activities (e.g., other contractors performing work in the vicinity of AECOM's operations, fuel delivery at the location, utility company working near AECOM operations).

- 4.4.6 **Task Hazard Assessment (THA).** A THA is the most important element in an effective hazard identification and risk reduction program. *S3AM-209-FM6 Task Hazard Assessment* (or *S3AM-209-FM6-A* or *S3AM-209-FM6-ES*) shall be completed before every assigned task at the work location. The THA is to be completed at the worksite by the individual(s) who is intended to conduct the task immediately prior to initiating the associated task. The intent of the THA is to engage the end-user in actively assessing the hazards associated with their task, as well as capture nuances or specifics immediately present that may otherwise remain unacknowledged.

The focus of the analysis shall be on the specific assigned task and the evaluation of risks and assignment of control measures based on actual work conditions. THA is a portion of the overall job scope, focused at the specific foreman and/or crew level. Task Hazard Assessments must be completed prior to the start of work. Re-assessment must also be completed when a significant change of scope occurs or if conflicting work is being done. Completion of the THA involves both the site supervision and employees involved in the work.

Task Hazard Assessment steps:

- Assemble employees involved in the work.
- Review the scope of work being performed.
- Break the task into individual steps.
- Identify actual and potential hazards.
- Rank the risk using the Risk Matrix.
- Develop appropriate controls measures for each hazard.
- Rank the post control measure risk using the Risk Matrix.
- Review the assessment.
- Confirm communication of the THA to all affected employees.

- Confirm the THA is reviewed by any visitors or additional or new personnel brought on to perform the task.

If the final risk rating is a 5-9 (medium risk) or 10-25 (high risk), additional hazard controls shall be identified and applied until the final risk rating is reduced to 4 or below. If the final risk rating cannot be reduced to 4 or lower, additional approvals are required before the activity can begin.

Employees shall monitor the activities for compliance with the THA. Workers should stop any work on a task if conditions change from the planned and agreed approach to the work. The THA should be updated to reflect new conditions or changes in task methods.

4.5 Key Elements in Risk Management at a Site

- 4.5.1 Regularly, or at least once per month, conduct safety meetings for supervisory personnel, including those of other contractors and subcontractors. Suggested action items for these meetings include:
 - a. Reviewing of the safety procedures and policies applicable to the project.
 - b. Identifying responsibilities of the various parties, including contractor(s) and subcontractor(s) obligations.
 - c. Reviewing noted and anticipated hazards, and plan methods to eliminate or control them.
 - d. Discussing incidents and near misses to determine causes and steps necessary to prevent reoccurrence.
 - e. Discussing suggestions and ideas for improving the project's safety program.
 - f. Maintaining a record of these meetings; this will be done by the safety representative or supervisor.
- 4.5.2 Regular inspections of active work areas will be made by the project supervisors and the site SH&E representative. To be effective, such inspections should occur on all shifts, should be unannounced, and should occur at varied intervals.
 - a. Imminent danger situations must be stopped and corrected immediately. Refer to *S3AM-002-PR1 Stop Work Authority*.
 - b. Inadequate or deficient protective measures and unsafe or unhealthy work practices must be brought to the immediate attention of the appropriate supervisor and/or manager for correction and disciplinary action, as required.
 - c. Inform the manager of all deficiencies not immediately correctable, and/or that may result in damage to facilities, equipment, or work in progress, or that create hazardous exposures to employees or the public.
- 4.5.3 Signs and posters of appropriate size and design, and bearing standard pertinent regulations, will be used to convey warnings, directions, and instructions to personnel and the public, as required by the client and other applicable regulations. The observance of such safety and incident prevention signs will be strictly required of company employees and visitors while on the project site.
- 4.5.4 Consideration must be given to make the project environmental protection plan effective. The type and extent of the measures needed for pollution control, hazardous materials handling, hazardous waste control and disposal, and for relating occupational health issues will depend upon the contract stipulations, hazard involved, type of operation, and the mandatory requirements of regulatory authorities. Such measures will include appropriate control methods necessary to prevent or reduce to safe levels exposure to hazardous substances.
- 4.5.5 It is the practice of AECOM to commend and reward employees and their supervisors for achieving excellence in their field of work, particularly when that work is performed safely. Project management is encouraged to promote and participate in safety recognition programs by developing project-specific safety goals and including safety incentive programs in project budgets. Project goals should include proactive goals such as training participation and training support, safety observations conducted, and management participation in safety reviews (e.g., safety walk-downs).
- 4.5.6 Concerning worksites in which other employers control concurrent operations and SH&E issues

related to the worksite, the manager shall coordinate with those conducting concurrent operations to confirm appropriate control measures are in place to protect employees from the hazards associated with activities to be performed.

- Coordination shall occur prior to work commencing, periodically thereafter, and as necessary given changes in scope and/or working conditions.
- Affected employees (including managers and supervisors) shall seek to participate in all site SH&E meetings related to concurrent operations.

4.5.7 All employees are empowered and expected to stop work or not start work when it is unsafe. Employees will be trained on stop work authority upon initial assignment. Refer to *S3AM-002-PR1 Stop Work Authority*.

4.6 Other Requirements

4.6.1 The following requirements apply to SH&E risk assessment documentation:

- Preparation of the SH&E documentation may be performed by a member of the project team or SH&E.
- SH&E documentation (including draft versions of documents) will be reviewed by a SH&E Manager prior to release for outside agency review (e.g., clients, regulatory agencies, etc.) and prior to its field implementation.
- Changes to approved SH&E documentation require concurrence from a SH&E Manager (or designee). This includes those made in response to changing field conditions or operational requirements and those made in response to regulator/client comments. Any written responses made to regulator/client comments also must be reviewed by the SH&E Manager.
- The SH&E documentation for any project lasting twelve (12) months or longer will be reviewed at periodic intervals, but at least annually. The SH&E Manager will review the changes and determine whether modifications are required to the existing SH&E planning documentation. This confirms that the documentation continues to reflect the current scope of work and knowledge of site conditions, and that any revised regulatory requirements are properly addressed. The Manager will provide a master copy of the SH&E documentation to be maintained on site for reference by personnel, together with copies of any required SH&E-related records or operational documentation. The master copy must be current in all respects, and will include any changes or modifications made as work progresses.
- Managers will confirm that SH&E documents have been reviewed with affected personnel prior to implementation of field work. Sign-off and concurrence is mandatory and to be kept in the project records.

5.0 Records

5.1 Completed SH&E Plans, Pre-job Hazard Assessments, Tailgate Meeting Forms and Task Hazard Assessment will be filed in the appropriate project file.

6.0 Attachments

- 6.1 [S3AM-209-ATT1](#) [California Injury & Illness Prevention Program](#)
- 6.2 [S3AM-209-FM1](#) [Office SH&E Plan Template](#)
- 6.3 [S3AM-209-FM2](#) [Industrial Site / Project SH&E Plan Template](#)
- 6.4 [S3AM-209-FM2-A](#) [Short Term SH&E Plan Template](#)
- 6.5 [S3AM-209-FM3](#) [Procedure Checklist](#)
- 6.6 [S3AM-209-FM4](#) [Pre-Job Hazard Assessment](#)

- 6.7 [S3AM-209-FM5](#) [Daily Tailgate Meeting Form](#)
- 6.8 [S3AM-209-FM6](#) [Task Hazard Assessment](#)
- 6.9 [S3AM-209-FM6-ES](#) [Evaluación de Riesgos de las Tareas \(Task Hazard Assessment – Spanish\)](#)
- 6.10 [S3AM-209-FM6-A](#) [Task Hazard Assessment – Management Services Group](#)
- 6.11 [S3AM-209-FM7](#) [Office Relocation Plan](#)

Global Office

Safety, Health & Environment Plan

<Facility Name>

<Building Name>

<Street Address, State/Province/Territory, Country>

<Insert Month, Year of Implementation/Review>

<Insert Month, Year of Next Review Date>

Prepared by: <Insert name>

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Appendices

Appendix A — Stop Work Authorization Forms

Americas — S3AM-002-FM1 Stop Work Order – AECOM Employees & Direct Subcontractors

Appendix B — Office Inspection

Americas — S3AM-216-FM2 Office Inspection

Appendix C — Location Specific Emergency Response Plan Forms

Americas — S3AM-010-FM2 Location Specific Emergency Response Plan Template

Appendix D — Additional and Optional Content

Americas — S3AM-209-FM3 — Procedure Checklist

Americas — S3AM-209-FM7 — Office Relocation Plan

<list any additional documents appending this SH&E Plan>

As applicable, your action items after reviewing this template are to:

- 1. Add your office specific information and gather additional information needed to complete the remainder of the template.**
- 2. Select the applicable forms and information for your office from Appendix A, B, C and D above and delete the others that do not apply. Update the above appendices list accordingly.**
- 3. Add any additional appendices with forms or content applicable to your office.**

Foreword from Andy Peters, Chief Safety Officer



We are committed to keeping our employees safe and becoming the industry Safety, Health & Environment (SH&E) leader as we work toward the goal of having zero incidents in the workplace. Our SH&E Vision and Mission are stated below:

SH&E Vision: To make the earth a safer place ...safety for life!

SH&E Mission: Create and sustain a culture of caring about people and the environment ... one person, one community at a time.

As a global company operating in more than 150 countries, AECOM is constantly evolving to achieve excellence in everything we do. To help meet our SH&E goals, we launched a new program in 2013 titled "Safety for Life." More than just a motto, this comprehensive initiative includes processes and tools that employees can incorporate into their work to ensure they return home safely to their families each day.

As part of the new Safety for Life program, AECOM has developed this Global Office SH&E Plan template to provide a framework for sustaining a safe and healthful office working environment for AECOM employees.

This plan was developed by taking best practices implemented throughout our world-wide operations and identifies a methodology for employing those best practices throughout all AECOM office locations. This Global Office SH&E Plan template standardizes the AECOM approach to office safety, health and environmental performance.

As part of the Safety for Life program, we have also updated AECOM's SH&E policies as well as our guiding principles. We firmly believe these "Life-Preserving Principles" will enhance AECOM's ability to achieve its goal of zero employee injuries and no property damage as well as foster an environmentally friendly and sustainable workplace.

Regards,

A handwritten signature in black ink that reads "Andrew D. Peters". The signature is written in a cursive, flowing style.

Andrew D. Peters
Senior Vice President
and Chief Safety Officer

1.0 Introduction

AECOM has developed this Global Office SH&E Plan template to provide a framework for sustaining a safe and healthy office environment for AECOM employees. This plan was developed by taking best practices implemented throughout our worldwide operations and identifies a methodology for employing those best practices throughout all AECOM office locations. This Global Office SH&E Plan standardizes the AECOM approach to office safety, health and environmental performance.

How to use this template: **Office management should utilize this template to customize a specific SH&E Plan applicable to your office location and geography, as well as the nature of your business activities.** Included in the template are places to insert your office-specific information. In addition, there is an appendix section with two examples of forms from which to choose.

- STEP 1: Review this template, add your office-specific information and gather additional information needed to complete the remainder of this template.
- STEP 2: Review the forms and additional content in Appendix A, B, C and D. Complete and include those that are applicable to your office (or equivalent) and delete those that do not apply.
- STEP 3: Add additional appendices, as needed, to customize this plan for your specific needs.

Employees are required to comply with and ensure adherence to these fundamental office safety, health and environmental requirements. Supervisory and management staff will conduct additional assessments and insert supplemental information to this plan for hazards or potential hazards not already specifically addressed in this plan's contents. These situations will be addressed through an appendix addition to this standard plan.

As changes in the local office environment necessitate a change or update to this information, the plan will be updated accordingly, and communicated to the locally affected personnel. At a minimum, this plan will be reviewed and updated at least annually by local supervisory and/or management personnel.

2.0 SH&E Policy and Life-Preserving Principles

2.1 SH&E Policy

Safety, Health and Environment Policy Statement

AECOM

Purpose

This policy establishes the framework to attain best-in-class Safety, Health and Environmental (SH&E) performance for AECOM's employees in the global marketplace.

Commitment

AECOM is committed to exceptional levels of performance in protecting its people and the environment. As stated in our Core Values, keeping our people safe is our most important measure of success. We strive to be the beacon of safety excellence in the industries and global communities in which we work.

To advance our SH&E program, we are committed to:

- Zero work-related injuries to AECOM employees and protection of the environment as a result of our activities.
- Providing a highly effective SH&E management system that drives continual review and improvement.
- Meeting client requirements and properly incorporating all safety, health and environmental rules and regulations at the local, state, provincial and national levels.
- Developing an exceptional safety culture where our people embrace ownership for the safety of themselves and others.
- Substantial improvements toward our goals of pollution prevention, resource conservation and environmental sustainability.
- Setting and meeting aggressive SH&E performance goals and Core Value Metrics to promote continuous improvement.
- Working with employees and business partners in order to continuously improve SH&E performance.
- Recognizing and celebrating those who contribute to excellent SH&E performance.
- Striving to make AECOM the provider of choice for the safe execution of design, build, finance, operate and maintenance work globally.

The commitment to this policy by the leadership, management and employees of AECOM provides the foundation for a safe workplace, operational excellence and long-term business success.

Expectations

Safety is a core value and a key to our success. We demand continuous improvement in our journey toward a zero incident culture, where everyone is committed to safety, health and environmental excellence.

To that end, we demand:

- Our leaders, managers, supervisors and employees demonstrate their commitment in their actions and decisions to assure that every person goes home safe every day.
- Our employees embrace safety as a core value both on and off the job.
- Each employee is committed to his/her own safety and that of his/her fellow employees.
- We will incorporate Life-Preserving Principles into our work planning and execution.
- We proactively and aggressively identify, manage and eliminate hazards in the workplace.
- We train and prepare our people to have the knowledge, skills, competency and equipment required to work safely.
- We stop our employees from working if the work cannot be executed safely or if conditions or behaviors on the work activity are unsafe.
- All employees immediately report safety, health and/or environmental incidents, near-misses, unsafe conditions, and at-risk behaviors to their supervisor; and that we diligently work to correct the problem.

Our SH&E expectations will be accomplished by the demonstrated leadership of management, compliance with regulatory requirements and participation of AECOM personnel.

Communication

This Policy will be reviewed annually to ensure it meets the needs of the company, and will be made available to all persons under the control of the company.

Sincerely:



Michael S. Burke
Chairman and Chief Executive Officer

04 March 2016

Date



2.2 Life-Preserving Principles

Life-Preserving Principles

AECOM has adopted these “Life-Preserving Principles” to help demonstrate the commitment of our Safety for Life program. We firmly believe these “Life-Preserving Principles” will enable AECOM to achieve its goal of zero employee injuries, property damage and an environmentally friendly and sustainable workplace.

Demonstrated Management Commitment

Our executive, senior and project managers will lead the Safety, Health and Environment improvement process and continuously demonstrate support and commitment.

Employee Participation

Our employees will be encouraged and empowered to become actively engaged in our safety processes through their active participation in safety committees, training, audits, observations and inspections. Employees will be encouraged to participate in health initiatives and adopt a healthy lifestyle.

Budgeting and Staffing for Safety

Our safety staff will be competent, fully trained and qualified to provide technical resources to our internal and external clients. A budget to support safety activities will be included project proposals.

Pre-Planning

Our design, engineering, project and construction management staffs will deploy effective risk mitigation efforts to design, plan and build safety into every project. Pre-Project and Pre-Task planning will be an effective tool in protecting our employees and the environment.

Contractor Management

Our project staff will work closely with our sub-consultants, subcontractors, contractors and Joint Venture Partners to provide a safe work environment for employees and members of the public. Our goal of SH&E performance excellence will be equally shared by all project participants.

Recognition and Rewards

Our employees will be recognized for their efforts in working safely and their support of our safety efforts.

Safety Orientation and Training

Our employees will be provided with effective safety training in order to identify and mitigate hazards in the workplace to prevent injuries to themselves and others who may be affected by their actions.

Incident Investigation

Our managers and safety professionals will investigate all recordable incidents and serious near misses to identify contributing factors and root causes in order to prevent a reoccurrence. Lessons learned shall be identified, communicated and implemented.

Fit for Duty

Our employees are responsible to report to work each day fit for duty and not to pose a health and safety hazard to themselves or others.

3.0 Purpose and Scope

The Global Office SH&E Plan is to provide general guidance and direction to all persons working in or visiting AECOM office locations. This Plan provides a framework for a safe, healthy and environmentally conscious office environment.

The scope of this document includes:

- Consideration of, and compliance with, relevant legislative, regulatory and statutory obligations;
- Corporate governance, including duty of care;
- Hazard identification, risk assessment and risk control requirements for routine and non-routine activities;
- Incident prevention initiatives; and
- Training, awareness and communication requirements.

4.0 Legal and Other Requirements

It is AECOM's policy to fully comply with all laws, rules and regulations applicable in the locations in which we operate. Safety, Health and Environmental laws enacted in **<insert your geographic location, i.e. State/Province/Territory and Country>** applicable to the office located at **<insert office location address>**.

In addition to company policies and procedures, employees are expected to comply with all applicable laws. Any violation of any law, regulation or policy by AECOM employees or others must be reported immediately to the employee's manager/supervisor. Employees may also call the AECOM hotline if they are unable to communicate their concerns with their supervisor.

<Please tailor the below chart to your operations.>

Country	Country Provider and/or Access Code	Toll-free Number (second stage dialing)/or Collect #
Brazil	Brazil - 0-800-890-0288	888-299-9602
Peru	Peru - Telefonica - 0-800-50-288	888-299-9602
	Americatel - 0-800-70-088	888-299-9602
	Telefonica - 0-800-50-000	888-299-9602
China	China - 10-811	888-299-9602
	China - 108-888	888-299-9602
Colombia	Colombia - 01-800-911-0010	888-299-9602
	Colombia - 01-800-911-0011	888-299-9602
Ecuador	Ecuador - 1-800-225-528	888-299-9602
	Ecuador - 1-999-119	888-299-9602
Ireland	Ireland - 1-800-550-000	888-299-9602
	UIFN - 00-800-222-55288	888-299-9602
Malaysia	Malaysia - 1-800-80-0011	888-299-9602
France	France Telecom - 0-800-99-0011	888-299-9602
	Telecom Development - 0805-701-288	888-299-9602
Spain	Spain - 900-99-0011	888-299-9602
Germany	Germany 0-800-225-5288	888-299-9602
Trinidad / Tobago	Trinidad / Tobago - 1-800-203-8074	888-299-9602
Canada	Canada	888-299-9602
United States	United States	888-299-9602
All Other Countries*	Collect - Reverse Charges	1-770-613-6322*

*When using this number, you can reverse the charges. Just tell your local operator that you would like to place a reverse call to the United States. If the operator asks for your name to place the call, you can use the AECOM name to remain anonymous.

4.1 Office Administration / Property Management

This facility is managed by:

<Insert building owner or property management company name, point of contact name, address, phone number, and email if applicable.>

4.2 Permits, Consents and / or Licenses

The safety, health or environmental permits, consents and licenses applicable to this Office are detailed below (if applicable, to be completed by a Senior Office Manager or their designee):

<i>Authority</i>	<i>Contact Office</i>	<i>Type of Consent</i>	<i>Renewal date</i>	<i>Specific Requirements*</i>

*mention any stated performance or measurement criteria imposed by the consent.

Copies of these consents or licenses can be found *<insert location and custodian of documents>*.

5.0 Key Objectives and Targets

The key objectives and targets are:

- To comply with relevant certifications;
- To systematically reduce AECOM SH&E incidents;
- To improve office SH&E awareness amongst employees;
- To ensure AECOM employees complete compliance based SH&E training;
- To provide a secure environment to reasonably protect employees from external threats such as intruders, thieves, bomb threats, natural disasters and hazardous office working conditions; and
- To promote a safe, barrier free, accessible workplace for the mobility challenged and other employees with disabilities in accordance with local regulations and in line with AECOM's commitment to being an equal opportunity employer.

SH&E targets are set annually. AECOM is committed to meeting the following targets:

- Achievement of a Total Recordable Injury Rate of less than **<insert TRIR Target>**; and
- **<insert additional location specific targets>**.

6.0 SH&E Awareness Campaign

The AECOM SH&E Awareness campaign aims to facilitate communication on local hazards and applicable SH&E information directly to AECOM employees. Our goal is to promote and sustain a proactive safety culture. The SH&E Awareness campaign communicates messages to staff members to ensure they are mindful of risks potentially encountered through day-to-day activities and tasks.

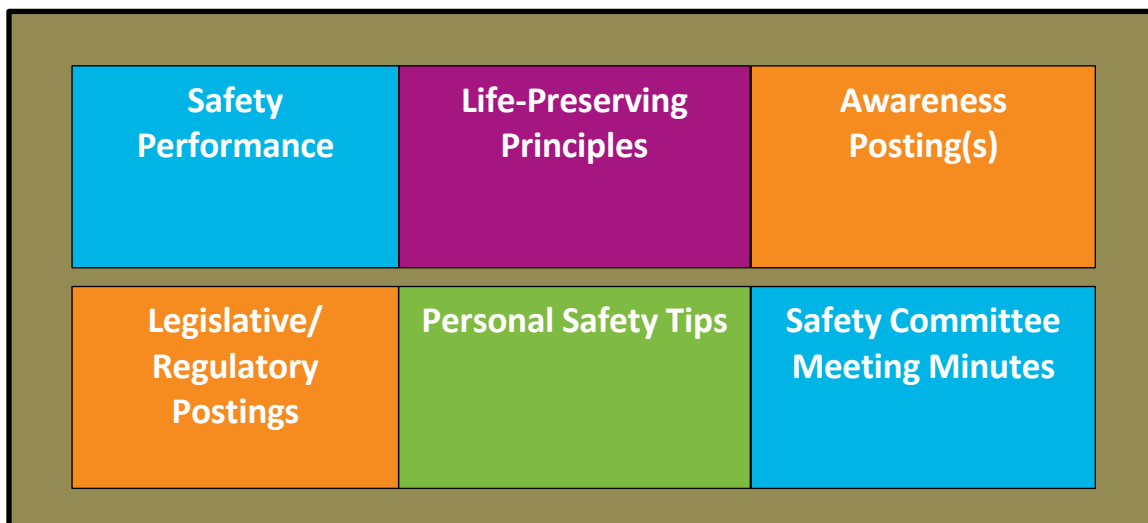
AECOM provides an environment where employees are encouraged to voice their concerns on any SH&E issues within the business. Information is regularly distributed to employees to keep them informed of SH&E matters that may contribute positively to maintaining a safe and healthful working environment.

Communication methods may include, but are not limited to:

- Team Briefs;
- Safety Committee Meetings;
- SH&E Bulletin Boards; and
- Safety Alerts.

6.1 Typical SH&E Bulletin Board Sample Layout

Each office with five or more staff must have an SH&E bulletin board or a substantial location dedicated to safety, health and the environment to display posters and informational materials. The SH&E Bulletin Board will have current, relevant materials posted to include the SH&E policy, Life-Preserving Principles as well as any other local legislative or geography specific information. All postings should be in the appropriate local language and in English.



6.2 Additional SH&E Awareness Campaign Suggestions

- Awards and Recognition for SH&E performance;
- Project logo shirts or caps;
- Stickers, buttons, key chains;
- Challenge Coins for on-the-spot recognition;
- Volunteer SH&E Advocates;
- Posters created by employees;
- Programs to recognize national safety, health, environment and fire protection events;
- Guest speakers for employee meetings;
- Banners addressing specific hazards;
- Banners promoting employee SH&E awareness;
- Whiteboards for workers to identify Today's Biggest Risks in This Area;
- Litter collection/recycling campaigns including moving to an office environment that minimizes the use of individual waste paper bins;
- Safety for Life Awareness Materials; and
- Personal safety awareness.

7.0 Roles and Responsibilities

AECOM has identified and allocated financial and physical resources to enable the effective implementation of the AECOM SH&E Management System.

7.1 Responsibility, Accountability and Authority

The SH&E Manager will maintain documents and records pertinent to the development, implementation and maintenance of this system. The SH&E Manager will provide technical guidance to operations in support of the requirements of applicable procedures and to enable a viable SH&E Office Inspection Program is effectively implemented at the location.

7.1.1 Office Operations Management

Office Operations Management or their designee has overall responsibility for providing a safe and healthy working environment and for maintaining safe work practices for all employees, contractors and sub-consultants working in AECOM offices.

7.1.2 Management and Supervisory Staff

Managers and Supervisors are responsible for the SH&E performance of the work areas under their control and have responsibility and authority for the following:

- Reporting on the performance of their respective business sectors to relevant AECOM management for review and as the basis for improvement;
- Acquiring and keeping up-to-date knowledge of relevant safety and health matters;
- Understanding the nature of the operations of the business and the hazards and SH&E risks associated with the business operations;
- Confirming a hazard reporting system is utilized and available;
- Consulting with employees who carry out work that could be affected by a potential SH&E risk;
- Coordinating with landlords and/or leasing agents to assure that facility-protective systems (e.g., sprinklers, fire extinguishers, alarms, and emergency lights) are periodically inspected and operational
- Developing a location-specific Emergency Response Plan.
- Establishing a routine office inspection program.
- Identifying and controlling any restricted work areas
- Reporting incidents;
- Reporting near misses;
- Confirming employees are properly trained on relevant SH&E topics by a qualified and competent person;
- Confirming SH&E is discussed during meetings;
- Providing employees with personal protective equipment relevant to the tasks and duties they are required to perform;
- Participating in incident investigations and incident reviews as required; and
- Confirming staff compliance with any jurisdictional, local and/or building property management required training.

7.1.3 Office Reception

Reception Staff in AECOM Offices will ensure that visitors are met at reception, sign into a log — electronic, or hard copy — and complete a visitor's induction overview. Reception staff will record and communicate all safety alerts, emergency situations or security concerns that they receive as the point of contact.

7.1.4 Fire / Floor Wardens and First Aid Officers / Providers

Please see Section 14 Emergency Preparedness and Response.

7.1.5 All Employees, Contractors, Sub-Contractors, Sub-Consultants and Visitors

Employees of AECOM, sub-consultants, contractors, sub-contractors, and others are required to:

- Inspect their own office work stations and areas and correcting conditions within their control to ensure compliance with this procedure.
- If requested, cooperate with Office Manager (Operations) to participate in site inspections or audits
- Take reasonable care and responsibility for their own safety and health, and the safety and health of others who may be affected by their actions or omissions in the workplace;
- Not introduce hazards to the premises by bringing or storing any items in the office that present a risk to life and safety;
- Comply with any reasonable instructions and directions issued by AECOM or organization's controlling work sites or locations (other than company controlled work sites or locations) at which the employees are required to work;
- Comply with the SH&E policies, procedures and instructions issued by AECOM or the organization controlling the work site or location;
- Not willfully damage, interfere with or misuse items or facilities provided in the interests of safety, health and welfare of the company employees and others;
- Report potential and actual hazards incidents, and near misses in accordance with company procedures;
- Use personal protective equipment and other safety promoting equipment when provided by the employer;
- Not willfully injure himself or herself.

7.2 SH&E Committee (Charter/Constitution)

AECOM offices shall establish a functioning SH&E Committee meeting requirements of local regulations that meets at least monthly. The SH&E Committee will establish a charter/constitution to outline how they will uphold and proactively manage SH&E concerns as well as implementation and enforcement of the AECOM Office Safety Plan. Where practicable, one SH&E Committee could be designated for several small offices where appropriate. The SH&E Committee shall:

- Encourage the active participation of all employees in the prevention of incidents and the promotion of safety, health and environmental activities in the workplace.
- Coordinate the SH&E Program and local legislative requirements for the office.
- Make recommendations to management on office or staff concerns brought to the committee or representatives attention.
- Minutes and action tracking from meetings should occur.

7.2.1 SH&E Committee Members

The functions of SH&E Committee Members Include:

- Representing their department in matters relating to SH&E;
- Investigating complaints from members of their department relating to SH&E;
- Inspecting the workplace, or any part of it, as assigned;
- Refer SH&E concerns to the committee;
- Promptly reporting any hazard or potential hazard to AECOM management;
- Consulting and cooperating with management on all matters relating to the SH&E of persons in the workplace; and
- Liaising with the employees regarding SH&E concerns.

8.0 Stop Work Authority

AECOM employees have not only the authority but also the responsibility to stop an unsafe act. This applies to work controlled by AECOM, AECOM employees and AECOM controlled sub-contractor work activities. See Appendix A for Stop Work Authority forms for each geography.

AECOM's goal is to protect employees from harm in their work above all other operational goals. To this end, we empower any employee, supervisor, manager or subcontractor to Stop Work if they believe a danger exists to any persons, property or the environment.

Prior to commencing a formal Stop Work Order, AECOM employees and subcontractors must conduct an informal Stop Work to discuss the concern and attempt to remove, mitigate or isolate the hazard in coordination with the supervisor and office manager. If the supervisor and office manager cannot sufficiently resolve the concern, a formal Stop Work Order will be enacted which elevates the concern to the SH&E Manager for assistance. Work associated with the affected area or operation will not resume unless all corrective actions identified have been resolved to an acceptable level.

Employees will never be penalized for exercising their responsibility to Stop Work.

9.0 Training and Competency

All AECOM employees, including managers and supervisors, will be trained on Office SH&E Plan requirements by a qualified and competent person. A qualified person will be knowledgeable of the specific Office SH&E Plan details, including applicable emergency evacuation and shelter-in-place procedures. Fire / Floor Wardens and First Aid Officers / Providers will be trained in accordance with local governing regulations. Specific instructions as related to emergency office evacuations and shelter-in-place training must be provided specific to the office location. This will be complete with emergency exit, rally / muster point and accountability procedures.

Office specific training will be administered for any hazard or risk not specifically addressed in this plan. Each office location will provide a supplement to fundamental training as necessary as an Appendix.

Any questions regarding qualified and competent trainers should be addressed with your local SH&E representative.

9.1 Employee Inductions / Orientations

Safety Inductions / Orientations will be conducted for all AECOM employees to familiarize employees and supervisors with SH&E potential hazards specific to work assignments as specified below.

- As a new AECOM employee;
- When the Office SH&E Plan is first established;
- When there are changes in the work environment or conditions that necessitate a change to the established Office SH&E Plan; and
- When employees are given a new job assignment with hazards or potential hazards that were not covered in the previous induction training.

9.2 Visitors

AECOM Office visitors will be issued a visitor's badge/tag or some identifiable means designating them as a visitor. The badge/tag must be worn for the duration of the visit. Visitors are to be informed of office emergency procedures including emergency exits, rally points and shelter-in-place locations. Visitors are to be accompanied by an inducted AECOM employee for the duration of their visit, or they must undergo the employee induction / orientation for that office location. For security reasons, many offices require visitors be accompanied by an AECOM employee while in the building, even if an Office Safety Induction / Orientation has been completed. All visitor escorts will ensure that their visitors are informed and aware of the hazards or potential hazards in the office they are visiting.

< insert any additional location specific information related to Visitors >

9.3 General Office Safety and Security

AECOM employees will promote safety and security in the office environment, perform and document safety inspections, and implement appropriate corrective actions designed to minimize risk and enhance operational SH&E performance.

Managers must ensure that employees working in that location understand any location specific risks, are briefed in the correct emergency response procedures and have access to support, such as first aid kits and firefighting equipment available for use, in the event of an incident or emergency.

Office and building evacuation means of escape should be inspected at least monthly to identify and address any specific hazards. Hazards that cannot be immediately addressed must be communicated to other employees, and corrective actions must be developed for resolution.

9.3.1 Office Ergonomics

Poor ergonomic work factors, such as repetitive motion, lack of motion/movement or improper workstation layout increase the risk of sustaining musculoskeletal injury. Advocate to employees to follow the 20-20-20 rule. Every 20 minutes, take a 20 second break and move 20 feet away from your workstation.

All equipment and workstation design shall take ergonomic performance into account. Ergonomics scientifically fits the job to the worker by reducing risk and obtaining maximum work efficiency with regards to work, work tools and the work environment.

Equipment and workstations shall be, as far as practicable, designed to suit the individual(s) interacting with them. Mechanical equipment or assistance shall be used whenever possible to reduce the manual material handling frequency, duration or load for workers. All office equipment and furniture should be used for its intended purpose and as recommended by the manufacturer

Formal workplace ergonomic hazard assessments will be carried out, as needed, to assess exposure and reduce risk. An ergonomic assessment will produce recommendations to improve the fit of the task to the worker most efficiently.

9.3.2 Slips, Trips and Falls

Slip, Trips and Falls are the most common hazards encountered that lead to employee injury. In order to abate these hazards:

- Clean up any spill immediately or notify property management if necessary.
- When utilizing a stairway, always use the handrail.
- Keep work spaces neat and orderly to prevent the accumulation of materials, boxes, etc. to minimize trip hazards.
- Keep pathways and aisle ways clear of obstructions and hazards.
- If work at heights is required, office staff will ensure the proper stool or ladder in good condition is provided and utilized in accordance with local regulations. Reference local working at height and/or fall protection procedures for specific guidance on applicable regulations and adequate stool and ladder specifications.

9.3.3 Housekeeping

Good housekeeping practices are an integral part of maintaining a safe office environment. This includes:

- Stacking materials neatly;
- Preventing electrical cords from being in aisle ways or passages;
- After using office supplies and/or equipment, putting them in their proper storage location;
- Cleaning up any spill immediately, and notifying property management when necessary;
- Turning off all electrical equipment at the end of the day;
- Implementing healthy housekeeping routines to ensure on-going and proactive upkeep; and
- Keeping all cabinet drawers and doors closed.

9.3.4 Manual Handling and Safe Lifting

Manual handling presents significant risk due to the potential for awkward postures, heavy or difficult to handle loads, space configuration hazards and unsuitable flooring. AECOM employees will observe safe lifting practices in order to minimize the potential to sustain a lifting related injury. When possible, employees will use a dolly to move items such as boxes. Special caution should be given to awkward lifting situations, such as in a tight space, or an oddly shaped or weighted item.

9.3.5 Motor Vehicles

Driving a motor vehicle presents significant risk due the possibility of vehicle collision or other event where personal injury or property damage may occur.

Motor vehicles must be selected, equipped, operated and maintained in a way that protects personnel from harm. **<Insert location guidance for vehicle assignment>**

Only authorized drivers, who are fit for duty, shall operate a motor vehicle. At-risk driving behavior by AECOM employees shall be identified and managed accordingly.

9.3.6 Electrical Safety

Electricity presents significant risk from electrical shock or due to an arc flash. An arc flash is a flash over of electrical current that causes it to leaves its intended path and travel through the air from one conductor to another or to the ground. Results are often violent and when a person is in close proximity to the arc flash severe injury or even death can occur.

All electrical work must be identified and completed against a defined set of criteria.

Efforts will be made to follow local safety codes and manufacturer's specifications to eliminate the need to directly work on live electrical systems where practicable.

Electrical work must be planned and managed by competent personnel. Including, but not limited to the, revision of the electrical system, de-energizing electrical systems and permit to work.

Only authorized and fit for work personnel shall perform work on, or near, live electrical system components.

9.3.7 Globally Harmonized System for Hazard Communication (HazCom)

HazCom is a system to ensure that information regarding chemical hazards in the workplace is communicated to all potentially affected employees. Any chemical container that is brought into the office must have the proper warning labels. Where practicable, chemicals will be stored in the original manufacturer's container with clearly legible labels.

If an employee has to utilize an item that poses a potential chemical hazard, they will first obtain a copy of the current Safety Data Sheet (SDS) formerly known as the Material Safety Data Sheet (MSDS).

9.3.8 Workplace Violence, Sexual Harassment, and Racial Harassment

Managers shall take deliberate steps to let all workers know the Company's position on workplace violence, sexual harassment and racial harassment by providing a method of confidential reporting and the understanding that all claims will be investigated and remedied promptly.

Employee complaints made in good faith shall be made without fear of retribution. Managers shall assess the workplace for potential scenarios and incorporate findings into the Emergency Preparedness and Response planning where applicable.

< insert any additional location specific information related to Workplace Violence, Sexual Harassment, and Racial Harassment>

AECOM's Workplace Violence and Harassment policies can be found **<insert location>** and are posted on the Office SHE Board.

10.0 Incident Management Process

The following events or situations as applied to AECOM employees and/or AECOM-controlled operations are considered SH&E Incidents:

- Any work-related injury or illness to an AECOM employee;
- Fire, explosion or flash that is not an intended result of a remediation process, laboratory procedure or other planned event;
- Any incident involving company-owned, rented or leased vehicles (including personal vehicles used to conduct company business);
- Property damage resulting from any AECOM or subcontractor activity;
- Unexpected release or imminent release of a hazardous material;
- Unexpected chemical exposures to workers or the public; and
- Any government agency inspection, citation or notice of violation.

10.1 Incident Reporting

All incidents must be reported to a manager/supervisor or designee as soon as practicable. Managers/Supervisors will ensure there is a Timely Notice of Loss in the online incident management system (e.g., IndustrySafe), within four hours of the incident or notice that the incident occurred. The IndustrySafe guide is available on AECOM's Corporate SH&E webpage.

10.1.1 Employee Responsibilities

If an incident appears to be a risk to life, limb or eyesight, seek immediate emergency medical services.

Only trained and competent employees, specifically to the blood borne pathogens rules and regulations and those that have proper protective equipment, may provide first aid when the response involves coming in contact with blood or bodily fluids.

Employees are responsible for reporting all occupationally related or potentially occupationally related incidents immediately to their manager/supervisor. All incidents must be reported no matter how minor the incident appears. Provide as much detail about the incident occurrence as possible, including:

- Who was injured;
- Extent and nature of the injury;
- Where it occurred;
- When it occurred; and
- Name witnesses to the incident.

If medical treatment is sought, the injured employee will obtain a copy of their work status report from the treating physician when practicable. Employees shall provide their manager/supervisor and the AECOM Workers Compensation Analyst a copy of their work status report within 24 hours after any appointment for the treatment of the occupational injury/illness.

10.1.2 Manager/Supervisor Responsibilities

Once a Manager/Supervisor becomes aware that an incident has occurred, assess the situation. If there is a risk to life, limb or eyesight, seek immediate emergency medical services for the injured.

- Arrange for proper medical care, if necessary, and ensure that the AECOM Workers Compensation Analyst is informed; and
- Ensure the incident is logged into the online incident management system (e.g., IndustrySafe, GSMART), within four hours of the incident occurrence, or knowledge of incident occurrence.

Only trained and competent employees, specifically to the blood borne pathogens rules and regulations and those that have proper protective equipment, will provide first aid when the response involves coming in contact with blood or bodily fluids.

There are a number of ways AECOM Management/Supervision could potentially be informed of an incident. Such as: an employee reports an incident directly to the manager/supervisor; notified by a physician either verbally or through written correspondence that an incident occurred; notified by a family member either verbally or through written correspondence that an incident has occurred; notified by an attorney either verbally or through written correspondence that an incident occurred; or notified by a Regulatory Body either verbally or through written correspondence that an incident occurred.

AECOM may need to file a Workers Compensation, Defense Base Act, General Liability (in the case of an automobile accident) or similar type claim even if AECOM is not at fault or has not accepted liability for an incident. Notify the AECOM Workers Compensation Analyst when any of the above scenarios occur.

10.2 Incident Investigation, Corrective and Preventive Action

Incident investigations are a vital element of our Office SH&E Plan because these investigations provide us with information in order to prevent similar incidents from occurring in the future. An investigation's objective is to identify the root cause of the incident, such as a system failure, unsafe acts and conditions or noncompliance with or ineffectiveness of an established safety rule, regulation, policy or procedure.

Corrective and Preventative actions must be implemented for every incident that occurs no matter how minor it may appear.

10.3 Fit for Duty

Fit for Duty simply translated means an individual is in a physical, mental and emotional state which enables them to perform the essential tasks of their work assignment in a manner that does not threaten the safety or health of oneself, co-workers, property or the public at large.

Employees must report to work in a fit state that does not place themselves or others at risk due to physical, mental and emotional factors.

Employees that report to work in an unfit state must inform their supervisor so that adjustments to their activities can be made accordingly. This may include:

- Drugs and Alcohol including prescription medication;
- Temporary Conditions such as fatigue, and stress
- Physical limitations such as eyesight, hearing, flexibility and lifting restrictions;
- Cognitive limitations such as brain damage; and
- Psycho-social factors such as depression, anxiety and fears that may restrict clear thinking.

Employees or supervisors that observe another employee that may be working in an impeded manner should consult with local management and human resources to determine a course of action.

Where an incident has occurred and there is reason to believe the individual may not have been fit for duty the local safety department and human resources should be contacted immediately and an appropriate investigation conducted.

11.0 Audits, Assessments and Inspections

Periodic office inspections will be performed, at minimum, in accordance with the following schedule:

- Prior to the occupation of any new facility by staff;
- When the Office SH&E Plan is initially established;
- Monthly;
- As required by any applicable governing regulation;
- When new tasks that were not previously performed at this location are now performed;
- When new hazards are introduced to the office environment; and
- When office conditions necessitate an inspection.

See Appendix B for example Office Inspection Checklists used in each geography.

11.1 Safety, Health and Environmental Inspections and Auditing

Inspections will be conducted prior to the occupation of any new facility and on a monthly basis, at minimum, utilizing appropriately qualified office staff employees. Actions to eliminate or reduce hazards and risks are to be implemented immediately or referred to the Safety Committee and/or Senior Management dependent upon severity. All inspections will be documented and retained in accordance with local records retention policy.

11.2 Documentation and Records Management

Office Management is responsible for taking steps to establish, implement and maintain the storage of records in accordance with AECOM's records retention requirements.

Common records that should be accounted for in the records retention chart are:

- Medical Monitoring Records;
- Training Records;
- Near Miss and Incident Reports;
- Lead and Asbestos Records;
- Chemical Exposure List;
- Audit and Inspection Findings;
- Corrective and Preventative Actions; and
- Industrial Hygiene Monitoring Reports.

This location's records retention requirements are **<Insert record retention chart>**.

12.0 Hazard Identification and Risk Assessment

Here is a list of anticipated hazards that are typically associated with the office work environment:

- Fire from ignited combustible materials by sparks typically generated from an applicant, power strip or electrical equipment;
- Injury from Trips, Slips or Falls;
- Injury from a Natural Disaster such as high winds, earthquake, tornado, hurricane or a wind storm;
- Motor vehicle incident resulting in injury either as a motorist or as a pedestrian;
- Musculoskeletal injuries that arise out of repetitive motions, body posturing and/or poor ergonomic practices;
- Stress related to the work environment;
- Cuts from sharp objects or paper; and
- Injury resulting from falls off of ladders or stools.

12.1 Hazard / Risk Assessment, Control and Evaluation

A Manager or Supervisor shall prepare and maintain a risk register for monitoring and evaluating all risks identified within an office. The risk register shall be reviewed on an annual basis or as high level risks or relevant SH&E legislative changes are identified. Controls shall be put in place to mitigate these risks.

The risk register shall also be reviewed by the **< insert locally responsible point of contact >** on a monthly basis (or as required) as part of the Management Review.

12.1.1 Operations

All hazards and risks identified will be assessed and controlled to the level of “As Low as Reasonably Practical.”

Hazards associated with business operations and environments are subject to a risk assessment. The results of assessments including recommended controls shall be communicated to the leadership group.

Hazards with a high risk rating (likely to cause significant harm) are assigned highest priority and are reported to management immediately. All hazards are to be reviewed by the Office Management Team and appropriate personnel. Mitigating controls are to be implemented to eliminate or reduce the reported hazards.

13.0 Environmental Management

This section addresses environmental compliance conditions and activities that could apply in the office as well as environmental sustainability activities. Complete section 13.1.4 as applicable.

13.1 Environmental Compliance

There are a number of environmental laws and regulations that could be applicable to office conditions and activities. Some of these are listed below:

13.1.1 Storage of Chemicals and Samples

Any chemicals or samples stored in the offices must be properly labeled. Depending on the time the chemicals and samples are stored, it may be necessary to obtain a permit for storage.

13.1.2 Shipment of Materials

This applies to shipment of materials considered to be hazardous and/or dangerous. Local laws and regulations in some countries have requirements for the proper labeling of materials shipped, via air or ground, and have training and documentation requirements for people involved with the shipment of these materials.

13.1.3 Obtaining of Permits Prior to Field Activities

Offices should ensure, prior to the start of field activities, that all necessary permits have been obtained. These permits can include: air permits for remediation systems, which may have air emissions; water discharge permits that may be required for remediation systems, which could discharge wastewater; storm water permits; waste storage and others.

13.1.4 Office Environmental Compliance Applicability

Office Activities	If Yes — Actions	Name the Office Lead Person and describe the process to ensure compliance (provide attachments as needed)
Does the office store chemicals or retain samples?	Ensure the chemicals and samples are stored properly, with appropriate labeling and have the applicable permits for storage.	
Does the office arrange for shipment of materials considered to be hazardous or dangerous?	Ensure people involved with arranging the shipment are properly trained with documentation available.	
Does the office perform field activities that require permits — air, water or waste?	Ensure permits are obtained prior to going to the field.	

13.2 Environmental Sustainability

13.2.1 Waste Management

The following waste contractors are used to remove waste from this site (as applicable):

Contractor	Waste Stream	Carriers/Brokers License Expiry date	Proposed Waste Disposal Facility (WDF)	Is WDF licensed or exempt to accept this waste stream?
	Paper			
	Glass			
	Plastic			
	Cans			
	Fluorescent Light Tubes			
	Waste Oils			
	IT Equipment			
	Interceptor Sludge			
	Batteries			
	Etc.			

All waste consignment notes (if applicable) are to be retained by **<insert who and where>** (Note: Non-hazardous waste transfer notes are to be kept for at least two years. Hazardous waste consignment notes are to be kept for at least three years).

Recycling is undertaken wherever possible and the materials that are being recycled are: (examples)

- Paper — **<insert how & where>;**
- Glass — **<insert how & where>;**
- Plastic — **<insert how & where>;**
- Cans — **<insert how & where>; and**
- Other — **<insert what, how & where>.**

13.2.2 Water Management

Fresh water is recognized as a depleting resource and measures have been implemented at this workplace to try and reduce our water usage.

<insert water conservation measures taken at this office>

Consideration is also given to the contamination of water sources. Waste is stored appropriately to reduce the risk of contamination through drainage networks, and where applicable, authorization is sought from the sewage network provider for discharge into the network (e.g. for toilet facilities).

13.2.3 Energy Use

Efficient use of energy resources are managed through specific initiatives. These may include:

- Turning off lights and heaters when out of room;
- Don't leave equipment on standby;
- Energy saving devices installed;
- Car sharing initiatives;
- Movement sensors for lights; and
- Thermostat controls set at reasonable temperatures and controlled during normal business hours.

13.3 Other Environmental Activities

13.3.1 Asbestos Management (As Applicable)

An asbestos assessment **<is/is not going to be conducted>** at this facility.

< An assessment has revealed that asbestos or asbestos containing materials **<is/is not present>**. >

< If Asbestos is present The Asbestos Management Plan for this workplace is kept **<insert location>** and **<insert name>** is responsible for keeping it current and ensuring monitoring takes place at the required intervals.>

< The outcome of all asbestos testing on the premises undertaken by appropriate authorities, including the building management is to be reviewed by locally qualified staff with the appropriate authority and retained in the records report. The company will work with the appropriate authorities to ensure the remediation of any identified asbestos issues.>

13.3.2 Air Quality Management

The outcome of all air-quality testing on the premises undertaken by appropriate authorities, including the building management is to be reviewed by locally qualified staff with the appropriate authority and retained in the records report. The company will work with the appropriate authorities to ensure the remediation of any identified air quality issues.

13.3.3 Energy Emergencies

In the event of a power/energy emergency, the type of power/energy used to include the service providers to facilitate quick communications in the event of an emergency includes:

- **Gas — name of service provider;**
- **Gas oil — name of service provider;**
- **Fuel oil — name of service provider; and**
- **Electricity — name of service provide>.**

14.0 Emergency Preparedness and Response

<Insert Office Location> has a Location Specific Emergency Response Plan specific to the premises and geographic location of the office. The Emergency Response plan is located **<insert specific location of the plan>**. All employees will be familiar with the Emergency Evacuation Plan as part of their Induction Training.

Geographic specific Emergency Response Planning procedures provide detail on the:

- Structure of the emergency response organization;
- Responsibilities for preparation, implementation review of emergency response processes;
- Training;
- Response strategies; and
- Testing of the emergency drill.

Location Specific Emergency Response Plans provide:

- Emergency contact lists;
- Applicable maps (office location, location of exits, emergency equipment, muster / rally points, etc.);
- Emergency procedures; and
- Emergency response evaluation.

A Manager or Supervisor shall ensure appropriate resources are allocated and that the Emergency Response Plan is implemented. Leadership will decide the need for periodical testing across each office.

14.1 Fire / Floor Wardens and First Aid Officers / Providers

In the event of a medical or fire or natural disaster emergency, fully trained and competent First Aid Officers and Floor wardens are to be in their designated location in order to provide assistance. In some localities, the property management provides appropriately trained Floor wardens. Contact your property management company and coordinate the delegated duties as appropriate.

14.2 First Aid Kits and Automated External Defibrillators AEDs

Stocked First Aid Kits are available at **<insert specific location of First Aid Kits on site>**.

AEDs are available at **<insert specific location of AEDs on site>**.

14.3 Emergency Response Plan

The Location Specific Emergency Response Plan is included as Appendix **<insert Appendix Number>**.

For an emergency evacuation of the office, alarms and/or flashing lights will be observed.

Employees will follow the directions provided by the floor wardens and proceed to the designated muster or rally points.

Every AECOM employee must know what to do in an emergency situation and how to obtain assistance. In the event of natural disasters, a fire, medical, hazardous chemical spill, elevator malfunction, security incident, power failure, emergency evacuation or shelter in place notify your Supervisor and Office/Facility Manager as soon as practicable.

14.4 Security

Each office will assess the potential for violence and establish appropriate security procedures consistent with building manager's protocol.

15.0 Contractors/Subcontractors

AECOM engages contractors, sub-consultants and sub-contractors to assist in the delivery of client projects. All sub-contractors must meet this office's minimum requirements with respect to safety documentation and reporting.

Service providers who perform work in the office environment unsupervised must complete a visitor's induction / orientation and be advised if any planned high-risk activities are to be performed, at minimum.

15.1 Service Providers

Office Management will be responsible to ensure the selection of competent contractors to carry out all maintenance/cleaning operations. Copies of named maintenance and cleaning contractors' agreements can be located **<insert location of information>**.

If the service provider is selected by the Property Management Company, contact the point of contact if any high-risk activities are occurring within workspace that has the potential to pose a risk to AECOM personnel.

15.2 Monitoring and Review

Surveillance and audit activities will be performed and provide a level of assurance that the subs have implemented planned arrangements. The project manager will plan for such surveillance and audit activity.

Where the sub will be engaging in high-risk activities, or where a sub's project safety plan is a contractual requirement, the project manager must ensure the plan(s) are reviewed and any non-conformances are rectified prior to work commencing.

AECOM recognizes that some clients may have specific requirements in relation to how contractors working on the client's sites are managed. In these circumstances, the client's specific requirements shall override AECOM procedures. The client-specific requirements will be made available to our staff.

16.0 Management Review

To ensure continuing suitability, adequacy and effectiveness of the SH&E Management System, a continual review process will be implemented. Management and Supervisory staff will review the SH&E Management System through management team meetings and reports. At minimum, the following items are addressed:

- Results of any internal or external SH&E related audits or inspections;
- Progress of the SH&E KPIs to include leading and lagging indicators;
- Incident Reports;
- Hazard Identification;
- Corrective Actions; and
- Changes to regulatory requirements

17.0 Office Closeout

At the conclusion of a project or lease, any property in which AECOM is a tenant, Office Management is responsible for vacating the premises, to include the removal of any AECOM-owned or personal property. Some leases may require that AECOM remove cabling from walls, closets and server rooms. Real Estate Services will provide direction as to AECOM's requirements as per the lease.

It is important that AECOM be present for a final walk through with the landlord or the building management's point of contact to come to a consensus on the condition of the space at time of turnover. AECOM and building management will agree upon satisfactory turnover conditions or resolutions. The AECOM representative should take photographs to document the condition of the space with a focus on spaces that appear to have excessive wear and/or damage.

18.0 Appendices

As applicable, your action items after reviewing this template are to:

- 1. Add your office specific information and gather additional information needed to complete the remainder of the template.**
- 2. Select the applicable forms and information for your office from Appendix A, B, C and D above and delete the others that do not apply. Update the above appendices list accordingly.**
- 3. Add any additional appendices with forms or content applicable to your office.**

Appendix A — Stop Work Authorization Forms

Americas — S3AM-002-FM1 Stop Work Order – AECOM Employees and Direct Subcontractors

Appendix B — Office Inspection

Americas — S3AM-216-FM2 Office Inspection

Appendix C — Location Specific Emergency Response Plan Forms

Americas — S3AM-010-FM2 Emergency Response Plan Template

Appendix D — Additional and Optional Content

Americas — S3AM-209-FM3 — Procedure Checklist

Americas — S3AM-209-FM7 — Office Relocation Plan

<list any additional documents appending this SH&E Plan>

Additional documents may be added.

Americas

Industrial Site / Project SH&E Plan

S3NA-209-FM2

[Industrial Site / Project Name]

[Industrial Site / Project Location]

Prepared for:

[Client]

[Address]

[City, State/Province, Zip./Postal Code]

[Month XX, 20XX]

Industrial Site / Project No.: [00000.00]

Plan Expiration Date:

[insert date 1 year from approval date]

THIS SH&E PLAN IS TO BE USED FOR THE SPECIFIC INDUSTRIAL SITE OR PROJECT DESCRIBED HEREIN. IT IS NOT TO BE USED FOR ANY OTHER INDUSTRIAL SITE OR PROJECT. THIS PLAN MUST BE REVISED AS APPROPRIATE TO ADDRESS CHANGING SITE CONDITIONS OR MODIFIED SCOPE OF WORK.

Disclaimer:

This SH&E Plan, and each of its provisions, is applicable only to, and for use only by, AECOM, its affiliates, and its subcontractors. Any use of this Plan by other parties, including, without limitation, third party contractors on industrial sites or projects where AECOM is providing engineering, construction management or similar services, without the express written permission of AECOM, will be at that party's sole risk, and AECOM Corporation shall have no responsibility therefore. The existence and use of this Plan by AECOM shall not be deemed an admission or evidence of any acceptance of any safety responsibility by AECOM for other parties unless such responsibility is expressly assumed in writing by AECOM in a specific project contract.

SH&E Plan**Approval Page**

By signing below, I acknowledge that I have reviewed and hereby approve the SH&E Plan for the [insert industrial site or project name]. This SH&E Plan has been written for the exclusive use of AECOM, its employees, and its subcontractors.

Prepared by:

(signature)

Date

[Preparer's Name]

[Preparer's Title]

[Preparer's Phone Number]

Reviewed by:

(signature)

Date

[Safety Prof Name]

[Safety Prof Title]

[Safety Prof Phone Number]

Approved by:

(signature)

Date

[Proj Mgr Name]

Program/Project Manager

[Proj Mgr Phone Number]

EXECUTIVE SUMMARY

The purpose of this Safety, Health, and Environmental (SH&E) Plan is to address health and safety concerns related to AECOM-managed activities at the [site name] site, located at [site address] in [city, state]. The specific roles, responsibilities, authority, and requirements as they pertain to the safety of employees and the scope of services are discussed herein. The document is intended to identify known potential hazards and to facilitate communication and control measures to prevent injury or harm. Additionally, provisions to control the potential for environmental impact from these activities are included where applicable.

Below is a brief description of the site, scope of services and responsible party:

AECOM will be...

Subcontractor X will be...

Subcontractor Y will be...

The primary physical hazards that may be encountered include:

[list PRIMARY physical hazards]

The chemical hazards that may be encountered include:

[list anticipated chemical hazards]

All staff are bound by the provisions of this SH&E Plan and are should understand the anticipated hazards and respective onsite controls. The discussion will cover the entire SH&E Plan subject matter, putting emphasis on critical elements of the plan; such as the emergency response procedures, personal protective equipment, site control strategies, and monitoring requirements. In addition, daily tailgate safety meetings will be held to discuss the anticipated scope of work, required controls, incident reporting, and any lessons learned or concerns from the previous day; to identify new hazards and controls; and to review the results of inspections.

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Attachments

Attachment A	Location Specific Emergency Response Plan
Attachment B	Pre-Job Hazard Assessment
Attachment C	Task Hazard Assessment (Blank)
Attachment D	SH&E Procedure Checklist and Applicable AECOM SH&E Procedures
Attachment E	Daily Tailgate Meeting (Blank)
Attachment F	Safety Data Sheets
Attachment G	Client Specific Health & Safety Guidelines [delete if not applicable]

[insert additional attachments as applicable e.g., Site Security Plan, Fall Protection and Rescue Plans, etc.]

1.0 Emergency Contacts & Facilities Information

This SH&E Plan addresses the requirements for AECOM and subcontractor personnel to conduct field activities to support the [Industrial Site or Project Name, Scope of Work, and Location].

Emergency Coordinators / Key Personnel			
Name	Title/Workstation	Telephone Number	Mobile Phone
[insert]	Client Contact	[insert]	[insert]
[insert]	Manager	[insert]	[insert]
[insert]	Site Supervisor	[insert]	[insert]
[insert]	Site Safety Officer	[insert]	[insert]
[insert]	SH&E Manager	[insert]	[insert]

[Delete the below table if not applicable]

Subcontractor Site Safety Officers			
Name	Subcontractor Name	Telephone Number	Mobile Phone
[insert]	[insert]	[insert]	[insert]
[insert]	[insert]	[insert]	[insert]
[insert]	[insert]	[insert]	[insert]
[insert]	[insert]	[insert]	[insert]
[insert]	[insert]	[insert]	[insert]

Medical Treatment Facilities			
Name	Address	Telephone Number	Days/Hours of Operation
EMERGENCY - [HOSPITAL insert]	[insert]	[insert]	[insert]
NON-EMERGENCY [OCCUPATIONAL CLINIC insert]	[insert]	[insert]	[insert]

A complete Location Specific Emergency Response Plan is provided in Attachment A. [Complete S3AM-010-FM2 Location Specific Emergency Response Plan and attach in Attachment A.]

2.0 AECOM's Safety for Life & Life Preserving Principles

"Safety for Life" is a comprehensive internal program that drives our nearly 100,000 employees toward the company's commitment to achieving zero work-related injuries and/or illnesses; preventing damage to property and the environment; and maintaining an environmentally friendly and sustainable workplace. Our Safety for Life program is supported by 9 Life Preserving Principles that apply to all AECOM activities.

Life-Preserving Principles

AECOM has adopted these “Life-Preserving Principles” to help demonstrate the commitment of our Safety for Life program. We firmly believe these “Life-Preserving Principles” will enable AECOM to achieve its goal of zero employee injuries, property damage and an environmentally friendly and sustainable workplace.

Demonstrated Management Commitment

Our executive, senior and project managers will lead the Safety, Health and Environment improvement process and continuously demonstrate support and commitment.

Employee Participation

Our employees will be encouraged and empowered to become actively engaged in our safety processes through their active participation in safety committees, training, audits, observations and inspections. Employees will be encouraged to participate in health initiatives and adopt a healthy lifestyle.

Budgeting and Staffing for Safety

Our safety staff will be competent, fully trained and qualified to provide technical resources to our internal and external clients. A budget to support safety activities will be included project proposals.

Pre-Planning

Our design, engineering, project and construction management staffs will deploy effective risk mitigation efforts to design, plan and build safety into every project. Pre-Project and Pre-Task planning will be an effective tool in protecting our employees and the environment.

Contractor Management

Our project staff will work closely with our sub-consultants, subcontractors, contractors and Joint Venture Partners to provide a safe work environment for employees and members of the public. Our goal of SH&E performance excellence will be equally shared by all project participants.

Recognition and Rewards

Our employees will be recognized for their efforts in working safely and their support of our safety efforts.

Safety Orientation and Training

Our employees will be provided with effective safety training in order to identify and mitigate hazards in the workplace to prevent injuries to themselves and others who may be affected by their actions.

Incident Investigation

Our managers and safety professionals will investigate all recordable incidents and serious near misses to identify contributing factors and root causes in order to prevent a reoccurrence. Lessons learned shall be identified, communicated and implemented.

Fit for Duty

Our employees are responsible to report to work each day fit for duty and not to pose a health and safety hazard to themselves or others.

3.0 Introduction

This SH&E Plan addresses the requirements for AECOM and subcontractor personnel to conduct field activities to support the [Industrial Site or Project Name, Scope of Work, and Location].

The requirements of this SH&E Plan apply to AECOM-managed operations only. No change to this SH&E Plan that could affect the health or safety of personnel, the community, or the environment may be made without prior approval of the AECOM Manager and the SH&E Manager. Concurrence with the provisions of this SH&E Plan is mandatory for all personnel at the site covered by this plan and must be evidenced by each individual signing the acknowledgement page of this plan.

3.1 Regulatory Requirements

3.1.1 This SH&E Plan meets the requirements and follows the respective Occupational Health and Safety requirements and the guidelines established by the jurisdiction of [identify applicable jurisdiction] as required: [choose and reference all regulatory requirements AND delete those that are not applicable]

- [For United States only] Federal Occupational Safety and Health Administration (OSHA) Code of Federal Regulation Title 29, Part 1910 (29 CFR Part 1910), Occupational Safety and Health Standards
- [For United States only] Federal Occupational Safety and Health Administration (OSHA) Code of Federal Regulation Title 29, Part 1926 (29 CFR Part 1926), Safety and Health Regulations for Construction
- [For Canada only] [reference to the applicable provincial occupational health and safety act or Canada Labour Code if Federal]
- [insert any additional state, provincial, Federal or other Occupational Health or Environmental requirements]

3.1.2 The requirements specified in this SH&E Plan also conform to AECOM's SH&E Management System. Procedures from the SH&E Management System that are applicable to the work activities planned during this project may be found in Attachment D.

3.2 Site Safety and Health Organization

3.2.1 Manager [Insert Name, if available]

- THE MANAGER HAS OVERALL MANAGEMENT AUTHORITY AND RESPONSIBILITY FOR ALL SITE OPERATIONS, INCLUDING SAFETY. THE MANAGER WILL PROVIDE THE SITE SUPERVISOR WITH WORK PLANS, STAFF, AND BUDGETARY RESOURCES THAT ARE APPROPRIATE TO MEET THE SAFETY NEEDS OF THE PROJECT OPERATIONS.

3.2.2 Site Safety Officer [Insert Name, if available – if there is to be no SSO remove all references to this position within this document]

- The Site Safety Officer (SSO) has the overall responsibility and authority to provide onsite safety support to the manager and provide guidance to any safety requirements to the site supervisors (site inspection, assisting incident investigation). The SSO will work directly with the Manager and Site Supervisor with work plans, training requirements and any other regulator safety compliance requirements and ensure all employees and subcontractor employees are fit for duty.

3.2.3 Site Supervisor [Insert Name, if available]

- The site supervisor has the overall responsibility and authority to direct work operations at the job site according to the provided work plans. The Manager may act as the site supervisor while on site.
- Responsibilities (Site Supervisor)

The site supervisor is responsible for:

- Observing and providing guidance with regard to safe work behavior and site safety training;
- Ensure all employees and subcontractor employees are fit for duty;
- Discussing deviations from the work plan with the Site Safety Officer (SSO) and Manager;
- Discussing safety issues with the Manager, SSO, and field personnel;
- Assisting the SSO with the development and implementation of corrective actions for site safety deficiencies;
- Assisting the SSO with the implementation of this SH&E Plan and with confirming compliance; and
- Assisting the SSO with inspections of the site for compliance with this SH&E Plan and applicable SH&E procedures.

- Authority (Site Supervisor)

The site supervisor has authority to:

- Verify that all operations are in compliance with the requirements of this SH&E Plan and stop any activity that poses a potential hazard to personnel, property, or the environment.
- Temporarily suspend individuals from field activities for infractions against the SH&E Plan pending consideration by the SSO, the SH&E Manager, and the Manager.

3.2.4 Employees

- Responsibilities (Employees)

Responsibilities of employees associated with this industrial site or project include, but are not limited to:

- Understanding and abiding by the policies and procedures specified in the SH&E Plan and other applicable safety policies, and clarifying those areas where understanding is incomplete.
- Providing feedback to SH&E management relating to omissions and modifications in the SH&E Plan or other safety policies.
- Reporting for work fit for duty.
- Immediately notifying the SSO of unsafe conditions and acts and complete written reports, if necessary.

- Authority (Employees)

The safety and health authority of each employee assigned to the site includes the following:

- The right to refuse to work and/or stop work authority when the employee feels the work is unsafe (including subcontractors or team contractors), or where specified safety precautions are not adequate or fully understood.
- The right to refuse to work on any site or operation where the safety procedures specified in this SH&E Plan or other safety policies are not being followed.
- The right to contact the SSO or the SH&E Manager at any time to discuss potential concerns.
- The right and duty to stop work when conditions are unsafe, and to assist in correcting these conditions.

4.0 Site Description and Planned Work Operations

4.1 General Description

The [site name] site is located at [site address]. [Insert description. This should include any significant physical features of the site (i.e., terrain, buildings, size, location, bodies of water etc., any relevant background or historical information related to the site, and any applicable concurrent operations occurring or to occur on the site)]

4.2 Planned Work Operations

[Provide a description of the overall objective for what is being done for the job and what is supposed to be accomplished. This does not have to actually spell out the steps for the job, as that will be covered in the bullets below.]

- [Provide a bulleted list of the tasks that will be accomplished throughout the job]

5.0 Hazard Assessment & Control

5.1 Pre-Job Hazard Assessment

5.1.1 A Pre-Job Hazard Assessment has been completed for all activities identified in the Scope of Work. The completed *Pre-Job Hazard Assessment* is provided in Attachment B.

5.2 Task Hazard Assessment (THA)

5.2.1 The THA is to be completed by the individual(s) intended to conduct the task immediately prior to initiating the associated task. The intent of the THA is to engage the end-user in actively assessing the hazards associated with their task, as well as capture nuances or specifics immediately present that may otherwise remain unacknowledged. A blank *Task Hazard Assessment* form is available as Attachment C.

5.3 Unanticipated Work Activities/Conditions

5.3.1 As a result of unanticipated work activities or changing conditions, additional Pre-Job Hazard Assessment may be required. All additional Pre-Job Hazard Assessments will be reviewed and approved by the SH&E Manager.

5.4 SH&E Procedures

5.4.1 Personnel may be exposed to a variety of chemical, physical, and radiological hazards resulting from task or equipment-specific activities.

5.4.2 The *Procedure Checklist* has been completed for activities identified in the Scope of Work, and the applicable procedures, along with related procedure attachments and forms, have been included. These can be found in Attachment D.

5.5 Geography or Business Group-Specific Requirements

[Add to the below content as applicable to the Industrial Site or Project AND delete the other option]

5.5.1 Requirements specific to [insert geography and/or Business Group] not addressed in a procedures contained in Attachment D are itemized in the below bullets.

- [insert requirements specific to the geography and/or Business Group]

OR

Requirements specific to [insert geography and/or Business Group] are adequately addressed in procedures contained in Attachment D.

6.0 Health and Safety Requirements

6.1 Site-Specific Safety Training

[Add to the below content as applicable to the Industrial Site or Project]

All AECOM personnel performing activities at the site will receive a documented site / project specific orientation prior to the commencement of their activities.

Visitors are required to complete an orientation appropriate to the location or site they are to visit, and subsequently abide by AECOM SH&E policies and procedures when visiting our premises or sites. Visitors to AECOM premises or sites shall be escorted by an AECOM employee who shall confirm local security arrangements are applied and the visitor is aware of SH&E management requirements, including those for emergency response and incident reporting.

All AECOM personnel performing activities at the site will be trained in accordance with S3AM-003-PR1 SH&E Training. All personnel are required to remain current in all of their required training and evaluate their need for additional training when there is a change in work. Safety training documentation is to be maintained.

In addition to the general SH&E training programs, personnel will be required to complete any supplemental task specific training developed for the tasks to be performed. **DELETE if not required. Required supplemental training may include:**

- [insert any supplemental training requirements]

Administration and compliance with the requirements for additional task-specific training will be the responsibility of the project or lead manager. Any additional required training that is completed will be documented and tracked.

6.2 Short Service Employees

[Delete section if not applicable OR add to the below content as applicable to the Industrial Site or Project]

Appropriate mentoring and oversight of newly hired or transferred employees shall be maintained in accordance with *S3AM-015-PR1 Short Service Employees*. Short Service Employees shall be easily identified by:

- [insert the required garment to be worn, hard hat or other method of identification].

6.3 Medical Screening & Surveillance

[Delete section if not applicable OR add to the below content as applicable to the Industrial Site or Project]

Medical screening & surveillance shall be conducted in a alignment with S3AM-128-PR1 Medical Screening & Surveillance. Employees involved in the following tasks or exposures shall participate in the medical screening or surveillance identified in the table below.

Task or Exposure	Type of Screening or Surveillance
[insert task or exposure]	<ul style="list-style-type: none"> • [insert type of screening or surveillance] • [insert type of screening or surveillance]
[insert task or exposure]	<ul style="list-style-type: none"> • [insert type of screening or surveillance] • [insert type of screening or surveillance]

6.4 Fitness for Duty

[Add to the below content as applicable to the Industrial Site or Project (e.g., defined hours of work or fatigue management plan, substance abuse testing requirements, etc.)]

Fitness for duty may be affected by significant fatigue, stress, emotional issues, illness, injury, or the effects of drugs and alcohol. Employees who are not fit for duty may present a safety hazard to themselves, to other employees, to the Company, or to the public. In order to provide a safe work environment, employees must be fit for work, be able to perform their job duties in a safe, secure, productive, and effective manner, and remain able to do so throughout the entire time they are working.

6.5 Tailgate Meetings

Prior to the commencement of daily activities, a tailgate meeting will be conducted to review the specific requirements of this SH&E Plan. Attendance at the daily tailgate meeting is mandatory for all employees and subcontractors at the site covered by this SH&E Plan and must be documented on the attendance form. A copy of a blank *S3AM-209-FM5 Daily Tailgate Meeting Form* is included as Attachment E, and may be used to document the tailgate meeting.

6.6 Hazard Communication

Hazardous materials that may be encountered as existing on-site environmental or physical/health contaminants during the work activities must be addressed in this SH&E Plan including but not limited to their properties, hazards, and associated required controls will be communicated to all affected staff and subcontractors.

In addition, any employee or organization (contractor or subcontractor) intending to bring any hazardous material(s) onto this AECOM-controlled work site must first provide a copy of the item's Safety Data Sheet (SDS) to the SSO for review and filing (the SSO will maintain copies of all SDS on site). In the event where a SDS was not made available for locally obtained products, the material in question will not be brought onto the worksite.

All personnel shall be briefed on the hazards of any chemical product they use, and shall be aware of and have access to all SDS.

All containers on site shall be properly labeled to indicate their contents. Labeling on any containers not intended for single-day, individual use shall contain additional information indicating potential health and safety hazards (flammability, reactivity, etc.). Materials that need to be separated into smaller containers shall have workplace labels in accordance to *S3AM-115-PR1 Hazardous Materials Communication*.

Attachment F provides copies of SDS for those items planned to be brought on site at the time this SH&E Plan is prepared. This information will be updated as required during site operations.

6.7 Incident Reporting, Notifications & Investigation

[Add to the below content as applicable to the Industrial Site or Project]

In an emergency/life-threatening situation, use the appropriate local emergency phone numbers and seek immediate medical care. All work-related injuries, illnesses and incidents, including near miss events, shall be reported to a supervisor immediately.

- [Insert appropriate telephone number of reporting line]

Injuries, illness and incidents shall be entered into the Online Reporting Database in accordance with *S3AM-004-PR1 Incident Reporting, Notifications & Investigation*.

6.8 Hazardous, Solid, or Municipal Waste

[Add to the below content as applicable to the Industrial Site or Project]

If hazardous, solid, and/or municipal wastes are generated during any phase of the project, the waste shall be accumulated, labeled, and disposed of in accordance with applicable federal, state, provincial, territorial and/or local regulations. Consult the SH&E Manager for further guidance. In addition, any hazardous materials or waste that may potentially pose harm to humans, and/or the environment must meet *S3AM - 204 Environmental Compliance*. Hazardous materials and waste shall not be discarded as regular waste.

6.9 General Safety Rules

[Add to the below content as applicable to the Industrial Site or Project]

All site personnel shall conduct themselves in a safe manner and maintain a working environment that is free of additional hazards, in adherence to *S3AM-001-PR1 Safe Work Standards and Rules* and *S3AM-013-PR1 Housekeeping*.

6.10 Housekeeping

[Add to the below content as applicable to the Industrial Site or Project]

During site activities, work areas will be continuously policed for identification of excess trash and unnecessary debris. Excess debris and trash will be collected and stored in an appropriate container (e.g., plastic trash bags, garbage can, roll-off bin) prior to disposal. At no time will debris or trash be intermingled with waste PPE or contaminated materials.

6.11 Smoking, Eating, or Drinking

[Add to the below content as applicable to the Industrial Site or Project]

Smoking, eating and drinking will not be permitted inside any controlled work area at any time. Field workers will first wash hands and face immediately after leaving controlled work areas (and always prior to eating or drinking). Consumption of alcoholic beverages is prohibited at any AECOM site. Smoking, eating or drinking must be in a designated area.

6.12 Personal Protective Equipment

The purpose of personal protective equipment (PPE) is to provide a barrier to shield or minimize the risk or exposure from the chemical and/or physical hazards that may be encountered during work activities.

S3AM-208-PR1 *Personal Protective Equipment* lists the general requirements for selection and usage of PPE. The table below identifies the minimum PPE required during site operations and additional PPE that may be necessary. The specific PPE requirements for each work task are specified in the Pre-Job Hazard Analysis or THA.

Personal Protective Equipment	
All site personnel	<ul style="list-style-type: none"> [insert description of minimum work clothing requirement as appropriate e.g., fire resistant, full length sleeves, etc.] [insert minimum glove type requirement] [insert class of Hardhat] [insert minimum foot protection e.g., safety toe boots, rubber boots, traction devices, etc.] [insert minimum eye protection requirements e.g., safety glasses with side shields, safety goggles, etc.] [insert minimum high visibility apparel requirements e.g., Class 3 apparel for work at night or during periods of poor visibility] [insert minimum hearing protection requirements] [insert additional requirement e.g., insect repellent, sunscreen]
[DELETE ROW IF NOT REQUIRED – insert task type or circumstances where minimum PPE requirements are to be supplemented]	<ul style="list-style-type: none"> [insert description of additional PPE requirements specific to the task or circumstances] [example work clothing requirement e.g., fire resistant coveralls, chemically resistant coveralls] [example gloves type(s) e.g., outer nitrile gloves, Kevlar, etc.] [example of respiratory protection e.g. full-face air purifying respirator with organic vapor cartridges. To use a respirator, employees must be trained, fit tested and medically qualified.] [example foot protection specific to the task(s) e.g., metatarsal protection, chemical protection, etc.] [example eye protection requirements e.g., dual eye protection, welding helmet class, etc.] [example fall protection requirements e.g. full body harness, shock-absorbing lanyard, reference to Fall Protection Plan]
[DELETE or ADD ROWS AS REQUIRED – insert task type or circumstances where minimum PPE requirements are to be supplemented]	<ul style="list-style-type: none"> [insert description of additional PPE requirements specific to the task or circumstances]

6.13 Personal Hygiene

[Add to the below content as applicable to the Industrial Site or Project]

The following personal hygiene requirements will be observed:

Water Supply: A water supply meeting the following requirements will be utilized:

Potable Water - An adequate supply of potable water will be available for field personnel consumption. Potable water can be provided in the form of water bottles, canteens, water coolers, or drinking fountains. Where drinking fountains are not available, individual-use cups will be provided as well as adequate disposal containers. Potable water containers will be properly identified in order to distinguish them from nonpotable water sources.

Nonpotable Water - Nonpotable water may be used for hand washing and cleaning activities. Nonpotable water shall not be used for drinking purposes. All containers of nonpotable water will be marked with a label stating:

***Nonpotable Water
Not Intended for Drinking Water Consumption***

Toilet Facilities: A minimum of one toilet will be provided for every 20 personnel on site, with separate toilets maintained for each sex except where there are less than 5 total personnel on site. For mobile crews where work activities and locations permit transportation to nearby toilet facilities on-site facilities are not required.

Washing Facilities: Employees will be provided washing facilities (e.g., buckets with water and Alconox) at each work location. The use of water and hand soap (or similar substance) will be required by all employees following exit from the Exclusion Zone, prior to breaks, and at the end of daily work activities.

6.14 Air Monitoring

[Delete section if not applicable OR add to the below content as applicable to the Industrial Site or Project]

Air monitoring will be conducted using [insert monitor or detector type here] calibrated to [insert substance(s)]. The monitoring equipment must be calibrated in accordance with the manufacturer's instructions. In addition, the results of daily instrument calibrations must be recorded in the field notes. Continuous monitoring is required during intrusive work. Document readings in the field notes. Additional monitoring may be required to enter an excavation or confined space. [Replace the following example of air monitoring requirements and table with content applicable to the industrial site or project.] The action levels below assume that no more than 4% of the VOCs present are benzene. This action level table is for BTEX contaminated sites. If the site contaminants of concern are different than BTEX, the table below needs to be revised to reflect the specific contaminants. If needed, contact a SH&E Manager for assistance.]

ACTION LEVEL TABLE

Analyzer Reading	Location	Duration	Action	Personal Protective Equipment
< 10 ppm	Point of Operations/Release Source Point	_____	Continue periodic monitoring.	Minimum Site Ensemble (Hardhat, Steel-toed boots, eye protection, hearing protection)
> 10 ppm	Point of Operations/Release Source Point	>1 minute	Monitor OBZ; don protective clothing; establish work zones	Minimum Site Ensemble, Plus Coveralls, Nitrile Outer Gloves, & Nitrile Inner (surgical) Gloves
< 10 ppm	OBZ	-----	No respirators required.	Same as above
> 10 ppm	OBZ	>1 minute	Improve engineering controls. If not effective, provide respiratory protection; establish decontamination area and contact the Safety Manager	Add full-face air purifying respirators with organic vapor cartridges. Cartridges will be changed on a daily basis.
>100 ppm OR > 100 ppm	OBZ OBZ	>1 minute instantaneous	Stop work; move upwind while vapors dissipate. If elevated levels remain, cover boring and cuttings, evacuate upwind and notify the Safety Manager	As specified by the Safety Manager

6.15 Stop Work Authority

All employees have the right and duty to stop work when conditions are unsafe and to assist in correcting these conditions as outlined in *S3AM-002-PR1 Stop Work Authority*. Whenever the SSO determines that workplace conditions present an uncontrolled risk of injury or illness to employees, immediate resolution with the appropriate supervisor shall be sought. Should the supervisor be unable or unwilling to correct the unsafe conditions, the SSO is authorized and required to stop work, which shall be immediately binding on all affected AECOM employees and subcontractors.

6.16 Additional Plans

[Delete section if not applicable OR add to the below content as applicable to the Industrial Site or Project]

Based on the scope of work the following plans have been developed and are considered part of this SH&E Plan as additional attachments:

Additional Plans	
Attachment H	• [example: Fall Protection & Rescue Plan]
Attachment I	• [example: Exposure Mitigation Plan]
Attachment J	• [example: Site Security Plan]

6.17 Client Specific Safety Requirements

[Select option and add content as applicable to the Industrial Site or Project AND delete the other options]

The client has specified no additional health and safety requirements.

OR

Client-specific health and safety guidelines are included in Attachment G of this SH&E PLAN. All site activities must be performed in accordance with client-specific requirements and procedures.

OR

[insert client-specific requirements]

Attachment A
Location Specific Emergency Response Plan

Attachment B

Pre-Job Hazard Assessment

Attachment C

Task Hazard Assessment

Attachment D
Applicable AECOM SH&E Procedures
(Attach completed Procedure Checklist S3AM-209-FM3 and identified procedures)

Attachment E

Daily Tailgate Meeting

Attachment F

Safety Data Sheets

Attachment G

Client Specific Health & Safety Guidelines

Americas

Procedure Checklist

S3AM-209-FM3

The following AECOM SH&E Procedures generally apply to all projects. Review the requirements of each procedure and determine appropriate steps to ensure project compliance with the requirements.

Determine the applicability of these procedures to the work activity	Yes	See #	Determine the applicability of these procedures to the work activity	Yes	See #
Safe Work Standards and Rules	Yes	001	First Aid	Yes	012
Stop Work Authority	Yes	002	Housekeeping	Yes	013
SH&E Training	Yes	003	Manual Lifting	Yes	014
Incident Reporting, Notifications & Investigation	Yes	004	Injury and Claims Management	Yes	018
Driving	Yes	005	Substance Abuse Prevention	Yes	019
Behavior Based Safety	Yes	007	Recognition & Rewards	Yes	020
Fitness for Duty	Yes	008	Risk Assessment & Management	Yes	209
Emergency Response Planning	Yes	010	Regulatory Inspections	Yes	211
Fire Protection	Yes	011	Compliance Assurance	Yes	216

The following SH&E procedures only apply when specific activities are conducted by AECOM and AECOM subcontractor personnel. If you answer "Yes" to any of the questions below, review the SH&E procedure indicated and determine the appropriate steps necessary to ensure compliance with the requirements.

Will work activities involve any of the following?	No	Yes	See #	Will work activities involve any of the following?	No	Yes	See #
Abrasive blasting or exposure to abrasive blasting media or waste?	<input type="checkbox"/>	<input type="checkbox"/>	335	Excavations or exposure to excavation hazards?	<input type="checkbox"/>	<input type="checkbox"/>	303, 331
Potential exposure to ticks, snakes, poisonous plants, and other biological hazards?	<input type="checkbox"/>	<input type="checkbox"/>	313	Flammable or combustible materials used or stored which could constitute a fire hazard?	<input type="checkbox"/>	<input type="checkbox"/>	011,126
Use of aerial lifts?	<input type="checkbox"/>	<input type="checkbox"/>	323	Use of portable, gas powered, electric, and/or powder actuated hand tools?	<input type="checkbox"/>	<input type="checkbox"/>	305, 327
Potential exposure to air contaminants in hazardous concentrations?	<input type="checkbox"/>	<input type="checkbox"/>	110,123 127	Hazardous materials shipping?	<input type="checkbox"/>	<input type="checkbox"/>	116
Asbestos surveys or abatement oversight?	<input type="checkbox"/>	<input type="checkbox"/>	109	Hazardous substances – chemical or health hazards?	<input type="checkbox"/>	<input type="checkbox"/>	110,115 127

Potential exposure to Bloodborne Pathogens (i.e. blood or other bodily fluids)?	<input type="checkbox"/>	<input type="checkbox"/>	111	Hazardous waste activities (investigative or remedial)?	<input type="checkbox"/>	<input type="checkbox"/>	117, 204
Work over or near water?	<input type="checkbox"/>	<input type="checkbox"/>	315	Heat Stress potential to employees working in: <ul style="list-style-type: none"> Hot environments; or Impermeable Chemical Protective Clothing? 	<input type="checkbox"/>	<input type="checkbox"/>	113
California job activities?	<input type="checkbox"/>	<input type="checkbox"/>	209	Heavy equipment use?	<input type="checkbox"/>	<input type="checkbox"/>	309
Corrosive materials used or handled?	<input type="checkbox"/>	<input type="checkbox"/>	125	Hot Work (welding, cutting, grinding)?	<input type="checkbox"/>	<input type="checkbox"/>	332
Confined space entries?	<input type="checkbox"/>	<input type="checkbox"/>	301	Drilling, boring and direct-push probing?	<input type="checkbox"/>	<input type="checkbox"/>	321, 331
Cranes or hoists?	<input type="checkbox"/>	<input type="checkbox"/>	310	Lead exposures (lead paint removal, lead in dust, etc)?	<input type="checkbox"/>	<input type="checkbox"/>	110
Demolition activities of any type of structures?	<input type="checkbox"/>	<input type="checkbox"/>	336, 339	International travel?	<input type="checkbox"/>	<input type="checkbox"/>	214
Drilling activities?	<input type="checkbox"/>	<input type="checkbox"/>	321, 331	Use of Manbasket (Crane Suspended Personnel Platforms) for working at heights?	<input type="checkbox"/>	<input type="checkbox"/>	310
Use of small watercraft (e.g., boats, canoes)?	<input type="checkbox"/>	<input type="checkbox"/>	333	Work on or near streets and/or roadways?	<input type="checkbox"/>	<input type="checkbox"/>	306
Environmental and hazardous waste laws and regulations are applicable to activities?	<input type="checkbox"/>	<input type="checkbox"/>	204	Commercial motor vehicles used?	<input type="checkbox"/>	<input type="checkbox"/>	320
Exposure to chemical/physical/biological agents and/or activities that require Medical Surveillance? Examples would include exposures to; Noise, Asbestos, Lead, Hazardous Waste, High Altitudes, Carcinogens, Respirator Use.	<input type="checkbox"/>	<input type="checkbox"/>	128	Working at heights of greater than 4 feet (1.22 meters), 6 feet (1.83 meters) for construction/demolition, or as defined by jurisdiction?	<input type="checkbox"/>	<input type="checkbox"/>	304
Noise exposures?	<input type="checkbox"/>	<input type="checkbox"/>	118	Potential exposure to subsurface and/or overhead utilities?	<input type="checkbox"/>	<input type="checkbox"/>	322, 331
Ladder use?	<input type="checkbox"/>	<input type="checkbox"/>	312	A chartered aircraft?	<input type="checkbox"/>	<input type="checkbox"/>	318
Exposure to eye, head, hand, foot, or other hazards that require the use of personal protective equipment?	<input type="checkbox"/>	<input type="checkbox"/>	208	Exposure to uncontrolled energy sources including electrical, fluid, pneumatic, fuel, steam, gravity, and hazardous material?	<input type="checkbox"/>	<input type="checkbox"/>	325
Use of portable gauges (e.g., nuclear-density gauges) containing sealed radioactive source materials?	<input type="checkbox"/>	<input type="checkbox"/>	122	Work with live electrical systems and/or potential electrical hazards?	<input type="checkbox"/>	<input type="checkbox"/>	302
Respiratory protection use – required and/or voluntary?	<input type="checkbox"/>	<input type="checkbox"/>	123	Work at altitudes greater than 7,000 feet (~ 2,100 meters)?	<input type="checkbox"/>	<input type="checkbox"/>	124

Scaffolding?	<input type="checkbox"/>	<input type="checkbox"/>	311	All-terrain vehicle use?	<input type="checkbox"/>	<input type="checkbox"/>	319
Compressed gases?	<input type="checkbox"/>	<input type="checkbox"/>	114	Use of computer workstations for data entry, CADD, word processing, etc.?	<input type="checkbox"/>	<input type="checkbox"/>	016
Laboratory activities?	<input type="checkbox"/>	<input type="checkbox"/>	119	Tool, equipment or job-specific potential for musculoskeletal disorder hazards?	<input type="checkbox"/>	<input type="checkbox"/>	016
Work on or near railroad transportation systems?	<input type="checkbox"/>	<input type="checkbox"/>	329	Exposure to recognized hand hazards?	<input type="checkbox"/>	<input type="checkbox"/>	317
Work at a client site requiring compliance with the OSHA Process Safety Management Standard?	<input type="checkbox"/>	<input type="checkbox"/>	328	Are employees or contractors required to operate Powered Industrial Vehicles (e.g., forklift trucks)?	<input type="checkbox"/>	<input type="checkbox"/>	324
Subcontractors to perform activities (e.g., drilling, excavation, hot work, etc.) with their own personnel and/or equipment?	<input type="checkbox"/>	<input type="checkbox"/>	213	Down-hole geologic logging operations associated with geotechnical explorations or caisson inspections?	<input type="checkbox"/>	<input type="checkbox"/>	330
Competent person required to be designated?	<input type="checkbox"/>	<input type="checkbox"/>	202	Potential exposure to non-ionizing radiation?	<input type="checkbox"/>	<input type="checkbox"/>	121
Potential personnel exposure to temperatures below 32°F?	<input type="checkbox"/>	<input type="checkbox"/>	112	Potential exposure to ionizing radiation?	<input type="checkbox"/>	<input type="checkbox"/>	120
AECOM personnel newly hired or transferred from another position?	<input type="checkbox"/>	<input type="checkbox"/>	015	Potential inhalation of chromium VI (hexavalent chromium)?	<input type="checkbox"/>	<input type="checkbox"/>	110
Work at a site regulated by the Mine Safety Health Administration (MSHA)?	<input type="checkbox"/>	<input type="checkbox"/>	341	Working alone in an area where they cannot be seen/heard by another person?	<input type="checkbox"/>	<input type="checkbox"/>	314
Diving activities?	<input type="checkbox"/>	<input type="checkbox"/>	334	Hoists, elevators or conveyors being used?	<input type="checkbox"/>	<input type="checkbox"/>	343
Coordinate construction material storage on-site?	<input type="checkbox"/>	<input type="checkbox"/>	316	Tunnels, shafts and caissons?	<input type="checkbox"/>	<input type="checkbox"/>	330
Operating and testing compressed air systems?	<input type="checkbox"/>	<input type="checkbox"/>	337	Signs, signals or barricades will be used onsite?	<input type="checkbox"/>	<input type="checkbox"/>	346
Temporary floors, stairs, railings, or toeboards being created?	<input type="checkbox"/>	<input type="checkbox"/>	342	Project security will be required?	<input type="checkbox"/>	<input type="checkbox"/>	010
Concrete will be poured or handled?	<input type="checkbox"/>	<input type="checkbox"/>	338	Installation of cofferdams being performed?	<input type="checkbox"/>	<input type="checkbox"/>	344
Steel erection activities being performed?	<input type="checkbox"/>	<input type="checkbox"/>	340	Use or handling of explosive or blasting agents?	<input type="checkbox"/>	<input type="checkbox"/>	336
Work on or transfer to/from marine transportation (e.g. barge, vessel)?	<input type="checkbox"/>	<input type="checkbox"/>	333	Mining operations are conducted or controlled by AECOM?	<input type="checkbox"/>	<input type="checkbox"/>	345
Working conditions or schedule (more than 12 hours/day) may increase worker fatigue?	<input type="checkbox"/>	<input type="checkbox"/>	009	Exposure to hazards associated with moving parts of equipment and machinery?	<input type="checkbox"/>	<input type="checkbox"/>	326

Americas

Pre-Job Hazard Assessment

S3AM-209-FM4

Location: 34T

Date: 34T

Prepared By: 34T

Approved By: 34T

Principal Activities	Potential Safety/Health Hazards	Initial Risk Rating	Control Measures	Final Risk Rating
List principle activities involved in the scope of work	Identify each safety or health hazard		Identify engineering and administrative controls and any specific PPE that is required	
ACTIVITY 1 – 34T	34T	34T	34T	34T
	34T	34T	34T	34T
	34T	34T	34T	34T
	34T	34T	34T	34T
	34T	34T	34T	34T
ACTIVITY 2 – 34T	34T	34T	34T	34T
	34T	34T	34T	34T
	34T	34T	34T	34T
	34T	34T	34T	34T
	34T	34T	34T	34T
ACTIVITY 3 – 34T	34T	34T	34T	34T
	34T	34T	34T	34T
	34T	34T	34T	34T
	34T	34T	34T	34T
	34T	34T	34T	34T
ACTIVITY 4 – 34T	34T	34T	34T	34T
	34T	34T	34T	34T
	34T	34T	34T	34T
	34T	34T	34T	34T
	34T	34T	34T	34T
ACTIVITY 5 – 34T	34T	34T	34T	34T
	34T	34T	34T	34T

Principal Activities	Potential Safety/Health Hazards	Initial Risk Rating	Control Measures	Final Risk Rating
	34T	34T	34T	34T
	34T	34T	34T	34T
	34T	34T	34T	34T
ACTIVITY 6 – 34T	34T	34T	34T	34T
	34T	34T	34T	34T
	34T	34T	34T	34T
	34T	34T	34T	34T
	34T	34T	34T	34T
ACTIVITY 7 – 34T	34T	34T	34T	34T
	34T	34T	34T	34T
	34T	34T	34T	34T
	34T	34T	34T	34T
	34T	34T	34T	34T
ACTIVITY 8 – 34T	34T	34T	34T	34T
	34T	34T	34T	34T
	34T	34T	34T	34T
	34T	34T	34T	34T
	34T	34T	34T	34T
ACTIVITY 9 – 34T	34T	34T	34T	34T
	34T	34T	34T	34T
	34T	34T	34T	34T
	34T	34T	34T	34T
	34T	34T	34T	34T

SPECIAL REQUIREMENTS

Step #	Equipment to be Used	Inspection requirements	Training Requirements
	List equipment to be used in work activity	List inspection/permit requirements for work activity	List training requirements including hazard communication
1.	34T	34T	34T
2.	34T	34T	34T
3.	34T	34T	34T
4.	34T	34T	34T
5.	34T	34T	34T
6.	34T	34T	34T
7.	34T	34T	34T
8.	34T	34T	34T
9.	34T	34T	34T

INSTRUCTIONS AND RISK MATRIX

Hazard Evaluation – Identify principle steps of the task. Identify potential safety/health hazards for each step and determine initial risk rating using the matrix provided below. Identify control measures including PPE for each hazard. Re-evaluate hazard potential and assign a final risk rating. If the final risk rating is a 5-9 (medium risk) or 10-25 (high risk), additional hazard controls shall be identified and applied until the final risk rating is reduced to 4 or below. The final risk rating cannot be reduced to 4 or lower, additional approvals are needed before the activity can begin. Add additional rows as required to cover all major steps/aspects of the activity.

Special Requirements – Identify equipment to be used including specific PPE required. Identify inspection requirements such as competent person, permit issue, documented task hazard analysis, etc. Identify training requirements such as hazard communication, scaffold user, fall protection, etc.

		High ←————→ Low				
High ↑ ↓ Low	Probability	Severity				
		5 - Catastrophic	4 - Critical	3 - Major	2 - Moderate	1 - Minor
	5 - Frequent	25	20	15	10	5
	4 - Probable	20	16	12	8	4
	3 - Occasional	15	12	9	6	3
	2 - Remote	10	8	6	4	2
	1 - Improbable	5	4	3	2	1
10-25 (red) are high risk, 5-9 (yellow) are medium risk, and 1-4 (green) are low risk						

Severity – Potential Consequences				
	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>\$1M USD, Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>\$250K to \$1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> \$10K to \$250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> \$1K to \$10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</\$1K USD	Small chemical release contained onsite	Individual complaint

Probability		
Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1,000
Improbable	Highly unlikely to occur, but possible during task/activity	1/10,000

Risk Rating (Probability x Severity)	Risk Acceptance Authority
1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Operations Lead/Supervisor & SH&E Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & SH&E Director

Americas

Daily Tailgate Meeting

S3AM-209-FM5

Job Location:		Date:	
AECOM Site Supervisor:		Person Conducting Tailgate Meeting:	
AECOM Site Supervisor Phone:		AECOM Safety Officer Name & Phone:	

List activities to be performed today:	
--	--

Muster Point:		Spill Kit Location:	
First Aid Kit Location:		Fire Extinguisher Location:	

Have all personnel reviewed and understand the site-specific safety plan?	<input type="checkbox"/> Yes <input type="checkbox"/> No*
Are current Pre-Job Hazard Assessments in place for each of the tasks to be performed today and understood by all?	<input type="checkbox"/> Yes <input type="checkbox"/> No*
Does each subcontractor have hazard assessments (e.g., THA, JSA, JHA) for their activities?	<input type="checkbox"/> Yes <input type="checkbox"/> No* <input type="checkbox"/> N/A
Are any required permits in place for the applicable tasks to be performed today and understood by all? Identify required permits and permit #s:	<input type="checkbox"/> Yes <input type="checkbox"/> No* <input type="checkbox"/> N/A
Have all members of the work team confirmed understanding of the work, hazards, and controls/mitigation?	<input type="checkbox"/> Yes <input type="checkbox"/> No*
Have work areas been properly cordoned-off to protect workers, site staff, and the public?	<input type="checkbox"/> Yes <input type="checkbox"/> No* <input type="checkbox"/> N/A
Have equipment checks been completed, documented, and reviewed?	<input type="checkbox"/> Yes <input type="checkbox"/> No* <input type="checkbox"/> N/A
Do all site workers understand injury/ intervention reporting requirements including immediately notifying the AECOM Site Supervisor of any injury near miss, unsafe condition or hazard observation?	<input type="checkbox"/> Yes <input type="checkbox"/> No*

** if No, then work cannot be performed until corrective action is completed and documented.*

Topics covered in today's tailgate meeting:	
---	--

Other Items Discussed Today:	Stop Work Authority & Obligation
	<p>* All employees will stop the job any time anyone is concerned or uncertain about safety.</p> <p>* All employees will stop the job if anyone identifies a hazard or additional mitigation not recorded on the THA.</p> <p>* All employees will be alerted to any changes in personnel or conditions at the worksite.</p> <p>* All employees will stop the job and reassess a task, hazards, and mitigations, and then amend the THA as needed.</p>

SITE WORKERS (including AECOM Contractors and Subcontractors): By signing here, you are stating the following:

- * You have been involved in reviewing the THAs and understand the hazards and control measures associated with each task you are about to perform.
- * You understand the permit to work requirements applicable to the work you are about to perform (if it includes permitted activities).
- * You are aware that no tasks or work (that is not risk-assessed) is to be performed.
- * You are aware of your authority and obligation to 'Stop Work'.

I arrived and departed fit for duty:

- * You are physically and mentally fit for duty.
- * You are not under the influence of any type of medication, drugs, or alcohol that could affect your ability to work safely.
- * You are aware of your responsibility to immediately report any illness, injury (regardless of where or when it occurred), or fatigue issue you may have to the AECOM Supervisor.
- * You signed-out uninjured unless you have otherwise informed the AECOM Supervisor.

Print Name & Company	Signature	Initials & Sign In Time	Initials & Sign Out Time
		In & Fit	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit

(Attach additional Site Worker sign-in/out sheets if needed)

SITE VISITOR / SITE REPRESENTATIVE

Name	Company Name	Arrival Time	Departure Time	Signature

To be completed once activities for the day have been concluded:

Were there any Incidents, Near Misses or Observations?	<input type="checkbox"/> Yes <input type="checkbox"/> No	If yes, details:
Were there any 'Stop Work' interventions?	<input type="checkbox"/> Yes <input type="checkbox"/> No	If yes, details:
Were there any areas for improvement noted?	<input type="checkbox"/> Yes <input type="checkbox"/> No	If yes, details:
At the conclusion of the day, the job site is being left in a safe condition and there were no reports of injury or first aid.	<input type="checkbox"/> Yes <input type="checkbox"/> No	AECOM Supervisor Signature:

S3AM-209-FM6

Customer	Permit No.
Location	Job No.
Description of Task	Date

[illegible]**Originator**

Signature

Supervisor

Signature

THIS FORM IS TO BE KEPT ON JOB SITE.

WORKER SIGN ON

NAME (Please Print)

SIGNATURE

I participated in the development and understand the content of this Task Hazard Assessment.

VISITOR SIGN ON

NAME (Please Print)

SIGNATURE

TIME

Risk Rating Matrix

Probability	Severity				
	5 - Catastrophic	4 – Critical	3 – Major	2 – Moderate	1 - Minor
5 – Frequent	25	20	15	10	5
4 – Probable	20	16	12	8	4
3 – Occasional	15	12	9	6	3
2 – Remote	10	8	6	4	2
1 - Improbable	5	4	3	2	1

Risk Rating (Probability x Severity)	Risk Acceptance Authority
1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Operations Lead/Supervisor & Safety Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & Safety Director

Severity – Potential Consequences				
	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>\$1M USD, Structural collapse	Offsite impact requiring remediation	Government intervention
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Moderate	Medical Treatment	> \$1K to \$10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	<=\$1K USD	Small chemical release contained onsite	Individual complaint

Probability		
Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1,000
Improbable	Highly unlikely to occur, but possible during task/activity	1/10,000

Emergency Meeting / Assembly Area

Emergency Contact #

Emergency Radio Channel

Area is safe and housekeeping completed at the end of task/shift.

Supervisor

```
(print name)
```

Signature

Task Hazard Assessment (S3AM-209-FM6)

Revision 5 December 15, 2016

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[illegible]

Task Hazard Assessment Follow-Up/Review.

First Break

Initial

Lunch Break

Initial

Second Break

Initial

Site/Location: _____ Date: ____ / ____ / ____

Job/Task (What am I about to do?): _____

What is the worst that could happen, regardless of likelihood?

Select one of the three choices below and follow the guidance

- | | |
|-----------------------|--|
| <input type="radio"/> | Major (severe injury or fatality)
STOP and complete the full THA on other side |
| <input type="radio"/> | Moderate (injuries requiring medical treatment) <ul style="list-style-type: none"> • If no JSA/JHA – STOP and complete the full THA on the other side • If JSA/JHA available – Review JSA/JHA and proceed with section below |
| <input type="radio"/> | Minor (injuries requiring first aid only) – Proceed with section below |

Simple Task Hazard Assessment (THA)

List hazards below (What could go wrong?)

- | | |
|---------|---------|
| 1 _____ | 4 _____ |
| 2 _____ | 5 _____ |
| 3 _____ | 6 _____ |

Complete the following steps and check off

- ☐ All hazards have been adequately controlled
- ☐ Information has been communicated to everyone involved/affected

Employee(s) Acknowledgements

(initials of each person involved and affected by activities)

Use the Risk Matrix to determine the initial and final risk rating.

Basic Task Steps	What could go wrong?	Initial Risk Rating	What will we do to make it safer?	Final Risk Rating after mitigation

Risk Matrix	Severity				
	5 – Catastrophic	4 – Critical	3 – Major	2 – Moderate	1 – Minor
5 – Frequent	25	20	15	10	5
4 – Probable	20	16	12	8	4
3 – Occasional	15	12	9	6	3
2 – Remote	10	8	6	4	2
1 – Improbable	5	4	3	2	1

Probability		
5 – Frequent	Expected to occur	9/10
4 – Probable	Likely to occur	1/10
3 – Occasional	May occur	1/100
2 – Remote	Unlikely to occur	1/1,000
1 – Improbable	Highly unlikely to occur, but possible	1/10,000

Severity (Worst Case Scenario)	
Injury Potential	
5 – Catastrophic	Fatality, Multiple Major Incidents
4 – Critical	Permanent impairment, Long term injury/illness
3 – Major	Lost Time /Restricted Work
2 – Moderate	Medical Treatment
1 – Minor	First Aid

1 to 4 (Low)	Risk is tolerable, manage at local level	5 to 9 (Medium)	Risk requires approval by Operations Lead/Supervisor & SH&E Manager	10 to 25 (High)	Risk requires the approval of the Operations Manager & SH&E Director
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Employee's Acknowledgement (initials of each person involved/affected)	Supervisor Approval (print name & sign)

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1.0 GENERAL INFORMATION	
Description:	Planned move date:
Move From: <i>(street address)</i>	
Move To: <i>(street address)</i>	
KEY CONTACTS	
AECOM Move Coordinator	
Moving Company contact	
Location SHE Representative	
Area SH&E Manager	
IT Contact	
TELEPHONE NUMBERS	
Medical/Fire Emergency	911
Incident Reporting hotline	800-348-5046

2.0 WORK DESCRIPTION

Office personnel will be required to pack their individual workspace in preparation for the office move. A professional moving company has been hired to relocate all office files, supplies, equipment, and furniture.

Specific job tasks will include:

- Cleaning out office of unneeded items such as documents and reports
- Removing personal items and transporting them home or to new office
- Transporting personal laptop and monitor to the new office
- Packing/unpacking files, books, reference materials, office supplies, and/or personal items
- Using hand carts/dollies to relocate boxed materials
- Setting up the new office location
- Sorting and packing field equipment storage areas to prepare for the move.

2.1 EQUIPMENT

- Office equipment (e.g. computers, printers, monitors, phones, etc.)
- Personal items
- Books, binders, and reference materials
- Project equipment (e.g. sample coolers, survey tools, water pumps, generators)
- Hand carts/dollies (if necessary for employees required to pack office contents into boxes)
- Move carts provided by moving company
- Totes provided by moving company

3.0 HAZARDS/ CONTROLS

3.1 PHYSICAL HAZARDS

- Lifting heavy or awkward items (back strain)
- Cuts from boxes, broken items, or sharp edges
- Blind corners and unfamiliar pathways
- Use of hand carts, dollies, etc.
- Trip hazards (e.g. poor housekeeping, cords, carpet, boxes in the walkways, carrying items)
- Slips, trips, or falls going to vehicle as a result of inclement weather
- Using cleaning supplies
- New vehicle parking and traffic environment

Controls

- Identify the individuals responsible for oversight in moving of specialty equipment (e.g. nuclear density meters, IT servers, air monitoring equipment, company vehicles, field samples)
- Use materials handling equipment to lift, move, and/or carry heavy or /bulky items to designated collection areas
- The unassisted maximum lift limit is 25 pounds, and employees must take into account their personal limitations which may require lifting less.
- Stack items on dollies/carts only waist high to help prevent back strain
- Inspect materials handling equipment prior to use
- Slow down when approaching corners while moving equipment
- All walkways should be kept clear of clutter and materials (e.g., boxes, materials handling equipment, cords)
- Do not use box cutters or other open blade type cutting tools
- Keep one hand on the handrail at all times going down stairs; ensure stairs are well lit and free of debris
- Only open one drawer of a filing cabinet at a time; empty the top drawers first when packing and load the bottom drawers first when unpacking
- Conduct a physical inspection before move day
- Communications to employees describe the new building layout including parking and any traffic safety concerns

3.2 ERGONOMIC HAZARDS

- Heavy lifting
- Awkward postures
- Awkwardly sized items and/or materials
- Certain field equipment (e.g. generators, pumps) often exceed 100 lbs.
- New desk/cubicle arrangements may create work station ergonomic hazards

Controls

- It is preferable that the moving company be responsible for heavy lifting. If required, use either mechanical lifting equipment or a two-person lift
- When lifting heavier items, use your legs and not your back to support the lift
- Use some form of assistance (another person, dolly, etc.) to move an item if it is awkwardly sized or shaped
- Follow the AECOM Manual Lifting procedure (S3AM-014-PR1)
- Employees to conduct a self-assessment of their new workstation using the AECOM Office Ergonomics Self-Assessment (S3AM-016-FM1)

3.3 CHEMICAL HAZARDS

- Cleaning supplies
- Field project chemicals (e.g. survey marking paint, preservatives, calibration gas,)

Controls

- Use proper PPE (e.g. safety glasses and nitrile gloves) as per the Safety Data Sheet (SDS)
- Proper packing of bottles and other chemicals
- Prior to the move arrange for disposal of chemicals no longer needed

4.0 APPLICABLE AECOM PROCEDURES

- Emergency Response Planning (S3AM-010-PR1)
- Fire Protection (S3AM-011-PR1)
- Housekeeping (S3AM-013-PR1)
- Manual Lifting (S3AM-014-PR1)
- Ergonomics (S3AM-016-PR1)
- Office Safety Plan (S3AM-209-FM1)
- Risk Assessment & Management (S3AM-209-PR1)

5.0 EMERGENCY PROCEDURES

- Review the Fire Protection and Emergency Response Plans for the for the new location
- Call 911 for medical emergencies
- Immediately report all injuries, illness, and near-misses to your Supervisor.
- Supervisor must promptly contact the AECOM **Incident Reporting Hotline: 800-348-5046.**

6.0 GENERAL SAFETY CONSIDERATIONS

1. Be on the lookout for slip, trip, and/or fall hazards and immediately report such hazards to management or maintenance personnel, or if feasible, safely eliminate the hazard.
2. Use caution when entering areas under desks to plug in cords; the best approach is to look at the area first and identify any hazards (e.g. metal brackets)
3. Do not attempt to move Items that a professional moving service will handle.
4. If an item is suspected of weighing more than your personal lifting capabilities or a maximum of 50 lbs, do not attempt to lift it without seeking assistance (mechanical or another person). Do not exceed your personal capabilities when lifting items and limit your lifts if directed by a medical professional.
5. Inspect all material handling equipment prior to use (e.g., hand cart tires, hand cart handle for sharp edge, broken components, etc.)
6. Avoid using heavy tape that will require cutting. Use tape that can be torn by hand or plastic containers that do not require tape.
7. Do not access ladders unless you have been properly trained.
8. Be cognizant of Global Harmonizing System (Safety Data Sheets) for chemicals handled during the move. Review cleaning chemical GHS sheets to ensure you are not allergic to the cleaning supplies and to follow all requirements for PPE and emergency response.

7.0 APPROVALS/ EMPLOYEE SIGNATURES

SIGNATURES

Area Health and Safety Manager

Office Manager

Office SH&E Representative

EMPLOYEES

I have read the plan, understand it, and agree to comply with all of its provisions (use additional sheets as needed).

Print Name	Signature	Date

1.0 Purpose and Scope

- 1.1 This procedure applies to all AECOM Americas based employees and operations.
- 1.2 A subcontractor is considered a person or business which has a contract (and is not an employee) with AECOM to provide some portion of the work or services on a project which the contractor has agreed to perform. This procedure is applicable to the operations of subcontractors and sub-subcontractors of any tier.
- 1.3 This procedure does not apply to vendors. For the purposes of this procedure, a vendor is a service provider and, is a person or business which performs services. Examples of a vendor could be a food machine vendor supplier for a site canteen; a portable toilet delivery company; an office equipment repair service; etc.
- 1.4 This procedure does not apply to third-party contractor operations where there is no subcontract relationship between the contractor and AECOM. Safety issues regarding third-party contractor operations are governed by project-specific contracts, and are not covered by this procedure.
- 1.5 This procedure provides requirements on the evaluation of subcontractor safety, health, and environmental programs; contractual risk management; subcontractor safety performance on the job site; and the responsibilities of the Manager with respect to subcontractor jobsite performance.
- 1.6 Each AECOM subcontractor must be evaluated at least annually using *S3AM-213-FM1 Subcontractor SH&E Evaluation Form*, or equivalent process (e.g., third-party qualification vendor, internal pre-qualification databases), in order to perform work on any AECOM projects.

2.0 Terms and Definitions

- 2.1 Subcontractor - For the purposes of this procedure, a person or business which has a contract directly with AECOM to provide work or services related to AECOM or client work scopes beyond delivery or basic repairs. Examples of a subcontractor could be an engineer; a sign installer; a welding company; an office renovation company; etc. A person or business with a contract directly with AECOM that does not fall clearly within this definition may also be required by the applicable business group to comply with this procedure.

3.0 References

- 3.1 S3AM-015-PR1 Short Service Employees

4.0 Procedure

- 4.1 Implementation of this procedure is the responsibility of the AECOM manager (Manager) directing activities of the facility, site, or project location.
- 4.2 Subcontractors must be competent and capable to perform their activities in a safe, healthful, and environmentally responsible manner.
- 4.3 Pre-qualification of Subcontractor – The Manager will complete the following for all subcontractors proposed for projects covered by this procedure unless an equivalent process (e.g., third-party prequalification vendor, internal pre-qualification databases) is used. The Manager shall also require subcontractors to follow these procedures with respect to pre-qualification of sub-subcontractors of any tier.
 - 4.3.1 Request all subcontractor candidates to complete the attached *S3AM-213-FM1 Subcontractor SH&E Evaluation Form* or equivalent (e.g., third-party prequalification vendors, internal pre-qualification databases).

- 4.3.2 Conduct an assessment of each subcontractor's qualifications with respect to the Subcontractor Evaluation Criteria contained in *S3AM-213-ATT1 Subcontractor Evaluation Criteria*.
- 4.3.3 If the subcontractor does not meet criteria outlined in *S3AM-213-ATT1 Subcontractor Evaluation Criteria*, the decision will be that the subcontractor will not be used. However, if a unique business need exists (e.g., subcontractor is a specialty subcontractor, lowest or only bid, client required, small business/minority set asides), the Manager should initiate *S3AM-213-FM2 Subcontractor Variance Form* (or equivalent vendor/database approval).
- 4.3.4 If the subcontractor has been successfully evaluated within the last 12 months, that evaluation may be substituted.
- 4.3.5 For long-term operations, update this evaluation within 12 months of the previous evaluation.
- 4.4 Contractual and Risk Management Requirements of Subcontractors
 - 4.4.1 Ensure that the subcontractor is contractually bound to comply with applicable client and AECOM SH&E Program requirements (e.g. alcohol and drug policies, procedures, insurance, licenses, registrations, etc.).
 - 4.4.2 Ensure that subcontractor develops additional safety procedures for work that is exclusive to their activities on the site, and for which they may have superior knowledge.
 - 4.4.3 Ensure that AECOM has the right in its subcontract, without liability to AECOM, to stop the subcontractor's work in the event of any violations of the applicable safety requirements.
 - 4.4.4 Managers shall require subcontractors to follow pre-qualification procedures for lower-tiered subcontractors.
- 4.5 Subcontractor Safety Representative
 - 4.5.1 Require each subcontractor to appoint a Subcontractor Safety Representative (SSR) who:
 - Is knowledgeable of the subcontractor's activities.
 - Understands the safety requirements of the subcontractor's activities.
 - Has the ability to recognize and the authority to correct safety deficiencies and execute a stop work order should an imminent danger arise.
 - Has the responsibility for the administration of the subcontractor safety program.
 - Will serve as the direct contact with AECOM regarding resolution of SH&E issues
 - Will report work-related injuries/illnesses/incidents, environmental incidents and regulatory inspections/violations to AECOM according to AECOM procedures and/or client requirements.
- 4.6 Communication
 - 4.6.1 Provide the SSR with information regarding site safety program including but not limited to:
 - Client Requirements
 - AECOM SH&E Program
 - Site Hazard Communication Program
 - Site Emergency Plan
 - Any additional safety information from other contractors or subcontractors working on the site.
 - 4.6.2 Require the participation of subcontractors in site safety briefings including, and as applicable, orientations, project kick-off meetings, hazard assessments, inspections and tailgate / toolbox meetings.
 - 4.6.3 Require subcontractor compliance with all safety directives and/or stop work orders issued by the AECOM representatives.

- 4.6.4 Require the subcontractor to notify the AECOM manager when they will utilize short service employees (SSE) to perform on-site activities. The AECOM manager must approve the use of any SSE by the subcontractor prior to mobilization. Site management will interact with the short service employee to verify their level of competency and manage the SSE in accordance with *S3AM-015-PR1 Short Service Employees*.
- 4.6.5 Prior to the start of work, roles, responsibilities, communication chain-of-command, and emergency preparedness procedures will be established.
- 4.7 Subcontractor Performance
 - 4.7.1 To the extent reasonable in light of AECOM's scope of work under the client contract, the AECOM Manager (or designee) should visit the site and periodically observe subcontractor's operations (e.g., conduct spot checks) to assess whether subcontractor appears to be conducting their operations in accordance with applicable safety requirements. Periodically review any required subcontractor health and safety written documentation for compliance with applicable requirements. This should be documented using *S3AM-FM3 Subcontractor SH&E Performance Assessment* or equivalent.
 - 4.7.2 In the event that unsafe acts or unsafe conditions are observed, immediately stop work, and bring them to the attention of the SSR for resolution.
 - 4.7.3 The AECOM Manager shall ensure incidents and significant near misses related to subcontractor operations are investigated to identify causes and corrective actions.
 - 4.7.4 In the event of serious and/or continuing subcontractor breaches of applicable requirements, contact legal counsel to assess whether formal contractual action is appropriate under the subcontract.
 - 4.7.5 Once a job is completed, a subcontractor's performance should be reviewed and feedback provided to subcontractor management. This should be documented using *S3AM-FM3 Subcontractor SH&E Performance Assessment* or equivalent.

5.0 Records

The following documentation will be maintained in the project file:

- 5.1 S3AM-213-FM1 Subcontractor SH&E Evaluation Form or equivalent.
- 5.2 S3AM-213-FM2 Subcontractor Variance Form or equivalent, if applicable.
- 5.3 S3AM-213-FM3 Subcontractor SH&E Performance Assessment or equivalent.
- 5.4 Identified safety deficiencies as applicable for subcontractors and verification of correction of conditions.
- 5.5 All other safety-related documentation such as training certifications, etc.
- 5.6 Subcontractor incident reports and resolution reports.

6.0 Attachments

- 6.1 [S3AM-213-ATT1 Subcontractor Evaluation Criteria](#)
- 6.2 [S3AM-213-FM1 Subcontractor SH&E Evaluation Form](#)
- 6.3 [S3AM-213-FM2 Subcontractor Variance Form](#)
- 6.4 [S3AM-213-FM3 Subcontractor SH&E Performance Assessment](#)

Americas

Subcontractor Evaluation Criteria

S3AM-213-ATT1

Prior to engaging a subcontractor on a project, Managers are required to ensure that the subcontractor has an effective safety program and is capable of conducting its operations in a safe manner. The following criteria shall be followed in determining whether the subcontractor may be used on an AECOM project.

If the subcontractor does not meet the criteria outlined below, the decision will be that the subcontractor will not be used. However, if a unique business need exists (e.g., subcontractor is a specialty subcontractor, lowest or only bid, client required, small business/minority set asides), the Manager should initiate *S3AM-213-FM2 Subcontractor Variance Form*.

Note: Some questions/answers (Sections 5 through 10) from *S3AM-213-FM1 Subcontractor Evaluation Form* are not discussed in the evaluation criteria below. These questions and the answers provided are intended to help the Manager understand the culture and/or priorities of the subcontractor.

If subcontractor has performed work for AECOM previously, check safety performance history with previous AECOM Manager.

The sections below directly correspond to the questions in *S3AM-213-FM1 Subcontractor Evaluation Form*.

1.0 Workers' Compensation Experience Information

- 1.1 If the EMR exceeds 0.99 (U.S.) or the subcontractor has a surcharge (International), the subcontractor does not meet AECOM's requirements and a variance is required.
- 1.2 If the subcontractor does not have workers' compensation insurance, a variance is required.

2.0 Safety Performance

- 2.1 If the subcontractor has had a fatality (for any year in line 3 on the table), the subcontractor does not meet AECOM requirements and a variance is required.
- 2.2 For any Lost Work Day Case Rate (for any year in line 11 on the table) listed as greater than 1.0, subcontractor does not meet AECOM requirements and a variance is required.
- 2.3 For any Total Recordable Incident Rate (for any year in line 10 on the table) listed as greater than 4.0, subcontractor does not meet AECOM requirements and a variance is required.
- 2.4 A subcontractor with willful, serious and repeat citations does not meet AECOM requirements and a variance is required.

3.0 Risk Management / Insurance Data

- 3.1 The ability to provide Insurance Certificates naming AECOM as an additional insured is required. Refer any questions to the AECOM Legal Department.
- 3.2 Proof of Workers' Compensation Insurance (or proof of exemption) is required. Refer any questions to the AECOM Legal Department.

4.0 Safety Program

- 4.1 For Sections 4 through 9, if a subcontractor answers 'No' to any of the questions, the Manager needs to consider the type of work the subcontractor will be performing to determine if the answer is acceptable.
- 4.2 A "No" answer should be discussed with Operations and Safety, Health & Environment (SH&E) Management. For small subcontractors, a 'No' answer may be acceptable with good incident and insurance rate statistics. Generally, some minimal program is expected depending on the breadth and complexity of the work. If a 'No' answer is determined to be not acceptable the subcontractor does not meet AECOM requirements and a variance is required.
- 4.3 It is expected that a subcontractor being hired to perform services on the project site should be the best prepared to address safety issues for their operations, especially when specialty work is being conducted, or for work in which the subcontractor possesses superior knowledge of their operations.

Americas

Subcontractor SH&E Evaluation Form

S3AM-213-FM1

It is the policy of AECOM to provide a safe and healthful environment for all of its employees through the prevention of incidents. As such, AECOM considers safety as paramount and requests the following information of our subcontractors.

Company Name:	_____	Date:	_____
Address:	_____	Contact Name:	_____
	_____	Title:	_____
City:	_____	Telephone:	_____
State/Province:	_____	Fax:	_____
Zip/Postal Code:	_____	Email:	_____
Type of services performed: _____			

Has your company previously performed work as a subcontractor to AECOM? ☐ Yes ☐ No

If "Yes" explain the nature of the work, project location, and project date, and AECOM Project Manager and telephone number.

How many years has your organization been in business under your firm's name? _____

If applicable, what was your organization's previous name(s)? _____

Does your company have the appropriate licenses, registrations and insurance? ☐ Yes ☐ No

1.0 Workers' Compensation Experience Information

(United States Only)

Insurance Carrier(s): _____

Contact for Insurance Information: _____

Title: _____ Telephone: _____ Fax: _____

1.1 For U.S. operations - List your firm's Interstate Workers' Compensation Experience Modification Rate (EMR) for the three most recent years: (Information is available from your workers' compensation insurance carrier.)

1.2 For international operations - List the applicable performance rating (e.g., WCB variance/experience rate in Canada) for your company.

Year	Rate
_____	_____
_____	_____
_____	_____

1.3 We require verification of your rate. Please attach the endorsement page from your policy/account listing your rating, or have your insurance carrier or broker provide this information on their letterhead.

1.4 If your EMR exceeds 0.99 (US) or you have a surcharge (International) for any one or more years above, please explain why:

Comments: _____

2.0 Safety Performance Data

2.1 Please consolidate your firm's injury and illness data for the last 3 years and complete the table below. The information provided must be for your company as a whole, not an individual office location. See page 7 for definitions of terms used below. For U.S. operations, provide copies of your OSHA 300 and 300A logs for the last 3 years.

	YEAR	YEAR	YEAR
1. Average Number of Employees			
2. Hours Worked			
3. Fatalities ¹			
4. Permanent Total Disabilities (PTD)			
5. Lost Workday Cases (LWC)			
6. Restricted Workday Cases (RWC)			
7. Medical Treatment Cases (MTC)			
8. Lost Work Days (LWD)			
9. Total Recordable Cases (TRC)			
10. Total Recordable Incident Rate (TRIR)			
11. Lost Workday Case Rate (LWCR)			
12. Days Away, Restricted & Transfer Case Rate (DART)			
13. Severity Rate			
14. Environmental Occurrences			

¹ For each fatality, please attach a description of the incident, including cause, lessons learned, actions taken resulting from that fatality, and actions taken to prevent future fatalities.

- 2.2 Has your company been issued any health and safety or environmental related citations/orders from any federal, state, province, or local regulatory agency during the past 3 years? ☐ Yes ☐ No

If "Yes", please explain the nature of the citation/order, classification, and final fine (if applicable) in an attachment to your evaluation form submittal.

3.0 Risk Management / Insurance Data

- 3.1 Are you able to provide AECOM (or applicable subsidiary company) with insurance certificates naming AECOM, and if requested, AECOM's client as an additional insured? ☐ Yes ☐ No

- 3.2 Please provide proof of current workers' compensation insurance coverage or proof of exemption.

4.0 Safety Program

- 4.1 Does your company operate a health and safety management system that is third-party registered or certified? ☐ Yes ☐ No

If "Yes," please include a copy of the registration/certification.

- 4.2 Does your company maintain a written Safety program? ☐ Yes ☐ No

If "Yes," please include a copy of the Table of Contents.

- 4.3 Is your company capable of preparing safety procedures specific to your work proposed for this project? ☐ Yes ☐ No

- 4.4 Does your firm have a full-time safety manager/representative? ☐ Yes ☐ No

If "Yes," please provide name and telephone number.

Name: _____ Telephone: _____

- 4.5 Do you hold jobsite safety meetings? ☐ Yes ☐ No

How Often?

Daily ☐ Weekly ☐ Bi-Weekly ☐ Monthly ☐ Less Often, As needed ☐

Are the safety meetings documented? ☐ Yes ☐ No

- 4.6 Does your firm have the following policies/procedures?
If "Yes," please provide copies of the policies/procedures.

- Stop Work? ☐ Yes ☐ No
- Short Service Employee? ☐ Yes ☐ No
- Fitness for Duty? ☐ Yes ☐ No

- 4.7 Is a program in place for the reporting and correction of workplace hazards? ☐ Yes ☐ No

- 4.8 Are workers encouraged to intervene when unsafe conditions are observed? ☐ Yes ☐ No

- 4.9 Have the safety hazards associated with your job activities been identified? ☐ Yes ☐ No

- 4.10 Has a risk assessment been performed on these hazards? ☐ Yes ☐ No

- 4.11 Does your company use subcontractors? ☐ Yes ☐ No
 If "Yes", please provide details of how you select and manage subcontractors.
-

5.0 Incident Reporting, Investigation, and Injury Management

- 5.1 Does your company have a process in place for immediate reporting, investigation, and follow-up of incidents, near-misses and occupational injuries? ☐ Yes ☐ No

If "Yes," who receives copies of the report? (Job Title) _____
 (Job Title) _____
 (Job Title) _____

- 5.2 Who is responsible for investigation and completion of your incident report forms? (Job Title) _____

Please provide your company's incident reporting procedures.

- 5.3 Does your company have an injury management procedure? ☐ Yes ☐ No
 If "Yes", provide a copy of the injury management procedure.

- 5.4 Does your injury management procedure include the use of occupational clinics (for non-critical injuries) as a preferred method of medical care? ☐ Yes ☐ No

- 5.5 Does your company have a nurse or doctor on staff? ☐ Yes ☐ No

- 5.6 Does your company use a third-party to provide medical advice to injured employees? ☐ Yes ☐ No

If "Yes", which third-party company is used? _____

6.0 Training and Competence

- 6.1 Have employees been trained in appropriate job skills? ☐ Yes ☐ No

- 6.2 Are employees' job skills certified where required by regulatory or industry standards? ☐ Yes ☐ No

- 6.3 Have your employees received the required safety training and retraining? ☐ Yes ☐ No

- 6.4 Does your company have a formal safety orientation program for new employees? ☐ Yes ☐ No
 If "Yes," submit an outline for evaluation.

If "Yes", are records kept? ☐ Yes ☐ No

If "Yes", who conducts the orientation? (Job Title) _____

If "No", how are new employees informed of safety policies, procedures and expectations?

6.5 Do you have additional safety training for newly hired or promoted foremen / superintendents? ☐ Yes ☐ No

6.6 Do you maintain a record of all employees' training? ☐ Yes ☐ No

6.7 Are your employees enrolled in a Defensive Driving Training Program? ☐ Yes ☐ No

7.0 Medical / Drug Testing

7.1 Does your company have a Drug/Alcohol policy or program? ☐ Yes ☐ No

If "Yes", does your drug and alcohol program include the following:

- Pre-employment testing ☐ Yes ☐ No
- Testing for Cause ☐ Yes ☐ No
- Post-incident testing ☐ Yes ☐ No
- Random testing ☐ Yes ☐ No

7.2 Does your company have an ongoing medical surveillance program as required by applicable governmental regulations? ☐ Yes ☐ No

7.3 Do you conduct medical examinations for:

- Pre-employment ☐ Yes ☐ No
- Pre-placement Job Capability ☐ Yes ☐ No
- Hearing Function (Audiograms) ☐ Yes ☐ No
- Pulmonary ☐ Yes ☐ No
- Respiratory ☐ Yes ☐ No

8.0 Compliance Assurance

8.1 Does your company conduct safety system audits and/or inspections? ☐ Yes ☐ No

- How often? _____
- Who conducts the audits/inspections? (Job Title) _____
- Who receives the reports? (Job Title) _____
- Are audits/inspections documented? ☐ Yes ☐ No

9.0 Environmental Management and Sustainability

9.1 Has your company been issued any environmental related citations/orders from any federal/state/province, or local regulatory agency during the past 3 years? ☐ Yes ☐ No

If "Yes", please explain the nature of the citation/order, classification, and final fine (if applicable) in an attachment to your evaluation form submittal.

9.2 Does your company have an Environmental Management and/or Sustainability Policy Statement (can be incorporated into a company policy statement)? ☐ Yes ☐ No

9.3 Does your company have any of the following?

- Process to assess environmental compliance requirements? ☐ Yes ☐ No
- Process to identify environmental impacts? ☐ Yes ☐ No

- Waste Management Program (including recycling)? ☐ Yes ☐ No
- Procurement policies requiring purchase of recycled materials? ☐ Yes ☐ No
- Energy use tracking and management policies? ☐ Yes ☐ No
- Green House Gas emissions reduction program? ☐ Yes ☐ No
- Tracking of "Carbon Footprint"? ☐ Yes ☐ No
- Environmental Certifications (e.g., ISO 14001)? ☐ Yes ☐ No
- Water Management/Conservation? ☐ Yes ☐ No
- Environmental Performance Metrics? ☐ Yes ☐ No

Comment on any other areas of your company's programs and policies that you think will be appropriate in our evaluation.

10.0 Verification Data

Please have an officer of the company sign below certifying that the information provided in this document is current and correct. Misrepresentation of data requested is grounds for immediate termination of contracts and disqualification from future consideration.

Name	Title
Signature	Date

11.0 Required Information Submittal

Please provide copies of the following documents with the completed evaluation form. **If the following information is not included, provide a written reason for the failure to do so.**

- ☐ Workers' compensation rating documentation
- ☐ U.S. Only - OSHA 300 and 300A Logs (Past 3 Years) – *Employee names must be removed.*
- ☐ Description for any fatalities (if applicable)
- ☐ Explanation of any health and safety related order/citation (if applicable)
- ☐ Safety Program (Table of Contents)
- ☐ Stop Work, Short Service Employee, Fitness for Duty Policies/Procedures (if applicable)
- ☐ Incident Reporting Procedure
- ☐ Injury Management Procedure
- ☐ Safety Orientation for New Hires (Outline)
- ☐ Explanation of any environmental related order/citations (if applicable)

Definitions for Section 3.1.

Hours Worked - The total number of hours worked during the given year including paid overtime and training but excluding leave, sickness and unpaid overtime hours. Hours worked should be calculated separately for company and contractor personnel.

Fatality - A death resulting from a work-related injury or occupational illness, regardless of the time intervening between the incident causing the injury or exposure causing illness and the death.

Permanent Total Disability (PTD) - Any work-related injury that permanently incapacitates an employee and results in termination of employment.

Lost Workday Case Rate (LWCR) - The number of cases with days away from work per 200,000 exposure hours. (Formerly called Lost Time Incident Rate).

$$\frac{\text{Number of Lost Workday Cases} \times 200,000 \text{ hours}}{\text{Hours Worked}}$$

Lost Work Days (LWD) – The total number of days away from work experienced by all employees during the year.

Severity Rate -

$$\frac{\text{Total number of lost work days} \times 200,000 \text{ hours}}{\text{Hours Worked}}$$

Days Away, Restricted & Transfer Case Rate (DART) - Cases involving days away from work, or days of restricted work activity, or both per 200,000 exposure hours. This rate is determined by the following formula:

$$\frac{\text{Total number of (LWC+RWC)} \times 200,000 \text{ hours}}{\text{Hours Worked}}$$

Total Recordable Cases (TRC) - The sum of injuries/illness resulting in fatalities, permanent total disabilities, lost workday cases, restricted work cases and medical treatment cases.

Total Recordable Incident Rate (TRIR) - The number of total recordable cases (see definitions above) per 200,000 exposure hours. This rate is determined by the following formula:

$$\frac{\text{Number of Total Recordable Cases} \times 200,000 \text{ hours}}{\text{Hours Worked}}$$

Environmental Occurrence – Any environmental occurrence required to be reported to a statutory body.

This page is to be completed by AECOM.

Subcontractor Name: _____

Manager Evaluation:

- Pass ☐ Subcontractor meets the criteria established in *S3AM-213-ATT1 Subcontractor Evaluation Criteria*, and no further action is required.
- Fail ☐ Subcontractor does not meet the criteria established in *S3AM-213-ATT1 Subcontractor Evaluation Criteria*. If a unique business need exists for hiring this specific subcontractor, and no other qualified subcontractor can be located or used, then a subcontractor variance must be initiated using *S3AM-213-FM2 Subcontractor Variance Form*.

Manager Name: _____

Signature: _____

Date: _____

Americas

Subcontractor Variance Form

S3AM-213-FM2

Subcontractor Name

Project or Site Location

Description of Work to Be Performed

Explain any of the following conditions that apply to the subcontractor:

- ☐ EMR exceeds 0.99 (U.S.) or company has a surcharge (International)
- ☐ No workers' compensation insurance
- ☐ Fatalities in the past 3 years
- ☐ Lost Time Injury Rate greater than 1.0 in the past 3 years
- ☐ Total Recordable Incident Rate greater than 4.0 in the past 3 years
- ☐ Willful, serious or repeat regulatory citation
- ☐ Inadequate Safety Program(s)

What conditions warrant selection of this subcontractor?

- ☐ Sole subcontractor available for specialty work
- ☐ Current subcontractor for work to be continued
- ☐ Small or minority business set aside requirement
- ☐ Existing site or client agreement requires use of subcontractor
- ☐ Site/project security requirements preclude other subcontractors
- ☐ Subcontractor has made efforts to improve safety performance
- ☐ Other (explain below)

Have other similar subcontractors been evaluated? If so, please explain.

Mitigations by AECOM to manage the risks.

Manager Requesting Variance**Safety Director/Manager Approval**

Name: _____

Date: _____

Signature: _____

Comments: _____

OPERATIONAL VICE PRESIDENT APPROVAL

Required for:

- Fatalities in the last three years
- No workers' compensation insurance
- Wilful, serious, or repeat citations

Name: _____

Date: _____

Signature: _____

Americas

Subcontractor SH&E Performance Assessment

S3AM-213-FM3

Company Name:	_____	Date:	_____
Address:	_____	Contact Name:	_____
	_____	Title:	_____
City:	_____	Telephone:	_____
State/Province:	_____	Fax:	_____
Zip/Postal Code:	_____	Email:	_____
Type of services performed: _____			

- ☐ Assessing performance of subcontractor on a project or during activity.
- ☐ Assessing performance of a subcontractor at the end of a project or activity.
- ☐ Completing an annual assessment of subcontractor performance.

Describe the nature of the work, project/program location, and project/program start date, and AECOM Manager and telephone number.

Assessment

Has the subcontractor met its contractual obligations and requirements? ☐ Yes ☐ No

If unsatisfactory describe any deficiencies and include examples / evidence.

Did or does the subcontractor follow a health and safety management system suitable to the activities or work scope? ☐ Yes ☐ No

If unsatisfactory describe any deficiencies and include examples / evidence.

Did or does the subcontractor maintain and submit documentation evidencing a health and safety management system is employed during the course of the activities or work scope (e.g., monthly training reports, monthly leading / lagging indicator performance, etc.)? ☐ Yes ☐ No

If unsatisfactory describe any deficiencies and include examples / evidence.

Did or does the subcontractor SH&E performance meet or exceed AECOM requirements?

- | | | |
|--|------------------------------|-----------------------------|
| Did or do subcontractor personnel receive site specific orientations prior to commencing work? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Did or do subcontractor personnel have appropriate training / certification for the job scope? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Did or does subcontractor have an SH&E plan that is acknowledged by its employees? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Did or does subcontractor hold jobsite safety meetings? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Did or does subcontractor identify and assess the risk of workplace hazards? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Did or does subcontractor identify and implement corrective actions for identified hazards? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Did or do subcontractor workers intervene when unsafe acts or conditions are observed? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Did or does subcontractor have a system to report identified hazards? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Did or does subcontractor immediately report incidents and near-misses? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Did or does subcontractor investigate and establish corrective actions? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Did or does subcontractor assign responsibility and track actions to completion? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Did or does subcontractor actively implement claims and injury management practices? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Did or does subcontractor routinely inspect and audit work sites? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Did or does subcontractor maintain medical surveillance program if required? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Did or does subcontractor routinely incorporate environmental sustainability practices? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Did or does subcontractor employ subcontractors? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Did or does subcontractor utilize a pre-qualification process to hire subcontractors? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Did or does subcontractor monitor SH&E performance of hired subcontractors? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |

If any items are assessed as unsatisfactory, describe any deficiencies and include examples / evidence.

Recommendations

Subcontractor Representative Name

Title

Signature

Date

AECOM Representative Name

Title

Signature

Date

Electrical Safety

S3AM-302-PR1

1.0 Purpose and Scope

- 1.1 Outline the safe working requirements for working with and near electric equipment and installations to minimize and control electrical hazards such as electrical shock, arc flash, and electrical fires in the workplace.
- 1.2 This procedure applies to all AECOM Americas-based employees and operations.
- 1.3 As a general rule, AECOM employees shall not work on exposed, energized systems with a potential greater than 50 volts. This work should be performed by a qualified electrician.

2.0 Terms and Definitions

- 2.1 **Arc Flash** – A dangerous condition associated with the release of energy during an electrical arc.
- 2.2 **Arc Flash Analysis** – A mathematical determination of the energy released by an electric arc and the distance from the source that a flash hazard exists. The process for an Arc Flash Analysis is defined in National Fire Protection Act 70E of the National Electric Code and Canadian Standards Association Z462.
- 2.3 **Arc Rating** – The maximum incident energy resistance demonstrated by a material prior to breakdown or at the onset of a second-degree skin burn (expressed in cal/cm2).
- 2.4 **Circuit Protective Device** – A load-rated switch, circuit breaker, or other device specifically designed as a disconnecting means for opening, reversing, or closing of live circuits.
- 2.5 **Energized Electrical Equipment** – Electrically connected to or having a source of voltage.
- 2.6 **Flash Hazard** – A dangerous situation associated with the release of energy caused by an electric arc.
- 2.7 **Ground Fault Circuit Interrupter (GFCI)** – An electrical device that protects the users of all devices connected to it from electrical shock. The GFCI is part of the circuit or device in use and continuously measures the current in that circuit. If a leakage of current is detected, as in the case of an electrical short circuit, the circuit is opened at the GFCI and current cannot flow beyond the GFCI.
- 2.8 **Licensed Electrician** – A person who possesses the local licenses and certifications to work on electrical circuitry, panels or equipment if full compliance with local legislation.
- 2.9 **Portable Electric Equipment** – Cord- and plug-connected equipment and extension cords.
- 2.10 **Qualified Persons** – Individuals who have specific and documented training and has demonstrated skills and knowledge in the construction and operation of electric equipment and installations to avoid the hazards of working on or near energized electrical equipment. Qualified Persons shall have been specifically permitted to near exposed energized and parts. Even an experienced electrician is unqualified unless he or she knows the particular equipment and has received specific safety training on the potential hazards involved.
- 2.11 **Shock Hazard** – A dangerous situation associated with the possible release of energy caused by contact or approach to live parts.

3.0 References

- 3.1 S3AM-003-PR1 SH&E Training
- 3.2 S3AM-202-PR1 Competent Person Designation
- 3.3 S3AM-208-PR1 Personal Protective Equipment
- 3.4 S3AM-209-PR1 Risk Assessment & Management

- 3.5 S3AM-305-PR1 Hand & Power Tools
- 3.6 S3AM-322-PR1 Overhead Lines
- 3.7 S3AM-325-PR1 Lockout Tagout
- 3.8 S3AM-410-PR1 Hazardous Energy Control

4.0 Procedure

4.1 Roles and Responsibilities

4.1.1 Manager / Supervisor

- Approve all Energized Electrical Work Permits.
- Confirm that all projects under their direct control or authority have a written SH&E Plan prepared for the activity.
- Confirm communication with client / owner of hazards presented by the work conducted by AECOM and controls measures in place.
- Provide technical guidance in support of this procedure.
- Confirming employees are informed of and comply with the provisions of this procedure.
- Supporting employees in the reporting of incidents per *S3AM-004-PR1 Incident Reporting, Notifications & Investigations*, including the entry of the incident into the on-line incident management system (e.g. IndustrySafe).

4.1.2 SH&E Manager

- Provide technical guidance and support to the Manager or Supervisor.
- Assist the Manager or Supervisor in compliance with the requirements of this procedure.
- Assist in the incident investigation and review process

4.1.3 Employees

- Comply with requirements of this procedure.
- Stop work if workers, other than Qualified Persons, are exposed to live electrical systems at unknown voltages or potentials greater than 50 volts.
- Only open electrical panels only if they are a Qualified Person.
- Employees designated as a Qualified Person, conduct work on or near energized electrical equipment in accordance with applicable training and jurisdictional requirements.
- Employees designated as a competent person in relation to the Assured Equipment Grounding Conductor Program, administer testing and recording in accordance with jurisdictional requirements.
- Immediately report incidents per *S3AM-004-PR1 Incident Reporting, Notifications & Investigations*, including the entry of the incident into the on-line incident management system (e.g., IndustrySafe).

4.2 Training

- 4.2.1 Employees who have potential exposures to electrical hazards shall be trained in and be familiar with the electrical safety-related work practices required by the applicable regulations. Refer to the *S3AM-003-PR1 SH&E Training* for specific required training.
- 4.2.2 Employees shall have reviewed and acknowledged the applicable SH&E plan specific to the project or location.

- 4.2.3 Refer to *S3AM-302-ATT1 Live Electrical Work* for qualifications if working on or near exposed electric conductors or circuit parts that can be energized.

4.3 General Requirements

- 4.3.1 Electrical outlets utilized to supply power for electrical equipment during field operations shall be of the three-wire grounding type. They should be tested for correct polarity and adequacy of the ground with a circuit analyzer. If it is determined that the outlet is incorrectly wired or inadequately grounded, it must not be used until serviced by a licensed electrician.
- 4.3.2 GFCI devices will be in place between the equipment and power source for all temporary circuits unless protected by an assured equipment grounding program as defined in this procedure (i.e., circuits that are not part of a permanently installed facility electrical system, such as on a construction site or temporary field installation).
- 4.3.3 Unqualified personnel are not permitted to work on electrical equipment unless it has been de-energized, verified as being free of hazardous energy and locked and tagged out in accordance with *S3AM-325-PR1 Lockout Tagout*.
- Electrical equipment that has been de-energized but not locked and tagged out shall be treated as energized.
- 4.3.4 After a circuit is de-energized by a circuit protective device, the circuit may not be repeatedly manually reenergized until it has been determined that the equipment and circuit can be safely energized.
- 4.3.5 Temporary or permanent light fixtures that present a shock or burn hazard shall be guarded.
- 4.3.6 Confirm power switches are properly labeled to identify what they control, unless this is clearly confirmed through switch proximity or location. Electric conductors shall be protected from damage.

4.4 Classified Locations

Electrical equipment and wiring may be installed in locations where any of the following may be present: flammable vapors, liquids, or gases; combustible dusts or fibers; or a concentration or quantity of flammable or combustible material. Below is a list of each type of location and the associated hazards.

4.4.1 Class I Locations

Class I locations are those in which flammable gases or vapors are or may be present in the air in quantities sufficient to produce explosive or ignitable mixtures. Class I locations include the following:

A. Class I, Division 1 location is a location:

1. In which ignitable concentrations of flammable gases or vapors may exist under normal operating conditions; or
2. In which ignitable concentrations of such gases or vapors may exist frequently because of repair or maintenance operations or because of leakage; or
3. In which breakdown or faulty operation of equipment or processes might release ignitable concentrations of flammable gases or vapors, and might also cause simultaneous failure of electric equipment.

B. Class I, Division 2 location is a location:

1. In which volatile flammable liquids or flammable gases are handled, processed, or used, but in which the hazardous liquids, vapors, or gases will normally be confined within closed containers or closed systems from which they can escape only in case of accidental rupture or breakdown of such containers or systems, or in case of abnormal operation of equipment; or

2. In which ignitable concentrations of gases or vapors are normally prevented by positive mechanical ventilation, and which might become hazardous through failure or abnormal operations of the ventilating equipment; or
3. That is adjacent to a Class I, Division 1 location, and to which ignitable concentrations of gases or vapors might occasionally be communicated unless such communication is prevented by adequate positive-pressure ventilation from a source of clean air, and effective safeguards against ventilation failure are provided.

4.4.2 Class II Locations

Class II locations are those that are hazardous because of the presence of combustible dust. Class II locations include the following:

- A. Class II, Division 1 location is a location:
 1. In which combustible dust is or may be in suspension in the air under normal operating conditions, in quantities sufficient to produce explosive or ignitable mixtures; or
 2. There mechanical failure or abnormal operation of machinery or equipment might cause such explosive or ignitable mixtures to be produced, and might also provide a source of ignition through simultaneous failure of electric equipment, operation of protection devices, or from other causes, or
 3. In which combustible dusts of an electrically conductive nature may be present.
- B. Class II, Division 2 location is a location in which:
 1. Combustible dust will not normally be in suspension in the air in quantities sufficient to produce explosive or ignitable mixtures, and dust accumulations are normally insufficient to interfere with the normal operation of electrical equipment or other apparatus; or
 2. Dust may be in suspension in the air as a result of infrequent malfunction of handling or processing equipment, and dust accumulations resulting therefrom may be ignitable by abnormal operation or failure of electrical equipment or other apparatus.

4.4.3 Class III Locations

Class III locations are those that are hazardous because of the presence of easily ignitable fibers or flyings but in which such fibers or flyings are not likely to be in suspension in the air in quantities sufficient to produce ignitable mixtures. Class III locations include the following:

- A. Class III, Division 1 location is a location in which easily ignitable fibers or materials producing combustible flyings are handled, manufactured, or used.
- B. Class III, Division 2 location is a location in which easily ignitable fibers are stored or handled, except in process of manufacture.

4.5 Distribution System Setup

- 4.5.1 Under no circumstances shall electrical lines be routed through doorways, hatches, windows, or other openings.
- 4.5.2 Electric lines crossing work areas, personnel, or vehicular traffic areas shall be either fastened securely overhead (at a height that provides safe clearance for work operations), or protected by a cover capable of withstanding the imposed loads without creating a trip hazard.
- 4.5.3 Circuit breakers shall be labeled to indicate their use.
- 4.5.4 All circuit breaker panels shall have no openings or uncovered knockouts and shall be kept covered when not in use.
- 4.5.5 All live parts of electrical equipment operating at 50 volts or more shall be properly guarded against accidental contact.
- 4.5.6 Extension Cord Use

- Extension cords and electrical connections on handheld and other power tools will be inspected prior to use for cuts, kinks, frayed wires, etc. If any deficiency is noted, the equipment will be tagged "OUT OF SERVICE" and removed from service. Manufacturer-installed insulated electrical cords will not be repaired except by a licensed electrician.
- Extension cords are not to be placed across aisles, through doors, through holes in a wall, or in areas where the cord may be damaged or create a tripping hazard.
- Extension cord sets for use in field operations should be of the three-wire grounding type and will be rated for the intended load.
- Use of extension cords is allowed only for temporary installations not to exceed 90 days.
- Extension cords shall be provided with a plug cap that is either molded to the cord or equipped with a cord clamp to prevent strain on the terminal screws.
- Extension cords shall not be fastened with staples or otherwise hung in a manner that could damage the outer jacket or insulation.
- Ground fault circuit interrupters shall be used or, if permitted by legislation, an "assured equipment grounding conductor program" is to be established for all nonpermanent wiring needed for construction purposes or when working outdoors, in wet or moist areas or elsewhere as required by legislation.

4.5.7 Temporary Lights/Task Lights

- A temporary light shall not be suspended by the cord unless the cord and light are designed for suspension.
- Temporary lights shall be equipped with bulb protectors unless they are installed at least 7 or more feet overhead.

4.6 Working on or Near Energized Parts

4.6.1 Working on or near energized parts covers either potential direct physical contact or contact by means of tools or equipment and working close enough to the energized part to draw an arc.

4.6.2 Any work on exposed, live electrical systems above 50 volts shall be conducted by a licensed electrician who is a Qualified Person.

4.6.3 Refer to *S3AM-302-ATT1 Live Electrical Work*.

4.6.4 Prior to performing any work near exposed, energized systems, the Qualified Person shall:

- Confirm with the Licensed Electrician that it is safe to do so.
- Perform a Shock Hazard Analysis.
- Perform an Arc Flash Analysis.
- Establish emergency contacts.
- Complete and have approved the Energized Electrical Work Permit.
- Have all required personal protective equipment (PPE), insulated tools, and test equipment tested and ready to use.
- Know and understand the procedures to be followed.
- Ensure that adequate lighting and clearance space is available.
- Remove all conductive clothing and jewelry.

4.6.5 Working Near Overhead Power Lines

- Personnel working in the vicinity of overhead power lines, either on the ground or elevated, shall comply with *S3AM-322-PR1 Overhead Lines*.

- All workers and equipment including cranes and drill rigs shall maintain a clearance distance of at least 50 feet (15.24m meters) from overhead power lines unless a detailed assessment has been completed demonstrating that a smaller clearance distance provides protection.

4.7 Grounding

4.7.1 "Ground fault protection" is required on construction sites. To provide this protection, either "ground fault circuit interrupters" (GFCI) are to be used with temporary receptacles, or if permitted by legislation an "assured equipment grounding conductor program" is to be established in which plug-connected electrical equipment, extension cords, and temporary receptacles are tested on a periodic basis.

4.7.2 Ground Fault Circuit Interrupters

- A GFCI is an electrical device that is designed to prevent electrocution from electrical leakage. It is designed to measure the difference in amperage between the "hot" wire and the "neutral" wire in a circuit. Under ideal conditions, the amperage should be the same in both wires. If there is electrical leakage (a ground-fault), the amperages will be different. If the difference is more than a predetermined amount, the GFCI "trips" and stops the flow of electricity.
- GFCIs may trip from many causes including but not limited to:
 - Electrical leakage in the tool from internal defects, damaged insulation or from normal leakage in long runs of cords.
 - Moisture in the air or cords lying in water or on moist dirt.
 - Too many tools on one GFCI circuit.
 - Faulty wiring of the GFCI into the circuit.
 - Defective GFCI.
 - Any such tripping will require the problem to be corrected before the protected circuit can be re-set.

4.7.3 All 120-volt, single-phase, 15- and 20-ampere temporary receptacles shall be protected with "approved" GFCIs. "Approved" means listed by Underwriters Laboratories.

4.7.4 There are several types of GFCIs.

- A combination circuit breaker and GFCI that is installed in place of the ordinary circuit breaker.
- A receptacle containing a built-in GFCI.
- A portable GFCI that plugs into a receptacle and allows the extension cord or tool to be plugged into the GFCI.
- A portable unit containing several GFCI protected receptacles.

4.7.5 GFCIs contain a test button and a reset button. Each GFCI needs to be tested prior to use and on a periodic basis depending upon the manufacturer's recommendations (at a minimum monthly).

4.7.6 Assured Equipment Grounding Conductor Program

- If allowed by local legislation, assured equipment grounding conductor program is to be used instead of GFCIs to provide ground fault protection, the program shall be governed by the following requirements.
- Temporary receptacles shall be electrically grounded in accordance with the temporary wiring requirements of the National Electrical Code (United States)/Canadian Electrical Code.
- Extension cords shall be three-wire cords containing an equipment grounding conductor (ground wire).
- Electrical equipment that is plugged into a receptacle or extension cord (portable electrical tools, bench grinders, electric heaters, etc.) shall have a ground wire properly attached to the

non-current-carrying metal parts of the equipment. (Double-insulated tools have no ground wire and are therefore exempt from these testing and recording requirements but still need to be inspected for defects.)

- The Manager or Supervisor is required to designate one or more competent persons to administer this testing and recording program. Refer to S3AM-202-PR1 Competent Person Designation.
- Periodic testing of all plug connected equipment, all extension cords, and all temporary receptacles is to be conducted at the following times:
 - Before a new item (equipment, cord, or receptacle) is put into use.
 - After any repairs to the item.
 - After any incident in which the item may have been damaged.
 - Within three months of the last test. (An exception is allowed in the Standard in which extension cords, and temporary receptacles, which are fixed in place and are not exposed to damage, may be tested every months months.)
- The purpose of the test is to determine the following:
 - Temporary receptacles—to be sure that the receptacle is grounded.
 - Extension Cords—to be sure that the ground wire is connected to the proper terminal at each end and that the ground wire is continuous throughout the length of the cord.
 - Plug Connected Equipment—to be sure that the ground wire is connected to the proper terminal and to the non-current carrying metal parts of the equipment and that the ground wire is continuous from the equipment to the plug.
- The tests may be conducted using the following instruments:
 - A receptacle tester may be used to test receptacles and to test extension cords when plugged into a receptacle.
 - A continuity tester, or a volt-ohm meter, may be used to test equipment and to test extension cords when not plugged into a receptacle.
- Records must be kept to show which items have passed the test and when the test was conducted. These records may be either written inspection logs, a color-coding system using colored tape attached to the item, or some other effective means.
- Color coding shall be used in the following manner:
 - After a plug-connected piece of equipment or an extension cord has been inspected and passed the test, colored tape is to be placed around the cord near the plug. After a temporary receptacle has passed the test, colored tape is to be placed on the cover plate.
 - Any set of colors may be used, with the exception of white, black, or silver.
 - If there has been no overall site requirements established by the general contractor, use the following colors for the test periods.

January, February, March	Red
April, May, June	Blue
July, August, September	Orange
October, November, December	Green

- The tests administered every three months are to begin on the first working day of each quarter. Testing and color coding are to be continued until all items covered by this program have been tested. The test administered every six months, for those receptacles and extension

cords needing only semi-annual testing, are to be color coded using the quarterly color current at the time of the semi-annual test.

- A visual inspection of plug-connected equipment, extension cords, and temporary receptacles is to be made by the user before each use. The purpose of the visual inspection is to look for damage or defects that could affect the safe use of the item. (Exception: extension cords and temporary receptacles that are fixed in place and not exposed to damage are not required to be given a daily visual inspection, but it is a good idea to do the daily visual inspection anyway.)
- Equipment, cords, or receptacles showing damage or defects that could affect its safe operation are not to be used. This applies not only to the visual inspection before each use but also applies to any evidence of damage observed any time during use. Damaged items are to be taken out of service and are not to be used until properly repaired and retested.
- Equipment covered by this program is not to be used until the equipment has been tested and color coded according to the requirements of this program.
- A copy of this program is to be kept at the worksite.

4.8 PPE/Work Practices

4.8.1 PPE requirements shall be determined based on the results of each of the following: Task Hazard Analysis, Shock Hazard Analysis, and Arc Flash Analysis. Refer to the *S3AM-208-PR1 Personal Protective Equipment* and *S3AM-302-ATT1 Live Electrical Work*.

4.8.2 PPE

2 – Required PPE (range based on maximum voltage)	
50 to 240 volts	<ul style="list-style-type: none"> • <u>Eye/Face:</u> Safety glasses with side shields or goggles and Arc-Flash Face Shield or Arc-Flash Suit Hood (4 cal/cm²) • <u>Body:</u> Flame-Retardant long-sleeved shirt/pants or coverall (4 cal/cm²) • <u>Hand:</u> Electrical Hazard (EH) gloves (Class 00 with leather protectors) • <u>Foot:</u> EH-rated footwear • <u>Head/Ears:</u> Class E hard hat, hearing protection (ear canal inserts) • <u>Tools:</u> ANSI/CSA-approved, voltage-rated
Above 240 to 480 volts	<ul style="list-style-type: none"> • <u>Eye/Face:</u> Safety glasses with side shields or goggles and Arc-Flash Face Shield and Sock Hood (8 cal/cm²) or Arc-Flash Suit Hood (8 cal/cm²) • <u>Body:</u> Flame-Retardant long-sleeved shirt/pants or coverall (8 cal/cm²) • <u>Hand:</u> EH gloves (Class 00 with leather protectors) • <u>Foot:</u> EH-rated footwear • <u>Head/Ears:</u> Class E Hard hat, hearing protection (ear canal inserts) • <u>Tools:</u> ANSI/CSA-approved, voltage-rated
480 to 600 volts	<ul style="list-style-type: none"> • <u>Eye/Face:</u> Safety glasses with side shields or goggles and Arc-Flash Suit Hood (8 cal/cm²) • <u>Body:</u> Flame-Retardant long-sleeved shirt/pants or coverall (8 cal/cm²) • <u>Hand:</u> EH gloves (Class 0 or higher with leather protectors) • <u>Foot:</u> EH-rated footwear (carbon fiber recommended) • <u>Head/Ears:</u> Class E Hard hat, hearing protection (ear canal inserts) • <u>Tools:</u> ANSI/CSA-approved, voltage-rated

4.9 Portable Electrical Equipment

4.9.1 Refer to *S3AM-305-PR1 Hand & Power Tools*.

5.0 Records

- 5.1 The Shock Hazard Analysis and the Arc Flash Analysis forms shall be retained in the project file.
- 5.2 The completed *S3AM-302-FM1 Energized Electrical Work Permit* or equivalent shall be retained in the project file.

6.0 Attachments

- 6.1 [S3AM-302-FM1](#) [Energized Electrical Work Permit](#)
- 6.2 [S3AM-302-FM2](#) [Electrical Hazard Checklist](#)
- 6.3 [S3AM-302-ATT1](#) [Live Electrical Work](#)
- 6.4 [S3AM-302-ATT2](#) [Generator Safety](#)

Americas

Energized Electrical Work Permit

S3AM-302-FM1

PART 1: To be completed by the requester

Job Work Number _____

- (1) Description of circuit/equipment/job location:
- (2) Description of work to be done:
- (3) Justification of why the circuit/equipment cannot be de-energized or the work cannot be deferred until the next scheduled outage:

Requester/Title_____
Date/Time**PART II: To be completed by the electrically qualified persons *doing* the work:**Check When
Complete

- | | |
|---|--|
| (1) Detailed job description procedure to be used in performing the above detailed work: | <input type="checkbox"/> |
| (2) Description of the Safe Work Practices to be employed: | <input type="checkbox"/> |
| (3) Results of the Shock Hazard Analysis: | <input type="checkbox"/> |
| (4) Determination of Shock Protection Boundaries: | <input type="checkbox"/> |
| (5) Results of Flash Hazard Analysis: | <input type="checkbox"/> |
| (6) Determination of the Flash Protection Boundary: | <input type="checkbox"/> |
| (7) Necessary personal protective equipment to safely perform the job: | <input type="checkbox"/> |
| (8) Means employed to restrict the access of unqualified persons from the work area: | <input type="checkbox"/> |
| (9) Evidence of completion of a Job Briefing including discussion of any job-related hazards: | <input type="checkbox"/> |
| (10) Do you agree that the above described work can be done safely?
(If <i>no</i> , return to requester) | <input type="checkbox"/> Yes <input type="checkbox"/> No |

Electrically Qualified Persons(s)_____
Date/Time_____
Electrically Qualified Persons(s)_____
Date/Time_____
Electrically Qualified Persons(s)_____
Date/Time_____
Electrically Qualified Persons(s)_____
Date/Time

Authorized by: _____

Authorized Supervisor_____
Date/Time

Notes:

Americas

Electrical Hazard Checklist

S3AM-302-FM2

Location Inspected: _____ Job No.: _____

Date Inspected: _____ Name of Inspector: _____

Check Yes, No, or NA for Not Applicable. If a comment is required, circle the number, and see Page 3.

Electrical Equipment Markings

- | | | | | |
|----|--|------------------------------|-----------------------------|-----------------------------|
| 1. | Disconnecting switches and circuit breakers are labeled to indicate their use or equipment served. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 2. | The necessary voltage, wattage, or current ratings are labeled. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 3. | Circuit breakers clearly indicate whether they are in the "on" or "off" position. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 4. | Markings for arc flash hazards per NFPA 70E or CSA Z462 are on each panel or distribution box. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |

Electrical Grounding

- | | | | | |
|-----|--|------------------------------|-----------------------------|-----------------------------|
| 5. | Extension cords used have a grounding conductor (third plug). | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 6. | Ground-fault circuit interrupters (GFCIs) are installed as required or an assured equipment grounding conductor program is in use. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 7. | Portable electrical tools and equipment are of the double-insulated type. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 8. | GFCIs open the circuit on a ground current of 5 milliamperes or greater, and are equipped with an integral push-button test circuit. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 9. | GFCIs are installed in accordance with the manufacturer's instructions. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 10. | Ground-fault circuit interrupters are tested prior to initial use, and periodically thereafter. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 11. | Grounding rods are at least 5/8-inch- (0.625-centimeter)-diameter steel or iron rods, 1/2-inch- (1.27-centimeter)-diameter copper-clad steel, or 3/4-inch-(1.9-centimeter)-diameter galvanized pipe. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 12. | Grounding rods are in 8-foot (2.5-meter) lengths and driven to full depth. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 13. | The paths from circuits, equipment, structures, and conduits or enclosures to ground are: | | | |
| | • Permanent and continuous. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| | • Have ample carrying capacity for current likely to be imposed on them. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| | • Have resistance sufficiently low to permit current flow to operate circuit breakers and similar overcurrent devices on the circuit. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 14. | Driven ground-rod electrodes have a resistance to ground not exceeding 25 ohms. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 15. | Upon installation of the driven ground-rod electrode, the resistance was tested and recorded. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 16. | Conductors, used for bonding and grounding circuits, are of sufficient size to carry the anticipated current. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 17. | Grounds are not removed until all work is complete. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |

Electrical Hazard Checklist (S3AM-302-FM2)

Revision 3 December 15, 2016

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Electrical Guarding

18. Switches, receptacles, etc., are provided with tight-fitting covers or plates. ☐ Yes ☐ No ☐ NA
19. All energized parts of electrical circuits and equipment are guarded against accidental contact by approved cabinets or enclosure. ☐ Yes ☐ No ☐ NA
20. All unused openings (including conduit knockouts) in electrical enclosures and fittings are enclosed with appropriate covers, plugs, or plates. ☐ Yes ☐ No ☐ NA
21. Ground-fault circuit interrupters are installed on each temporary 15- or 20-ampere, 120-volt AC circuit at locations where construction, demolition, modifications, alterations, or excavations are being performed. ☐ Yes ☐ No ☐ NA
22. Electrical switches and breakers (rated 440 volts or greater) are provided with a means for locking them out in the OFF position. ☐ Yes ☐ No ☐ NA

Electrical Systems

23. Circuit breakers accessible to personnel are protected from physical damage, and located away from ignitable material. ☐ Yes ☐ No ☐ NA
24. Weatherproof cabinets or enclosures are used when switches, circuit breakers, fuse panels, and motor controllers are in a wet or outside location. ☐ Yes ☐ No ☐ NA
25. A readily accessible, manually operated switch is provided for each incoming service or supply circuit rated less than 5 kilovolts. ☐ Yes ☐ No ☐ NA
26. Electrical raceways and enclosures are securely fastened in place. ☐ Yes ☐ No ☐ NA
27. Overcurrent protection is provided for fuses or circuit breakers for each feeder and branch circuit. ☐ Yes ☐ No ☐ NA
28. Insulating fuse tongs or extractors are used when removing fuses from circuits rated 50 to 600 volts. ☐ Yes ☐ No ☐ NA
29. Fuse cabinets have close-fitting doors that can be locked. ☐ Yes ☐ No ☐ NA

Extension Cords

30. Clamps or other securing means are provided on flexible cords or cables at plug receptacles, tools, equipment, etc., and the cord jackets are securely held in place. ☐ Yes ☐ No ☐ NA
31. Flexible cords and cables are free of splices and taps. ☐ Yes ☐ No ☐ NA
32. Only 3-wire grounded-type extension cords, designated for hard or extra-hard service, are used. ☐ Yes ☐ No ☐ NA
33. Extension cords are listed by Underwriters Laboratories, Inc. ☐ Yes ☐ No ☐ NA
34. Extension cords are checked for damage before use. ☐ Yes ☐ No ☐ NA
35. The rated load on extension cords is not exceeded. ☐ Yes ☐ No ☐ NA
36. Extension cords are of adequate length and multiple cords are not connected together. ☐ Yes ☐ No ☐ NA
36. Extension cords are not fastened with staples, hung by nails, or suspended by wire. ☐ Yes ☐ No ☐ NA

Temporary Wiring

37. Temporary wiring is guarded, buried, or isolated by elevation to prevent accidental contact by workers and equipment. ☐ Yes ☐ No ☐ NA
38. A vertical clearance above walkways for temporary wiring is not less than 10 feet (3 meters) from circuits carrying 600 volts or less. ☐ Yes ☐ No ☐ NA

- | | | | | |
|-----|--|------------------------------|-----------------------------|-----------------------------|
| 39. | All exposed temporary wiring is supported on insulators. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 40. | Temporary wiring is protected from accidental damage. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 41. | Nonconductive lamp sockets and connections are permanently molded to the conductor insulation on lighting strings. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 42. | Lighting strings have lamp guards. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 43. | Broken or defective bulbs are replaced promptly. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 44. | Lights are protected from accidental contact or breakage. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 45. | Wiring installed in conduit is equipped with bushings at outlets and terminals. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 46. | Receptacles are of the grounding type, and electrically connected to the equipment-grounding conductor. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |

Worker Practices

- | | | | | |
|-----|--|------------------------------|-----------------------------|-----------------------------|
| 47. | Personnel performing electrical repairs are properly trained and qualified. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 48. | Workers de-energize, ground, or guard electrical circuits before working in close proximity to them. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 49. | Workers consider all electrical systems as live until verified de-energized and grounded. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 50. | Proper lockout/tag-out procedures are used for de-energizing electric circuits. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 51. | Arc flash protection protocols are in place for work on circuits of 50 volts or higher. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |

Equipment

- | | | | | |
|-----|---|------------------------------|-----------------------------|-----------------------------|
| 52. | Only fiberglass or wood ladders are used when working near electrical hazards. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 53. | Insulation mats are placed on floors and on frames of equipment when working on energized equipment. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 54. | Only voltage-rated tools are used on or near live circuits. Voltage rating is appropriate for the work being performed. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |

Personal Protective Equipment

- | | | | | |
|-----|--|------------------------------|-----------------------------|-----------------------------|
| 55. | Rubber matting, blankets, insulated sleeves, and rubber gloves are inspected before use. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 56. | Workers use safety glasses and face shields during work activities where there is a reasonable probability of eye injury (and on systems with 50 or more volts). | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 57. | Workers wear arc flash protective clothing, hoods, face shields, and gloves when working on live circuits greater than 50 volts (per NFPA 70E or CSA Z462). | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |

COMMENTS:

1.0 Purpose

- 1.1 The purpose of this attachment to *S3AM-302-PR1 Electrical Safety* is to confirm that all live electrical work conducted under the control of AECOM personnel is carried out in accordance with legislation and recognized best practices in order to provide adequate protection to workers from potential arc flash and / or electrical shock.

2.0 Definitions

- 2.1 **Arc Rating** – The maximum incident energy resistance demonstrated by a material prior to breakdown or at the onset of a second-degree skin burn (expressed in cal / cm²).
- 2.2 **Flash Hazard** – A dangerous situation associated with the release of energy caused by an electric arc.
- 2.3 **Energized Electrical Equipment** – Electrically connected to or having a source of voltage.
- 2.4 **Shock Hazard** – A dangerous situation associated with the possible release of energy caused by contact or approach to live parts.

3.0 Responsibilities

3.1 Manager

- 3.1.1 Be familiar with all precautions and Federal and State / Provincial regulations and Best Practices.
- 3.1.2 Provide training on this Work Instruction to Qualified Persons covering:
- Nature and control of known shock and arc flash hazards.
 - Means of eliminating and controlling shock and arc flash hazards.
 - Special electrical personal protective equipment (PPE) requirements (task specific).
 - Procedure for reporting any deviations to this Work Instruction.
- 3.1.3 Confirm employees are provided with safe access to the work area.
- 3.1.4 Control access to energized electrical equipment with potential of shock or arc flash to Qualified Persons only.
- 3.1.5 Confirm availability of proper tools for the operation and maintenance of electrical equipment.
- 3.1.6 Proper identification and guarding of potentially hazardous electrical equipment.
- 3.1.7 Providing available electrical one-line diagrams.
- 3.1.8 Confirm proper housekeeping around energized electrical equipment at all times.
- 3.1.9 Provide proper working conditions, including adequate lighting, to facilitate work in a safe environment.
- 3.1.10 Provide proper supervision of employees.
- 3.1.11 Maintaining a list of authorized electrical supervisor, Qualified Person(s), and attendant.
- 3.1.12 Implementation an ongoing evaluation of this Best Management Practice.
- 3.1.13 Terminate the work and cancel the permit when live work has been completed or any new electrical hazard arises.
- 3.1.14 Verify that communication modes are available and have been tested.

- 3.1.15 Remove unauthorized individuals who enter or who attempt to enter the approach boundaries during live work.
- 3.1.16 Confirm that live work remains consistent with terms of the live work permit and that acceptable working conditions are maintained.
- 3.1.17 Withdraw the live work permit and stop all work if unsafe conditions are reported during any live work (e.g. sparking, smoldering etc.). Do not permit work on that equipment until the cause of any unsafe condition is thoroughly investigated and the live work procedure has been reviewed to prevent reoccurrence.

3.2 **Authorized Electrical Attendant**

- 3.2.1 Practice all precautions and Federal and State / Provincial regulations and Best Practices.
- 3.2.2 Understand the hazards that may be faced during live work, including the potential for arc flash, shock hazard, and other related hazards.
- 3.2.3 Be aware of the potential of arc flash or shock possible to the Qualified Persons.
- 3.2.4 Maintain an accurate count of Qualified Persons working near the live equipment or inside approach boundaries.
- 3.2.5 Remain near the approach boundary until relieved by another authorized electrical attendant.
- 3.2.6 Communicate with Qualified Persons as necessary to confirm maintenance of safe conditions at all times.
- 3.2.7 Monitor activities inside and outside the approach zone to determine if it is safe for the worker to continue to remain in the approach zone. Order the Qualified Persons to stop live work under any of the following conditions:
 - The attendant detects a problem;
 - The attendant detects the signs of short-circuiting, such as electrical sparking, smoldering, or any other abnormality;
 - The attendant detects a situation outside the approach zone that could endanger the worker; and
 - If the attendant cannot effectively and safely perform all assigned duties.
- 3.2.8 Perform no other duties that might interfere with the attendant's primary duty to monitor and protect the Qualified Persons.

3.3 **Qualified Persons (Authorized Electrical Worker)**

- 3.3.1 Perform all work in accordance with Federal and State / Provincial regulations, AECOM policies and procedures, and this work instruction.
- 3.3.2 Be continuously alert, focused, and aware of the hazards of performing the task.
- 3.3.3 Understand AECOM Safety, Health and Environmental policies and standards as well as site-specific electrical safe work practices.
- 3.3.4 Examine and understand all the documents provided by AECOM and manufacturers, including all specific hazards, advisories, cautions, etc.
- 3.3.5 Be knowledgeable of the use and selection of the proper tools to safely perform the electrical task safely.
- 3.3.6 Complete a Safe Work Plan prior to the start of a task and during work, if conditions change.
- 3.3.7 Maintain good housekeeping around work areas. Remove all debris, materials, etc., at the completion of tasks.
- 3.3.8 Report any hazardous (uncontrolled) conditions to AECOM's authorized supervisor.

- 3.3.9 Understand the hazards that may be faced during live work, including arc flash, shock, or other electrical hazards.
- 3.3.10 Properly inspect prior to use, and properly use required PPE and electrical tools as specified in this work instruction and the applicable SH&E Plan.
- 3.3.11 Communicate with the authorized electrical attendant as necessary.
- 3.3.12 Alert the attendant whenever any abnormality occurs (e.g., sparking, minor shock, burning smell, etc.) or symptoms of unsafe conditions are observed.
- 3.3.13 Stop all work and exit from the approach zone whenever:
 - An order to evacuate is given by the authorized electrical attendant or the authorized supervisor; or
 - When the worker observes any warning sign or symptom of short circuiting or a dangerous situation; or
 - When the supervisor gives an order to stop work.

4.0 Multi-employer Live Electrical Work Coordination

4.1 AECOM will:

- Inform the contractor that the workplace contains shock and / or arc flash potential and that live work is allowed only through compliance with a live work permit program meeting the requirements of the applicable Federal and State / Provincial legislation.
- Appraise the contractor of the elements of the work, including the hazards identified and all past experiences with the live work that make the live work hazardous.
- Appraise the contractor of any precautions or procedures that have been implemented for the protection of employees in the approach zone where contractor personnel will be working.
- Prior to work commencing, coordinate live work operations with the contractor when both AECOM employees and contractor employees will be working in or near approach zone, so that employees of AECOM and the contractor do not endanger each other.
- Debrief the contractor at the conclusion of the live work operations.

4.2 **Contractor Requirements** – In addition to complying with the live work permit requirements, each contractor who is retained to perform live electrical work will:

- Obtain any available information regarding live work from the Manager.
- Coordinate live work operations with the Manager when both AECOM personnel and contractor personnel will be jointly working in or near the approach zone.
- Practice work in accordance with Federal and State / Provincial regulations and industry best practices.
- Inform AECOM's Manager of the live work permit that the contractor will be using and of any hazards confronted or created during live work, either through debriefing or during live work.

5.0 Required Minimum Qualifications

5.1 All electrical work including instrumentation, installations, maintenance, troubleshooting, calibration, and operation of breakers will only be conducted by qualified, trained, and skilled personnel (this includes AECOM personnel and contractors / subcontractors). These personnel will meet all qualification requirements mandated by the Federal / State / Provincial regulations as well as applicable electrical associations and trade bodies (e.g., NFPA 70E – refresher training in safety related practices and any changes to the NFPA standard shall be completed at intervals not exceeding three years).

5.2 The Manager, in consultation with the Safety, Health and Environment (SH&E) Department, will determine

the minimum qualifications requirements for any work with the potential for arc flash.

6.0 Working on or Near Electrical Conductors of Circuit Parts

- 6.1 Safe work practices shall be used to safeguard employees from injury when working on or near exposed electric conductors or circuit parts that can be energized.
- Live Parts – Safe Work Conditions: Live parts to which an employee might be exposed shall be put into an electrically safe work condition before an employee works on or near them.
 - Live Parts – Unsafe Work Conditions: Only qualified persons shall be permitted to work on electrical conductors or circuit parts that have not been put into electrically safe conditions.
- 6.2 Working on or near exposed electrical conductors OR circuit parts that are, or might become, energized – Prior to working on or near exposed electrical conductors and circuit parts operating at 50 volts or more, lockout / tagout devices shall be applied in accordance with AECOM and site-specific policies.
- 6.3 Electrical Hazard Analysis – If the live parts operating at 50 volts or more are not placed in electrically safe condition, other safety-related work practices shall be used to protect employees who might be exposed to electrical hazards. Safe work practices mentioned below shall be established before any person approaches exposed live parts within limited approach boundary:
- 6.3.1 Shock Hazard Analysis – A shock hazard analysis shall determine the voltage to which personnel will be exposed, boundary requirements, and the PPE necessary in order to minimize the possibility of electrical shock.
- 6.3.2 Flash Hazard Analysis – A flash hazard analysis shall be done in order to protect personnel from the possibility of being injured by an arc flash. The analysis shall determine the flash protection boundary and the PPE that people within the flash protection boundary shall use.

7.0 Shock Hazard Analysis and Approach Boundaries

- 7.1 A comprehensive Shock Hazard Analysis Survey is the method used to:
- 7.1.1 Systematically analyze shock hazards,
 - 7.1.2 Identify approach boundaries, and
 - 7.1.3 Identify appropriate PPE.
- 7.2 Before permitting live work on electrical equipment, each project site having electrical equipment operating at more than 50 volts is required to conduct a Shock Hazard Analysis Survey. Upon completion of the survey, the applicable electrical areas / spaces will be labeled in accordance with survey results.
- 7.3 Shock hazard analysis for individual equipment is not required if a facility-wide shock hazard analysis has been conducted and if conditions (including labels and signage) are maintained at all times.
- NOTE: Only authorized personnel are allowed to work within the approach boundaries.*
- 7.4 No qualified person shall approach or take any conductive object closer to exposed live parts operating at 50 volts or more than the restricted approach boundary set forth in National Fire Protection Act (NFPA) 70-E.
- 7.5 In the absence of a facility-wide survey, a Shock Hazard Analysis (including the identification of approach boundaries) shall be conducted (see Appendix A-1 of this procedure) for all electrical equipment operating at over 50 volts.
- 7.6 Results of both facility-wide as well as individual Shock Hazard Analysis Survey shall be made available to all authorized employees, including Qualified Persons and Authorized Attendants. Additionally, any recommendations given by the survey generated from the survey shall be reviewed by the Manager and shall be addressed in a timely manner.

8.0 Arc Flash Hazard Analysis and Approach Boundaries

- 8.1 Arc flash safety requirements apply to all electrical equipment operating at 50 volts or more.
- 8.2 A comprehensive Arc Flash Hazard Analysis Survey is the method used to:
 - 8.2.1 Systematically analyze the potential for arc flash,
 - 8.2.2 Identify the limits of the approach, and
 - 8.2.3 Identify appropriate PPE (refer to appendix A-2).
- 8.3 Once a comprehensive facility Arc Flash Survey has been conducted and electrical work areas / spaces are labeled in accordance with survey results, an individual Arc Flash Hazard Analysis is not required, provided that qualified personnel confirm that the conditions, as indicated on the labels and signs, are maintained.

NOTE: Only authorized personnel are allowed to work within the limits of approach.
- 8.4 Please refer to NFPA 70-E for details.
- 8.5 Prior to performing any work on energized electrical systems, an Arc Flash Hazard Analysis (including the identification of approach boundaries) will be conducted.

9.0 Required PPE Categorized by Exposure

- 9.1 Employees shall be provided specialized PPE appropriate to the voltage that may be encountered.
- 9.2 The following specialized PPE requirements will be used while working on energized electrical systems. PPE appropriate to the voltage that may be encountered:
 - 9.2.1 As prescribed by the shock hazard analysis and arc flash analysis; or
 - 9.2.2 As identified in the location or project specific SH&E Plan.
- 9.3 All PPE (e.g. arc rated clothing, insulated gloves, leather covers, etc.) shall be visually inspected prior to issue, prior to each use, according to manufacturer specifications, and if suspected of damage.
- 9.4 Damaged or defective PPE shall be immediately removed from service.

10.0 Required Tools and Equipment

- 10.1 Employees shall be provided tools and testing or protective equipment approved by ANSI / ASTM / CSA for the relevant voltage rating to be used when working on energized electrical systems.
- 10.2 All tools and testing or protective equipment (e.g. sleeves, blankets, hot sticks, etc.) shall be visually inspected and tested prior to use, and as appropriate, according to regulatory requirements (e.g., as per NFPA 70E sleeves / blankets every 12 months, gloves every 6 months, etc.), according to manufacturer's specifications, specific to task (e.g., testing for absence of voltage, equipment function must be verified using a known voltage source before and after absence of voltage test), and if suspected of damage (e.g., after an incident), to confirm that the protection systems associated with the tool or equipment are not damaged or impaired and that diagnostic meters and tools are configured properly.
- 10.3 Tested equipment shall be marked in a manner to identify either the most current test date or the next date testing is due.
- 10.4 Any tool or testing or protective equipment suspected of being compromised will be immediately taken out of service and will be tagged for disposal.

11.0 Work on Energized Electrical Systems

- 11.1 All electrical maintenance or troubleshooting will be done on de-energized circuits, to the extent practical. Work on energized circuits can only be done under special circumstances using a "Live Work Permit" issued

by an authorized electrical supervisor. This permit takes into consideration the voltage levels, known electrical hazards, communication requirements, insulated tool requirements, and need for watch persons, etc. The following procedure will be observed for a live work permit:

- 11.1.1 The person requesting the work (Qualified Person) will complete the permit and will retain the original with him or her during the work. Copy of the permit will be displayed at a prominent location in the control room as a notice that live work has been authorized in certain part of the plant / project.
 - 11.1.2 Permit will be reviewed for correctness, proper safety precautions, and adequacy of controls by the authorized electrical supervisor. After satisfying all safety requirements, an authorized electrical supervisor will sign the permit and will give the original copy to the Qualified Person.
 - 11.1.3 Upon work completion, the Qualified Person will note any observation on the permit and will return the original to the authorized supervisor.
 - 11.1.4 Authorized supervisor will keep both copies of the permit as a controlled record for a period of 12 months.
- 11.2 The following conditions will be met for live electrical work:
- 11.2.1 If a qualified person is working in the vicinity of live electrical line, including overhead lines, whether in an elevated position or on the ground, the person may not approach or take any conductive object without an approved insulating handle closer to exposed energized parts than shown in the below table (or as specified by the applicable jurisdiction) unless:
 - The qualified person is insulated from the energized part (gloves, with sleeves if necessary, rated for the voltage involved are considered to be insulation of the person from the energized part on which work is performed), or
 - The energized part is insulated both from all other conductive objects at a different potential and from the person, or
 - The person is insulated from all conductive objects at a potential different from that of the energized part.

APPROACH DISTANCES FOR QUALIFIED EMPLOYEES - ALTERNATING CURRENT

300V and less	Avoid Contact
Over 300V, not over 750V	1 ft. 0 in. (30.5 cm)
Over 750V, not over 2kV	1 ft. 6 in. (46 cm)
Over 2kV, not over 15kV	2 ft. 0 in. (61 cm)
Over 15kV, not over 37kV	3 ft. 0 in. (91 cm)
Over 37kV, not over 87.5kV	3 ft. 6 in. (107 cm)
Over 87.5kV, not over 121kV	4 ft. 0 in. (122 cm)
Over 121kV, not over 140kV	4 ft. 6 in. (137 cm)

- 11.2.2 If any equipment or instrumentation is to be disabled while other related components or systems are still functioning, the Live Work Permit should record how process safety of the remaining systems will be maintained.
 - 11.2.3 All electrical and instrumentation work conducted will be recorded in the applicable MCC log. The documentation will include a reference to the permit number where appropriate.
 - 11.2.4 The worker will inform the operations supervisor that he or she intends to de-energize a circuit. He or she will also inform the operations supervisor when the work is complete and that the system can be returned to service.
- 11.3 See *S3AM-302-FM1 Energized Electrical Work Permit* for a suggested template for a "Live Work Permit."

12.0 Lockout / Tagout Policy and Procedures

- 12.1 All equipment will be locked out prior to any work commencing in accordance with AECOM's procedure *S3AM-410-PR1 Hazardous Energy Control* and applicable site-specific lockout / tagout program.

13.0 Troubleshooting Procedure

- 13.1 The troubleshooting of electrical equipment often requires working with live circuits. Where possible, work will be done on de-energized circuits following the relevant AECOM and site-specific lockout / tagout policy. However, troubleshooting may require limited work on live circuits; if such work is required it will be done using the "Live Work Permit" and site-specific Troubleshooting Guidelines.

14.0 Housekeeping

- 14.1 All areas containing electrical equipment will:
- 14.1.1 Be maintained and kept clean.
 - 14.1.2 Be well illuminated.
 - 14.1.3 Not be used for storage of supplies.
 - 14.1.4 Not be used for the storage of any flammable materials.
 - 14.1.5 Be assessed for safety hazards.
 - 14.1.6 Be suitably ventilated to control dust, temperature, and humidity.

15.0 Communication

- 15.1 Personnel working in or around equipment with electrical hazards will employ a suitable means of communication to confirm their safety.
- 15.2 The means of communication may include:
- 15.2.1 Authorized attendant (required for ALL live work conducted on 600 volts and above).
 - 15.2.2 Permits.
 - 15.2.3 Two-way radios.

16.0 Signage and Labels

- 16.1 Motor Control Center (MCC), Electric Contact Relay (ECR) battery rooms, and electrical panels are required to have the following labeling to identify arc flash and shock hazards. The information on the label will include:
- 16.1.1 Flash Hazard Boundary (Arc Flash Current);
 - 16.1.2 Flash Hazard at 18 inches in cal / cm² or joules;
 - 16.1.3 PPE Category;
 - 16.1.4 Shock Hazards;
 - 16.1.5 Limited Approach Boundaries;
 - 16.1.6 Restricted Approach;
 - 16.1.7 Prohibited Approach; and
 - 16.1.8 Log book to record all electrically related activities.
- 16.2 All doorways to buildings and enclosures containing energized electrical equipment will be signed to indicate that:

- 16.2.1 Access is restricted to authorized personnel only; and
- 16.2.2 Electrical hazards exist beyond this (boundary, door, etc.).

APPENDIX A-1

NFPA 70-E Approach Boundaries to Live Parts for Shock Protection

(All dimensions are distance from live part to employee.)

Nominal Voltage Range (Phase to Phase)	Limited Approach Boundary	Exposed Fixed Circuit Parts	Restricted Approach Boundary; includes inadvertent movement adder	Prohibited Approach Boundary
	Exposed Moveable Conductor			
Up to 50 Volts	Not Specified	Not Specified	Not Specified	Not Specified
50-300	10 feet	3.5 feet	Avoid Contact	Avoid Contact
300-750	10 feet	3.5 feet	1 foot	1 inch
More than 750 volts	Consult a Master Electrician, High Voltage Electrician or other authorized electrician.			

APPENDIX A-2

NFPA 70-E Protective Clothing and Personal Protective Equipment (PPE) Matrix

Protective Clothing Characteristics

PPE Category	Clothing Description (Typical number of clothing layers is given in parentheses)	Required Minimum Arc Rating of PPE [(J/cm ² (cal/cm ²)]
1	Arc rated shirt and pants or coverall (1)	16.74 (4)
2	Cotton underwear – conventional short sleeve and brief / shorts, plus FR shirt and FR pants (1 or 2)	33.47 (8)
3	Cotton underwear plus FR shirt and FR pants plus FR coverall, or cotton underwear plus two FR coveralls (2 or 3)	104.6 (25)
4	Cotton underwear plus FR shirt and FR pants plus multilayer flash suit (3 or more)	167.36 (40)

NOTE:

Arc rating: Arc rating is defined in Article 100 and can be either ATPV or E_{BT}.

ATPV: ATPV is defined in ASTM F 1959-99 as the incident energy on a fabric or material that results in sufficient heat transfer through the fabric or material to cause the onset of a second-degree burn based on the Stoll curve.

E_{BT}: E_{BT} is defined in ASTM F 1959-99 as the average of the five highest incident energy exposure values below the Stoll curve where the specimens do not exhibit breakopen. E_{BT} is reported when ATPV cannot be measured due to FR fabric breakopen.

Generator Safety

S3AM-302-ATT2

1.0 Objective/Overview

- 1.1 Portable generators should be used with extreme caution in order to prevent personal injury. When using a portable generator it is important to follow the manufacturer's instructions to avoid injuring someone or damaging your generator or appliances.
- 1.2 Allow only trained, authorized personnel to operate the generator. Along with training, consider the need for other safety measures, including proper maintenance of equipment and personal protective equipment (PPE). It is important to note that muscle strains are the most common injury associated with portable generators.

2.0 Safe Operating Guidelines

- 2.1 Follow manufacturer's recommended operating instructions; every generator is not the same.
- 2.2 Maintain adequate ventilation. Generators emit carbon monoxide (CO). Never operate a generator in an enclosed building without proper ventilation.
- 2.3 Turn the generator off and allow it to cool prior to re-fueling. Gasoline and its vapors may ignite if they come into contact with hot components or an electrical spark.
- 2.4 Gasoline shall only be stored and dispensed to portable generators using a UL/FM approved safety can of 5 gallons (19 liters) or less. No smoking or open flames within 50 feet (15.24 meters) of the refueling area is permitted.
- 2.5 To avoid a shock, make sure that your hands are dry and that you are standing in a dry place whenever you operate the generator.
- 2.6 Turn off equipment and lights supplied by the generator until it is running.
- 2.7 Use the right extension cord. Use only UL-listed, three-prong extension cords. Be sure the extension cord is the proper size (wire-gauge) to handle the electric load that will be plugged into it.
- 2.8 Ensure the generator is properly grounded prior to each use.
- 2.9 Using a portable generator to tie into the wiring of an existing structure shall be done only by a licensed electrician.

2.9.1 Potential Hazards include:

- Lifting, carrying, and pulling starter cords;
- Burns from contact with the hot muffler or engine;
- Shocks/electrocution;
- Noise exposure; and
- Inhaling exhaust gases, CO.

2.9.2 Training Requirements include:

- Review of applicable standard operating procedures;
- Back Injury Prevention;
- Demonstrated knowledge on the use of a generator; and
- Review of manufacturers operating guidelines.

2.9.3 Level D PPE include:

- Leather Gloves;
- Hearing Protection; and
- FR or non-synthetic clothing when a fire hazard is present.

2.9.4 Other Safety Tips include:

- Have a Class A:B:C fire extinguisher readily available at all times.

Hand & Power Tools

S3AM-305-PR1

1.0 Purpose and Scope

- 1.1 This procedure provides the AECOM requirements for all manually operated hand and power tools and associated use, handling and storage. These requirements apply to tools provided by AECOM for employee use as well as tools provided by employees for use on AECOM work sites.
- 1.2 This procedure applies to all AECOM Americas-based employees and operations.

2.0 Terms and Definitions

- 2.1 None

3.0 References

- 3.1 S3AM-003-PR1 SH&E Training
- 3.2 S3AM-118-PR1 Hearing Conservation
- 3.3 S3AM-208-PR1 Personal Protective Equipment
- 3.4 S3AM-302-PR1 Electrical Safety
- 3.5 S3AM-325-PR1 Lockout Tagout

4.0 Procedure

4.1 Roles and Responsibilities

4.1.1 Managers/Supervisors

- Ensure that all aspects of this procedure are followed and adhered to on all AECOM projects, sites and locations.
- If a specific tool is not included in the work instructions related to this procedure, appropriate guidelines shall be established prior to work associated with that tool, including following manufacturer's recommendations.
- Ensure compliance with applicable client requirements and restrictions regarding hand or power tools.

4.1.2 Safety, Health and Environment (SH&E) Manager

- Provide technical guidance and support as to this procedure and associated work instructions.

4.1.3 Employees

- Work only with tools for which they are appropriately trained and familiar with.
- Follow manufacturer's recommendations for its use and never modify the equipment without first obtaining authorization from the manufacturer.
- Comply with applicable client requirements and restrictions regarding hand or power tools.

4.2 Requirements

- 4.2.1 Always conduct a task hazard assessment (THA) prior to work commencing and include the identified hazards associated with the anticipated tool use.
- 4.2.2 No employee shall use any hand or power tool, unless they are familiar with the use and operation of the equipment or have received specific instruction on its use and operation.

- 4.2.3 All tools will be used for which they were designed and in accordance with manufacturer's specifications. Do not use tools for jobs they are not intended for. For example, do not use a slot screw driver as a chisel, pry bar, wedge or punch or wrenches as hammers.
- 4.2.4 Use approved tools only. Never modify or use makeshift tools.
- 4.2.5 Do not apply excessive force or pressure on tools unless permitted by the manufacturer's specifications. This includes additional force by hammering with body weight, foot or other tools.
- 4.2.6 Keep surfaces and handles clean and free of excess oil and grease to prevent slipping.
- 4.2.7 Do not carry sharp tools (e.g. knife, chisel, screwdriver, etc.) in pockets; this practice may cause puncture wounds.
- 4.2.8 All tools shall be properly maintained. Clean, dry, lubricate and repair tools as applicable, and return to a suitable toolbox, room, rack, or other storage area upon completion of a job.
- 4.2.9 Ensure proper ergonomics principles are observed when using hand and power tools, such as but not limited to:
 - Avoid static and awkward positions when possible.
 - Move at intervals to reduce muscle fatigue.
 - Consider tools with a trigger strip, rather than a trigger button. This strip will allow the exertion of more force over a greater area of the hand that, in turn, will reduce muscle fatigue
 - Do not apply excessive force or pressure on tools.
 - If possible use tools with comfortable grips that are designed to allow the wrist to stay straight. Avoid using a bent wrist.
 - Choose hand tools that have a centre of gravity within or close to the handle.
 - Frequently used tools that weigh more than 1 pound (0.45 kilograms) should be counter-balanced.
 - Ensure proper body positioning when using a tool to prevent slips or falls in the event of unanticipated tool behaviour (slip, kickback, etc.). Avoid over-reaching.
 - Pull on tools such as a wrench or pliers whenever possible. Loss of balance is more likely when pushing if the tool slips. If pushing is necessary, hold the tool with an open palm.
 - Hand-arm vibration exposure is associated with the use of hand tools.
 - Reduce power to the lowest setting that can complete the job safely. This action reduces tool vibration at the source.
 - Consider the need for controls such as limiting time of use.
 - If safe to do so, adjust to a looser but stable grip, and use anti-vibration gloves.
 - Use of heavy tools such as jackhammers can cause fatigue and strains. Heavy rubber grips can reduce these effects by providing a secure handhold.
 - Do not increase a tool's leverage by adding sleeved additions (e.g. a pipe or snipe) to increase tool handle length.
- 4.2.10 Avoid placing fingers and hands in danger zones:
 - Ensure hands and fingers have sufficient clearance in the event the tool slips.
 - Ensure stability of the work-piece. Use work-piece holders (e.g. vise, chisel holder, etc.) whenever possible to prevent injury to hands or deflection of tool or work-piece.
 - Use push sticks or guides when cutting or machining smaller material.

- 4.2.11 Secure tools when working from heights to prevent them from falling. Never leave tools on ladders, scaffolds, or overhead work areas when they are not in use.
- 4.2.12 Utilize good housekeeping practices to ensure tools do not present a tripping hazard.
- 4.2.13 Ensure no part of a tool extends over the edge of the bench top. Place sharp tools (e.g., saws, chisels, knives) on benches so that sharp points or edges face away from the edge.
- 4.2.14 When using saw blades, knives, or other tools, if possible direct the tools away from aisle areas and away from other employees working in close proximity.
- 4.2.15 Do not throw tools from place to place or from person to person, or drop tools from heights. Hand them, handle first, directly to other workers.
- 4.2.16 Use non-sparking and intrinsically safe tools in atmospheres with flammable or explosive characteristics and where highly volatile liquids, and other explosive substances are stored or used.
 - Iron or steel hand tools may produce sparks that can be an ignition source around flammable substances. Where this hazard exists, spark-resistant tools made of non-ferrous materials shall be used.
 - Electrical tools shall be identified as intrinsically safe.
- 4.2.17 If the task presents electrical hazards, worker must be competent and use the appropriate insulated tools to perform work that includes the risk of electrical shock. Cushioned grip handles do not protect against electrical shock.
- 4.2.18 The fluid used in hydraulic power tools must be an approved fire-resistant fluid and must retain its operating characteristics at the most extreme temperatures to which it will be exposed. The exception to fire-resistant fluid involves all hydraulic fluids used for the insulated sections of derrick trucks, aerial lifts, and hydraulic tools that are used on or around energized lines. This hydraulic fluid shall be of the insulating type.
- 4.2.19 All tools designed to accommodate guards must have the guard(s) in place when the tool is in use. Do not modify, remove, or disable any machine guards.
- 4.2.20 Do not allow loose clothing, long hair, loose jewelry, rings, and chains to be worn while working with power tools.
- 4.2.21 Make provisions to prevent tools from automatically restarting upon restoration of power. Refer to *S3AM-325-PR Lockout Tagout*.
- 4.3 Training
 - 4.3.1 Instruction in the proper use, safe handling, and maintenance of tools will be provided to employees unfamiliar with the tool.
 - Assess the employee's training needs as per *S3AM-003-PR1 SH&E Training* procedure.
 - Refer to the applicable work instructions associated with this procedure for any additional training specifics.
 - Training shall include applicable manufacturer's recommendations and guidelines.
 - 4.3.2 Employees shall demonstrate knowledge and competency in the use, safe handling and maintenance of the applicable tool prior to operation.
- 4.4 Personal Protective Equipment (PPE)
 - 4.4.1 Utilize basic PPE appropriate to the task; gloves, safety-toed boots, hard hats and safety glasses with side shields. Refer to *S3AM-208-PR1 Personal Protective Equipment*.
 - 4.4.2 Ensure lockout devices (padlocks, multiple lock hasps, tags) are utilized as necessary. Refer to *S3AM-325-PR Lockout Tagout*.

- 4.4.3 Ensure PPE is appropriate to the work and use additional PPE as required (e.g. mono-goggles, hearing protection, respiratory protection, etc.).
- Dual eye protection is required to be worn by any employee undertaking or within 3 ½ feet (1 meter) of a task that produces projected particles or material.
 - Head and face protection is recommended for employees working with pneumatic tools.
 - Noise hazard is associated with pneumatic and many other tools. Working with noisy tools such as jackhammers requires proper, effective use of appropriate hearing protection.
- 4.4.4 Screens shall also be set up to protect nearby workers from being struck by flying fragments around chippers, riveting guns, staplers, or air drills.
- 4.4.5 Refer to the applicable work instructions associated with this procedure for any additional specialized PPE.
- 4.5 Inspections
- 4.5.1 All tools must be inspected prior to each use.
- Any tool that is defective or has missing parts must not be used.
 - Every broken or defective tool must be tagged 'out of service' or 'do not use' and immediately removed from service.
 - Tagged tools will be returned to the supervisor for repair or replacement.
- 4.5.2 All tools must be inspected to manufacture's specifications and according to tool rests and guard adjustment tolerances. All tools will be inspected to ascertain that all safety devices are present and functioning properly. Refer to *S3AM-305-FM1 Hand & Power Tool Maintenance Inventory* and *S3AM-305-FM2 Hand & Power Tool Inspection Report*.

5.0 Records

- 5.1 None

6.0 Attachments

- 6.1 [S3AM-305-ATT1 Chainsaw](#)
- 6.2 [S3AM-305-ATT2 Circular Saw](#)
- 6.3 [S3AM-305-ATT3 Cut Off Saw](#)
- 6.4 [S3AM-305-ATT4 Handheld Grinder](#)
- 6.5 [S3AM-305-ATT5 Impact Wrench](#)
- 6.6 [S3AM-305-ATT6 Nail Gun](#)
- 6.7 [S3AM-305-ATT7 Dustless Vacuum](#)
- 6.8 [S3AM-305-ATT8 Power Drill](#)
- 6.9 [S3AM-305-ATT9 Pressure Washer](#)
- 6.10 [S3AM-305-ATT10 Reciprocating Saw](#)
- 6.11 [S3AM-305-ATT11 Sander](#)
- 6.12 [S3AM-305-ATT12 Knives](#)

- 6.13 [S3AM-305-ATT13 Clearing & Grubbing Equipment](#)
- 6.14 [S3AM-305-ATT14 Pneumatic Tools](#)
- 6.15 [S3AM-305-ATT15 Manual Hand Tools](#)
- 6.16 [S3AM-305-ATT16 Small Engines](#)
- 6.17 [S3AM-305-ATT17 Electric & Battery Hand Tools](#)
- 6.18 [S3AM-305-FM1 Hand & Power Tool Maintenance Inventory](#)
- 6.19 [S3AM-305-FM2 Hand & Power Tool Inspection Report](#)

Chainsaw

S3AM-305-ATT1

1.0 Objective / Overview

- 1.1 Available in a variety of types and capacities, chainsaws are one of the most powerful, yet dangerous cutting tools available.
- 1.2 Working safely with a chain saw includes proper training, good body mechanics and felling technique, well-maintained equipment, and protective clothing.

2.0 Hazards

- 2.1 Improper operation (kickback – sudden and violent reverse movement of the saw)
- 2.2 Hand/arm vibration
- 2.3 Noise
- 2.4 Flying/falling debris
- 2.5 Sharp, moving blade
- 2.6 Defective tool

3.0 Safe Operating Guidelines

- 3.1 Only approved operators are permitted to operate a chainsaw.
- 3.2 Review manufacturer's operating manual, *S3AM-305-PR1 Hand & Power Tools*, and *S3AM-305-ATT16 Small Engines* for additional guidelines.
- 3.3 Inspect saws prior to use and periodically during use:
 - 3.3.1 A sharp chainsaw is safer than a dull one. Worn chains shall be replaced immediately.
 - 3.3.2 Keep the saw clean, lubricated, and adjusted.
 - 3.3.3 Inspect and test the chain brake, chain catch, throttle lock, handles and guards, all nuts and bolts, spark arrestor, and muffler and air filter.
 - 3.3.4 The chain tension should be properly adjusted and the carburetor tuned. The idle must be correctly adjusted; the chain should not move when the saw is in the idle mode.
 - 3.3.5 Ensure the saw is fitted with an inertia break and hand guard.
 - 3.3.6 Ensure the saw is fueled with the appropriate fuel type.
 - 3.3.7 Do not operate a chain saw that is damaged or improperly adjusted, or is not completely and securely assembled. If a chainsaw is defective, remove it from service, and tag it clearly "Out of service for repair" or "Do Not Use". Replace damaged equipment immediately – do not use defective tools "temporarily." DO NOT ATTEMPT FIELD REPAIRS.
- 3.4 Never "drop start" the saw (the saw is held in the air with one hand on the handlebar and the other on the pull cord) as no control is provided to prevent rotation of the saw back toward the user.
- 3.5 Ensure an appropriately sized fire extinguisher or fire-fighting equipment is readily available.
- 3.6 A chainsaw is not only dangerous to the operator but also to surrounding persons. Do not allow others in the area when chainsaws are operated.
- 3.7 Never operate a chain saw when fatigued.

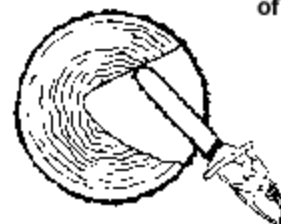
- 3.8 Make sure there are no nails, wire, or other imbedded material in the material to be cut that can cause flying particles or kickback.
- 3.9 Keep all parts of the body away from the saw chain when the engine is running.
 - 3.9.1 Keep the saw close to the body.
 - 3.9.2 Bend from the knees, not the waist. Improper lifting techniques and poor posture contribute to injuries.
 - 3.9.3 Always avoid standing on the log and making cuts with the saw between your legs; always cut with the saw to the outside of your legs.
 - 3.9.4 Always stand to one side of the limb to be cut, never straddle it.
 - 3.9.5 Never cut above chest height.
- 3.10 Determine where the tree/limb will fall prior to cutting.
 - 3.10.1 Start cutting only after a clear escape path has been made.
 - 3.10.2 Always ensure that personnel and equipment are not in the path of the falling tree/log, and that you have time to move away.
 - 3.10.3 If necessary, flag/or fence off the area to prevent entry.
- 3.11 Always keep in mind where the chain will go if it breaks; never position body or allow others in line with the chain.
- 3.12 Avoid operations that could result in kickback of the saw towards the operator.
- 3.13 Keep the chain out of the dirt, debris will fly, the teeth will be dulled and the chain life shortened.
- 3.14 Shut the saw off when carrying through brush or on slippery surfaces. The saw may be carried no more than 50 feet (15 meters) while idling.



Blade nose strikes another object



Improper starting of bore



Top or blade nose touches bottom or side of kerf during reinsertion

4.0 Personal Protective Equipment

- 4.1 Dual eye protection – safety glasses with side shields and a face shield
- 4.2 Chainsaw Chaps
- 4.3 Wear appropriate apparel. Long hair, loose or baggy clothing, ties, or jewellery can become caught in moving parts.
- 4.4 Safety toe work boots
- 4.5 Hardhat with lateral impact protection
- 4.6 Gloves providing impact, abrasion, cut, tear, & puncture resistance
- 4.7 Hearing Protection

Americas

Circular Saw

S3AM-305-ATT2

1.0 Objective / Overview

- 1.1 The circular saw is used in cutting wood products (e.g. plywood, construction lumber, etc.).
- 1.2 Safe measures for use include proper training, good body mechanics and operating technique, well-maintained equipment, and protective equipment.

2.0 Hazards

- 2.1 Kickback – Sudden and violent reverse movement of the saw
- 2.2 Noise
- 2.3 Flying debris
- 2.4 Sharp, moving blade (severe cuts)
- 2.5 Defective tool
- 2.6 Improper operation



3.0 Safe Operating Guidelines

- 3.1 Review manufacturer's operating manual, *S3AM-305-PR1 Hand & Power Tools*, and *S3AM-305-ATT17 Electric & Battery Hand Tools* for additional guidelines.
- 3.2 Use sharp blades and ensure cracked and dull blades are removed from service. Dull blades cause binding, stalling and possible kickback.
- 3.3 Use the correct blade for the application and check for proper operation before each cut.
- 3.4 Check often to ensure that guards return to their normal position quickly. Never defeat the guard to expose the blade.
- 3.5 Portable circular saws having a blade greater than 2 inches (5.08 centimeters) in diameter must be equipped at all times with guards. An upper guard must cover the entire blade of the saw.
- 3.6 A retractable lower guard must cover the teeth of the saw, except where it makes contact with the work material. The lower guard must automatically return to the covering position when the tool is withdrawn from the work position.
- 3.7 Before starting a circular saw, be sure the power cord and extension cords are out of the blade path and are long enough to freely complete the cut. A sudden jerk or pulling on the cord can cause loss of control of the saw and a serious accident.
- 3.8 Secure the work being cut to avoid movement.
- 3.9 For maximum control, hold the saw firmly with both hands after securing the work piece.
- 3.10 Keep the upper and retracting lower blade guard and the motor free from dust.
- 3.11 Do not hold or force the retracting lower guard in the open position.
- 3.12 Do not over tighten the blade-locking nut.
- 3.13 Do not twist the saw to change, cut or check alignment.
- 3.14 Do not use a saw that vibrates or appears unsafe in any way.
- 3.15 Do not force the saw during cutting.
- 3.16 Do not cut materials without first checking for obstructions or other objects such as nails and screws.
- 3.17 Check frequently to be sure clamps remain secure.

- 3.18 Avoid cutting small pieces that can't be properly secured and material on which the saw shoe can't properly rest. Use a push stick or guide when cutting operation requires the hands of the operator to come close to the blade.
- 3.19 Do not overreach. Keep proper footing and balance.
- 3.20 When starting the saw, allow the blade to reach full speed before contacting the work piece.
- 3.21 Circular saws are designed for right-hand operation; left-handed operation will demand more care to operate safely.
- 3.22 Never place hand under or in front of the shoe or guard of the saw when operating.
- 3.23 Cut at the proper depth ($\frac{1}{4}$ inch / 0.64 centimeters) below work surface. Set the depth of the blade prior to use, when the saw is unplugged.

4.0 Personal Protective Equipment

- 4.1 Wear proper apparel for the task. Long hair, loose or baggy clothing, ties, or jewelry can become caught in moving parts.
- 4.2 Gloves that provide cut, abrasion and impact resistance.
- 4.3 Kickback apron as necessary.
- 4.4 Safety toed boots.
- 4.5 Safety glasses with side shields and faceshield.
- 4.6 Hearing Protection.

Cut Off Saw

S3AM-305-ATT3

1.0 Objective / Overview

- 1.1 Cut-off saws are high-speed cutting tools and very dangerous to operate. Therefore, it is very important to review the general safety rules, training, Personal Protective Equipment and procedures for working with portable cut off saws.
- 1.2 Cut off saws are used in a variety of activities (i.e. concrete, piping, metal, etc.).

2.0 Hazards

- 2.1 Noise
- 2.2 Flying debris
- 2.3 Sharp, moving blades (severe cuts)
- 2.4 Ignition sources (hot engine, sparks)
- 2.5 Hand/arm vibration
- 2.6 Kickback – Sudden and violent reverse movement of the saw

3.0 Safe Operating Guidelines

- 3.1 Review manufacturer's operating manual, *S3AM-305-PR1 Hand & Power Tools*, and *S3AM-305-ATT17 Electric & Battery Hand Tools* or *S3AM-305-ATT16 Small Engines* for additional guidelines
- 3.2 In addition to inspecting the general tool prior to operation, inspect the abrasive wheel for cracks and chips and appropriate wheel type.
 - 3.2.1 If cracked or chipped, replace wheel before use.
 - 3.2.2 Do not use abrasive-type wheels for rough grinding.
- 3.3 Ensure the saw is started in accordance with manufacturer's specifications:
 - 3.3.1 Start the saw on firm ground or other solid surface in an open area.
 - 3.3.2 Never "drop start" the saw as in the above picture (the saw is held in the air with one hand on the handlebar and the other on the pull cord) as no control is provided to prevent rotation of the saw back toward the user.
- 3.4 Handling
 - 3.4.1 Hold the saw firmly with two hands when the engine is running, and whenever the blade is rotating until it comes to a complete stop.
 - 3.4.2 Carry the saw with engine stopped, muffler away from your body, while protecting the cutting wheel from striking the ground or other objects.
- 3.5 Cutting
 - 3.5.1 Clear the working area.
 - 3.5.2 Begin cutting at full throttle and continue at full throttle until the cut is finished.
 - 3.5.3 Avoid standing in a direct line with the cutting wheel.
 - 3.5.4 Use only downward pressure on the saw, as lateral pressure may cause the blade to break and shatter.

- 3.5.5 Do not change the direction of the cut once started, as this can also cause the blade to break and shatter.
- 3.5.6 Do not cut above shoulder height.
- 3.5.7 Avoid operating the saw if the terrain is wet and/or frozen.
- 3.5.8 Keep flammable and combustible materials away from saw while cutting.
- 3.5.9 Ensure an appropriate fire extinguisher or fire-fighting equipment is readily available.
- 3.6 Maintenance
 - 3.6.1 Shut off the engine and remove the spark plug wire before adjusting or working on the saw.

4.0 Personal Protective Equipment

- 4.1 Safety glasses with side shields and faceshield.
- 4.2 Chainsaw chaps.
- 4.3 Safety toe work boots.
- 4.4 Gloves that provide cut abrasion and impact resistance.
- 4.5 Hearing protection: earplugs and/or earmuffs.
- 4.6 Respirator if required (concrete operations).

Handheld Grinder

S3AM-305-ATT4

1.0 Objective / Overview

- 1.1 Handheld grinders are high-speed electric- or pneumatic-powered grinding tools used to shape or cut metal, and can be dangerous to operate.
- 1.2 Grinders are used in a variety of activities (i.e., piping installation/repair, metal, restoring, polishing, sharpening, etc.).

2.0 Potential Hazards

- 2.1 Kickback – Sudden and violent reverse movement of the grinder
- 2.2 Flying debris
- 2.3 Moving parts (severe cuts)
- 2.4 Fire hazard from sparks igniting nearby debris or objects
- 2.5 Noise
- 2.6 Hand/arm vibration

3.0 Safe Operating Guidelines

- 3.1 Review manufacturer's operating manual, *S3AM-305-PR1 Hand & Power Tools*, and *S3AM-305-ATT17 Electric & Battery Hand Tools* for additional guidelines.
 - 3.1.1 Be sure to keep your footing and maintain proper balance.
- 3.2 Inspect the tool before every use. Damaged tools must be removed from use and tagged "DO NOT USE".
- 3.3 Grinder guards are to be used at all times and must not be altered.
 - 3.3.1 US requirements specify a maximum of 180° of the grinding wheel to be exposed.
 - 3.3.2 While 120° coverage may be permissible in certain jurisdictions (Alberta, BC), guards that are greater are not to be cut down.
 - 3.3.3 Replace damaged or defective guards immediately
- 3.4 Grinders must be used with an unmodified manufacturer supplied handle at all times. If removal of the handle is required the reason must be appropriately documented and approved by project / location manager and SH&E manager. Client approval may also be required.
- 3.5 Never use the grinder for jobs for which it is not designed (e.g. cutting with a grinding wheel vs. cutting disc).
- 3.6 Grinders must be permanently marked with the manufacturer's established maximum RPM (revolutions per minute).
- 3.7 Inspect the disk or wheel prior to operation:
 - 3.7.1 Wire wheels must be inspected for loose and broken wires.
 - 3.7.2 Ensure the RPM (as posted on the wheel) is equal to or greater than that posted on the grinder, the correct size for the grinder, and the type of wheel is compatible with the material being ground. An improperly installed or incompatible wheel can break or explode and cause injury.
 - 3.7.3 Wheels must be replaced as specified by the manufacturer (e.g. ¾ of original diameter). In the absence of specifications a wheel shall not be worn down to a size which would allow the mounting flange assembly to contact the work-piece or work-piece holding fixture.

- 3.7.4 Ensure the disk or wheel is checked for cracks or other damage. A ring test can be conducted on clean, dry, unmounted wheels greater than 4" (10.16 centimeters) in diameter:
- Suspend the wheel by its arbor hole;
 - Use a non-metallic tool (wood, plastic) to gently tap the wheel at 45° from the vertical center line on either side of the wheel, approximately 1 to 2 inches (2.5 – 5 centimeters) from the edge;
 - Rotate the wheel 45° and repeat the process until the entire wheel has been tested;
 - A wheel that emits a metallic ring indicates absence of damage, whereas a dull sound means the wheel should be removed from service.
- 3.7.5 If cracked, chipped, or there is any other evidence of damage, remove from service and replace wheel before use.
- 3.8 When mounting the wheels:
- 3.8.1 Follow manufacturer's specifications (e.g. stamp facing grinder, mount up, mount down, etc.)
- 3.8.2 Ensure that the mounting flanges are clean and the mounting blotters are used.
- 3.8.3 Do not over tighten the mounting nut.
- 3.8.4 Before grinding, run newly mounted wheels at operating speed to check for vibrations.
- 3.9 Ensure abrasive wheels are stored according to manufacturer specifications (absence of temperature extremes and solvents, dry area protected from impact, first in first out).
- 3.10 Keep the work area clean. Do not grind near flammable and combustible materials. Sparks can ignite debris and flammable vapors. A fully charged fire extinguisher must be located nearby.
- 3.11 All observers should be kept at a safe distance from the work area.
- 3.12 Always secure work with clamps or a vise, freeing both hands to operate the tool.
- 3.13 Use grinding wheels only at their rated speed.
- 3.14 Ensure safety guard(s) is positioned properly prior to start-up.
- 3.15 Allow the grinder to come to full operating speed before beginning grinding operation.
- 3.16 Do not use the side of a grinding wheel unless the wheel is designed for side grinding.
- 3.17 Always stand to the side of the wheel, never directly behind it.
- 3.18 Grinding aluminum is prohibited.
- 3.19 Never clamp a handheld grinder in a vice.
- 3.20 Tools shall be maintained with care. They should be kept clean and sharp for the best performance. Follow instructions in the user's manual for lubricating and care instructions.

4.0 Personal Protective Equipment (PPE)

- 4.1 Gloves providing appropriate impact, abrasion, cut, tear, & puncture resistance.
- 4.2 Wear appropriate apparel. Long hair, loose or baggy clothing, hoodie strings, ties, or jewellery can become caught in moving parts.
- 4.3 Safety glasses with sideshields and face shield.
- 4.4 Safety toe work boots.
- 4.5 Hearing protection: earplugs and/or earmuffs.
- 4.6 Other PPE as necessary for the work site/activity (e.g. respiratory protection).

Impact Wrench

S3AM-305-ATT5

1.0 Objective / Overview

- 1.1 Impact wrenches are mainly used for tire changing but that does not limit their use. They can be used in all applications when a certain amount of torque is needed to loosen or tighten nuts and bolts.
- 1.2 The danger comes in to play when employees try to use the wrong sockets with an air wrench. Employees using air wrenches must have a general understanding of how to use them.

2.0 Potential Hazards

- 2.1 Flying debris
- 2.2 Noise
- 2.3 Cuts
- 2.4 Hand/arm vibration

3.0 Safe Operating Guidelines

- 3.1 Review manufacturer's operating manual, *S3AM-305-PR1 Hand & Power Tools*, and *S3AM-305-ATT14 Pneumatic Tools* for additional guidelines.
- 3.2 Impact wrench sockets and accessories must be used with this tool. Do not use hand sockets and accessories.
- 3.3 The proper fastening torque may differ depending upon the kind or size of the bolt.
- 3.4 Check the torque with a torque wrench.
- 3.5 Connect tool to air hose of recommended size.
- 3.6 Never use a wire, soft pin, or nail to hold the socket onto the square spindle of the impact wrench.
- 3.7 If the proper retaining device on the tool is broken, the tool shall be removed from service to be repaired.
- 3.8 On applications where a low or critical level of torque is required, it is recommended that each fastener is impacted lightly. Then perform the final tightening with a hand torque wrench.

4.0 Personal Protective Equipment

- 4.1 Safety toed boots
- 4.2 Anti-vibration gloves with impact and abrasion and cut resistance.
- 4.3 Safety glasses with side shields.
- 4.4 Hearing protection.

Nail Gun & Stapling Tool

S3AM-305-ATT6

1.0 Objective / Overview

- 1.1 Nail guns and stapling tools (pneumatic power-fastening devices) are useful, but must be handled with care.
- 1.2 Nail guns and stapling tools have been shown to be the cause of unnecessary injuries when the design of the gun places emphasis on speed, rather than safety.

2.0 Potential Hazards

- 2.1 Flying debris/nails
- 2.2 Imbedded object
- 2.3 Puncture wounds
- 2.4 Noise

3.0 Safe Operating Guidelines

- 3.1 Review manufacturer's operating manual, *S3AM-305-PR1 Hand & Power Tools*, and *S3AM-305-ATT14 Pneumatic Tool* for additional guidelines.
- 3.2 Permit only experienced and trained persons to operate pneumatic nailing and stapling tools. Never let an inexperienced worker use a nail gun without supervised training.
- 3.3 Never point a nail gun or stapling tool toward the body or any other personnel.
 - 3.3.1 Never rest the gun against any part of your body, or try to climb a ladder with the gun cradled against your body.
 - 3.3.2 Be aware of other workers in the work area.
 - 3.3.3 Be aware of what is located behind the nailing surface. Never place hands or other body parts directly behind the nailing surface.
 - 3.3.4 Ensure no one is in the line of fire should an incorrectly selected fastener eject out the other side of the material.
- 3.4 Inspect a tool before connecting it to air supply:
 - 3.4.1 Check tool safety mechanisms if applicable. Never disable a safety tip on a nail gun or stapling tool.
 - 3.4.2 Tighten securely all screws and cylinder caps.
 - 3.4.3 Pneumatic power-fastening devices that shoot nails, rivets, staples, or similar fasteners and operate at pressures more than 100 pounds per square inch (6,890 kPa), must be equipped with a safety interlock to keep fasteners from being ejected, unless the muzzle is pressed against the work surface.
- 3.5 Check correct air supply and pressure before connecting a tool.
- 3.6 Check that the tool is correctly and securely connected to the air supply hose and that it is in good working order, with the safety mechanism operative, before using.
- 3.7 Always handle a tool as if it loaded with fasteners (nails, staples, etc.). Do not carry a tool with a finger on the trigger or with the trigger depressed.
- 3.8 Equip tools with a work-contacting element that limits the contact area to one that is as small as practical.
- 3.9 Make sure that the mechanical linkage between the work-contacting element and trigger is enclosed.

- 3.10 Disconnect a tool from the air supply and ensure the air is completely exhausted from the tool when the tool is unattended, when loading with fasteners (nails, staples), and during cleaning or adjustment.
- 3.11 Before clearing a blockage, be sure that depressing the trigger exhausts all air from the tool and the tool is disconnected from the air supply.
- 3.12 Use only fasteners recommended by the manufacturer. Ensure fasteners are appropriate to the work surface to ensure fastener does not eject completely through the material.
- 3.13 Avoid nailing into knots as nail can splinter wood.
- 3.14 Permit only properly trained people to carry out tool maintenance.
- 3.15 Do not depress the trigger unless the nosepiece of tool is directed onto a safe work surface and properly aligned both vertically and horizontally with the surface
- 3.16 Do not overreach. Keep proper footing and balance.
- 3.17 Ensure the hand not holding the nail gun or stapling tool is a minimum of 12 inches (30cm) away from the nosepiece of the tool.
- 3.18 Keep the gun properly aligned with your work both vertically and horizontally.

4.0 Personal Protective Equipment

- 4.1 Gloves providing appropriate protection to the task (e.g. impact, puncture, chemical, etc.).
- 4.2 Safety toed boots.
- 4.3 Use hearing protection, where required.
- 4.4 Wear safety glasses with side shields at all times and face shield if flying debris may be encountered.

Dustless Vacuum

S3AM-305-ATT7

1.0 Objective / Overview

- 1.1 Dustless decontamination system (also referred to as Pentek brand name) removes and packages surface contamination from concrete and steel structures.
- 1.2 The Pentek integrated suite of manually operated equipment (e.g., squirrel III, corner cutter, roto-peen, and crack chaser) is designed for the safe removal of radioactive materials, lead-based paints, polychlorinated biphenyls, pesticides, chemical residues, and other contaminated coatings.
- 1.3 The Pentek system incorporates a high-performance vacuum and waste packaging unit, the VAC-PAC, in conjunction with pneumatically operated equipment to remove contaminated material. Dust and debris are captured at the cutting tool surface. Supporting equipment required to operate the unit includes a 60 kilowatt generator and an air compressor (minimum 350 cubic feet capacity), as well as a drum grapple for drum handling activities.

2.0 Hazards

- 2.1 Noise
- 2.2 Vibration
- 2.3 Tripping
- 2.4 Hot surfaces (vacuum unit)
- 2.5 Electrical (high voltage)
- 2.6 Pinch
- 2.7 Back strain
- 2.8 High pressure air

3.0 Safe Operating Guidelines

- 3.1 Review manufacturer's operating manual, *S3AM-305-PR1 Hand & Power Tools*, and *S3AM-305-ATT14 Pneumatic Tool* for additional guidelines.
- 3.2 Prior to use, a pre-operation inspection must be completed to determine if the unit is in safe working condition.
- 3.3 The vacuum unit should be placed a minimum of 50 feet (15.2 meters) away from the work area.
- 3.4 Once in position to begin work, apply the brake to stabilize the unit. When raising the VAC-PAC to insert/remove a drum, do not place your body or any extremity under the VAC-PAC while it is in the raised position.
- 3.5 Two workers should be used to maneuver the unit into place.
- 3.6 A minimum 10 feet (3 meters) clearance will be established around the unit while in operation.
- 3.7 Workers should be aware of their position in relation to the hoses and cable to minimize tripping hazards.
- 3.8 A competent person will train each worker in the operation of the unit.
- 3.9 Maintenance in excess of preventive maintenance activities (e.g., lubrication) will be performed by manufacturer personnel ONLY. Always know where the emergency stop is located.
- 3.10 Operators of a motorized drum grapple must be trained in agreement with the powered industrial truck

standard. Refer to *S3AM-324-PR1 Powered Industrial Trucks*.

- 3.11 Review *S3AM-302-PR1 Electrical Safety* prior to refueling the electrical generator and/or compressor.

4.0 Personal Protective Equipment

- 4.1 Leather gloves (maintenance).
- 4.2 As applicable, Tyvek suit (with hood).
- 4.3 Anti-vibration gloves (operation).
- 4.4 Hearing protection (plugs or muffs).

Power Drill

S3AM-305-ATT8

1.0 Objective / Overview

- 1.1 Available in a variety of types and capacities, portable power drills are undoubtedly the most used power tools.
- 1.2 Because of their handiness and application to a wide range of jobs, drills often receive heavy use. For this reason, you will need to carefully check your drill's capacity limitations and accessory recommendations.

2.0 Hazards

- 2.1 Electricity
- 2.2 Flying debris
- 2.3 Rotating and sharp parts
- 2.4 Burns (hot bits)
- 2.5 Manual handling (sprains/strains - wrist)

3.0 Safe Operating Guidelines

- 3.1 Review manufacturer's operating manual, *S3AM-305-PR1 Hand & Power Tools*, and *S3AM-305-ATT17 Electric & Battery Hand Tools* for additional guidelines.
- 3.2 Always keep drill bits sharp.
- 3.3 Disconnect the power supply before changing or adjusting bit or attachments,
- 3.4 Do not use high speed steel (HSS) bits without cooling or using lubrication.
- 3.5 Be sure the chuck is tightly secured to the spindle. This is especially important on reversible-type drills. Tighten the bit securely as described by the owner/operators manual.
- 3.6 The chuck key must be removed from the chuck before starting the drill. A flying key can be an injury-inflicting missile.
- 3.7 Secure workpiece being drilled to prevent movement.
- 3.8 If the bit is long enough to pass through the material, select a shorter drill bit or provide against damage and injury.
 - 3.8.1 Prevent other workers from accessing the area.
 - 3.8.2 Remove or provide coverage for material that could be damaged by the drill bit.
- 3.9 Secure magnetic drills with a chain or rope to prevent falling. Label cord connections to prevent unplugging.
- 3.10 Check auxiliary handles, if part of the tool. Be sure they are securely installed.
- 3.11 Always use the auxiliary drill handle when provided. It gives you more control of the drill, especially if stalled conditions occur.
- 3.12 Grasp the drill firmly by insulated surfaces.
- 3.13 Always hold or brace the tool securely. Brace against stationary objects for maximum control. If drilling in a clockwise -- forward -- direction, brace the drill to prevent a counter-clockwise reaction.
- 3.14 Do not overreach. Always keep proper footing and balance.
- 3.15 Don't force a drill. Apply enough pressure to keep the drill bit cutting smoothly. If the drill slows down, relieve

the pressure. Forcing the drill can cause the motor to overheat, damage the bit and reduce operator control.

4.0 Personal Protective Equipment

- 4.1 Wear proper apparel for the task. Long hair, loose or baggy clothing, ties, or jewellery can become caught in moving parts.
- 4.2 Gloves that provide cut, abrasion and impact resistance.
- 4.3 Safety toed boots.
- 4.4 Safety glasses with side shields and face shield.
- 4.5 Hearing protection.

Pressure Washer

S3AM-305-ATT9

1.0 Objective / Overview

- 1.1 Pressure washing can be divided into three categories based on the water pressure the equipment is capable of producing:
- Ultra high pressure jetting – greater than 30,000 psi
 - High pressure washing – 5,000 to 30,000 psi
 - Pressure washing – less than 5,000 psi
- 1.2 Generally, light duty portable pressure washing equipment and car washes produce less than 5,000 psi. High pressure washing equipment is often used for such tasks as cleaning vessels and process piping. Ultra high pressure jetting is also often employed to clean vessels and to remove coatings and scaling of production equipment. If not used correctly and safely, pressure washers can be dangerous piece of work equipment.
- 1.3 AECOM only allows trained, authorized personnel to operate the high pressure washers. Along with training, other safety measures include: reviewing the manufacturers instructional booklet, proper maintenance of equipment, and personal protective equipment.

2.0 Hazards

- 2.1 Kickback – Sudden and violent reverse movement of the gun
- 2.2 Flying debris
- 2.3 Slips and trips on wet surfaces and hoses
- 2.4 Noise
- 2.5 Manual handling
- 2.6 Exhaust fumes/carbon monoxide (CO) in enclosed spaces
- 2.7 Contact with high pressure / high temperature fluids

3.0 Safe Operating Guidelines

- 3.1 Review manufacturer's operating manual, *S3AM-305-PR1 Hand & Power Tools*, *S3AM-305-ATT17 Electric & Battery Hand Tools* or *S3AM-305-ATT16 Small Engines* for additional guidelines.
- 3.2 Ensure area is properly flagged with tags identifying work being performed and hazards. Keep all unauthorized workers out of area while job in progress.
- 3.3 Inspect all hoses, fittings, wands, cords and hose reel for damage or defects.
- 3.3.1 Equipment is complete and assembled correctly (i.e. nozzle tip correctly connected to the wand and not directly to hose).
- 3.3.2 Ensure trigger mechanism is functioning properly.
- 3.3.3 Fittings are securely attached.
- 3.3.4 Insulated components are in place.
- 3.4 Check fuel connections and hoses for signs of leaks, defects or damage.
- 3.5 Confirm nozzle / jets are clear by turning on water, without pump pressure.

- 3.6 Check pressure pump oil level before use. Hold the wand firmly with the trigger released when turning the pump on.
- 3.7 Recheck hoses once the system is pressurized.
- 3.8 Never service equipment while energized or pressurized.
- 3.9 Ensure other personnel are clear of area while pressure washer is pressurized. Non-operators must remain a minimum of 25 feet (7.6m) from the operator.
- 3.10 Do not wash at a 90 degree angle to minimize spray and flying debris.
- 3.11 Never point a pressure washer at yourself or others. Contact with high pressure fluid can result in serious cut or injection injuries.
- 3.12 Increase pressure slowly during operation to prevent hose kick-back.
- 3.13 Do not drive over, pull on, or kink the high pressure hose. Damage to the hose may compromise the wire braiding inside and cause the hose to burst.
- 3.14 Whip checks must be used for all high pressure connections.
- 3.15 High-pressure washing equipment should be cleaned often to avoid dirt buildup, especially around the trigger and guard area.
- 3.16 Always set the trigger safety lock when the gun valve is not in use.
- 3.17 Relieve the pressure in the system before coupling and uncoupling hoses.
- 3.18 Visually inspect the full length of high pressure discharge hose and inspect other high pressure fluid-handling components for abrasions or cuts, damage caused by exposure to chemicals and for damage caused by kinks in the hose.
- 3.19 High pressure washers shall be used to clean or decontaminate equipment, surfaces or structures only.
- 3.20 High pressure washers WILL NOT be used to clean or decontaminate workers or personal protective equipment while it is being worn.
- 3.21 Maintain a distance from the spray contact point to reduce noise exposure and risk of being struck by flying debris. Avoid overreaching and maintain a stable stance.
- 3.22 When shutting down a pressure washer, turn the pump off before turning the water supply off.
- 3.23 After turning off pressure washer, ensure all residual pressure is released from system by squeezing the trigger. Consult the operator's manual for any other procedures specific to the equipment for shut-down.
- 3.24 Protect unit from freezing, when applicable.

4.0 Personal Protective Equipment

- 4.1 Hardhat.
- 4.2 Safety glasses with side shields and a face shield.
- 4.3 Gloves providing appropriate protection (rubber, chemical).
- 4.4 Hearing protection.
- 4.5 PVC (or equivalent) rain suit.
- 4.6 Safety toed boots with metatarsal protection.

Reciprocating Saw

S3AM-305-ATT10

1.0 Objective / Overview

- 1.1 The versatility of the reciprocating saw, in cutting metal, pipe, wood and other materials have made it a widely used tool.
- 1.2 By design, it is a simple tool to handle. Its demands for safe use, however, are very important.

2.0 Potential Hazards

- 2.1 Flying debris
- 2.2 Noise
- 2.3 Sharp, moving parts (cuts)
- 2.4 Hand/arm vibration
- 2.5 Electricity

3.0 Safe Operating Guidelines

- 3.1 Review manufacturer's operating manual, *S3AM-305-PR1 Hand & Power Tools*, and *S3AM-305-ATT17 Electric & Battery Hand Tools* for additional guidelines.
- 3.2 Use sharp blades. Dull blades can produce excessive heat, make sawing difficult, result in forcing the tool, and possibly cause an accident.
- 3.3 Ensure appropriate blade selection. Different work surfaces demand different blades
- 3.4 Position yourself to maintain full control of the tool, and avoid cutting above shoulder height. Always use two hands to operate the saw.
- 3.5 To minimize blade flexing and provide a smooth cut, use the shortest blade that will do the job.
- 3.6 The work piece must be clamped securely, and the shoe of the saw held firmly against the work to prevent operator injury and blade breakage.
- 3.7 Maintain firm contact between the saw's shoe and the material being cut.
- 3.8 When making a "blind" cut (cannot see behind what is being cut), be sure that hidden electrical wiring, or water pipes are not in the path of the cut.
- 3.9 If wires are present, they must be disconnected at their power source by a qualified person or avoided, to prevent the possibility of lethal shock or fire.
- 3.10 Water pipes must be drained and capped.
- 3.11 Always hold the tool by the insulated grouping surfaces. When making anything other than a through cut, allow the tool to come to a complete stop before removing the blade from the work piece. This prevents breakage of the blade, and possible loss of tool control. Do not operate reciprocating saw in explosive atmospheres.
- 3.12 Do not overreach. Keep proper footing and balance at all times.
- 3.13 Check for misalignment or binding of moving parts, breakage or parts and any other condition that may affect the tool's operation.

4.0 Personal Protective Equipment

- 4.1 Wear proper apparel for the task. Long hair, loose or baggy clothing, ties, or jewelry can become caught in moving parts.
- 4.2 Gloves that provide cut abrasion and impact resistance.
- 4.3 Kickback apron, as necessary.
- 4.4 Safety toed boots.
- 4.5 Safety glasses with side shields and face shield.
- 4.6 Hearing protection.

Sander

S3AM-305-ATT11

1.0 Objective / Overview

- 1.1 Sanders are commonly used at project sites for a variety of tasks.
- 1.2 Often times the hazards associated with sanders are overlooked; they don't appear threatening because they don't have sharp blades or bits. These misconceptions can be prevented through proper training and personal protective equipment (PPE) selection.

2.0 Potential Hazards

- 2.1 Kickback – Sudden and violent reverse of the sander
- 2.2 Noise
- 2.3 Hand/arm vibration
- 2.4 Dust exposure
- 2.5 Flying debris
- 2.6 Severe abrasive parts
- 2.7 Electricity
- 2.8 Fuel (fine dust) and ignition sources (electricity, friction)

3.0 Safe Operating Guidelines

- 3.1 Review manufacturer's operating manual, *S3AM-305-PR1 Hand & Power Tools*, and *S3AM-305-ATT17 Electric & Battery Hand Tools* for additional guidelines.
- 3.2 Disconnect power supply before changing a sanding belt, making adjustments, or emptying dust collector.
- 3.3 Inspect sanding belts before use. Replace those belts that are worn or frayed.
- 3.4 Install sanding belts that are the same widths as the pulley drum.
- 3.5 Adjust sanding belt tension to keep the belt running true and at the same speed as pulley drum.
- 3.6 Secure the sanding belt in the direction shown on the belt and the machine. Keep hands away from the sanding belt.
- 3.7 Before starting a sander, be sure the power cord and extension cords are out of the belt path and are long enough to freely complete the task. The sander must be either double insulated or connected to a ground fault circuit interrupter.
- 3.8 Use two hands to operate sanders – one on the trigger and the other on the front handle knob. Move sanders away from the body.
- 3.9 Clean dust from the motor and vents at regular intervals.
- 3.10 Do not use a sander without an exhaust system or dust collector present that is in good working order. The dust created when sanding can be a fire and explosion hazard. Proper ventilation is essential as well as guarding against open flame and sparks.
- 3.11 Empty the collector when ¼ full. Minimise dust disturbance when emptying the collector.
- 3.12 Do not exert excessive pressure on a moving sander. The weight of the sander provides adequate pressure for the job.

- 3.13 Do not work on unsecured stock unless it is heavy enough to stay in place. Clamp the stop into place or use a 'stop block' to prevent movement.
- 3.14 Do not overreach. Always keep proper footing and balance.
- 3.15 Do not cover air vents of the sander.
- 3.16 Check often to ensure that guards are in their normal position.

4.0 Personal Protective Equipment

- 4.1 Wear proper apparel for the task. Long hair, loose or baggy clothing, ties, or jewellery can become caught in moving parts.
- 4.2 Gloves that provide cut, abrasion and impact resistance.
- 4.3 Safety toed boots.
- 4.4 Safety goggles and faceshield.
- 4.5 Hearing protection.
- 4.6 Respiratory protection, as necessary.

Americas**Knives****S3AM-305-ATT12****1.0 Objective / Overview**

- 1.1 Knives serve a variety of purposes at work sites, and can be a useful tool, when used safely and correctly.
- 1.2 Learning proper positioning and correct use of a knife will drastically reduce the potential of cut-related injuries.

2.0 Hazards

- 2.1 Improper body positioning
- 2.2 Improper knife selection
- 2.3 Defective knife
- 2.4 Improper knife operation (including storage)

3.0 Safe Operating Guidelines

- 3.1 Select the appropriate knife for the task. Consider using a rounded tip blade if the task allows.
- 3.2 Always be sure that knives are sharp and not dull. A dull blade will require more force to cut, increasing the likelihood of injury (e.g. hand slipping, knife breaking, etc.). Replace dull blades – A knife that tears rather than cuts, generally indicates the blade is dull.
- 3.3 Be sure the blade is seated in the frame of the knife correctly, closed, and fastened together properly.
- 3.4 Always direct the cut away from yourself and others
 - 3.4.1 Keep body parts away from the cut line, (e.g., fingers, leg, etc.)
 - 3.4.2 Ensure that the material being cut is stabilized and not against a body part (e.g. cutting rope against your leg).
 - 3.4.3 Always pull the knife, never push the knife (the blade may break, and momentum could cause the body to come into contact with broken blade).
- 3.5 Ensure knife blades are protected or retracted when not in use.
 - 3.5.1 Never carry a knife with an exposed blade in your pocket.
- 3.6 Use of razor and break away utility knives is prohibited.
 - 3.6.1 Purchase safety-equipped utility knives with guarding or automatically retracting blades.
- 3.7 When using a knife to cut thicker materials, use several passes. Increased force on the blade can cause it to stray from the intended cut path, or break the blade.
- 3.8 When changing blades, always handle from the non-sharp side. Cover blade with duct tape and dispose.
- 3.9 Use an alternate tool when possible (scissors, wire cutters, etc.).
- 3.10 Let a falling knife fall.

4.0 Personal Protective Equipment

- 4.1 Cut resistant gloves are mandatory when using knives (Kevlar, thick leather, etc.).

Americas

Clearing & Grubbing Equipment

S3AM-305-ATT13

The following safety precautions will be followed during site clearing and tree falling.

1.0 General

- 1.1 Refer to *S3AM-305-PR1 Hand & Power Tools* for additional guidance.
- 1.2 As applicable, refer also to *S3AM-305-ATT15 Manual Hand Tools*, *S3AM-305-ATT16 Small Engines*, and *S3AM-305-ATT17 Electric & Battery Hand Tools* for additional guidance.
- 1.3 All clearing activities shall terminate during electrical storms and periods of high winds.
- 1.4 Dead, broken or rotted limbs or trees (widow makers) shall be felled first.
- 1.5 Be aware of the presence of other personnel when using any tool, especially picks or axes.

2.0 Machete, Pick and Axe Use

- 2.1 A machetes, picks and axes will only be used for their designated purpose; do not carelessly swing the tool when it is not needed.
- 2.2 To prevent lacerations, employees will wear Kevlar gloves and Kevlar chain saw chaps.
- 2.3 Machetes, picks and axes shall not be used when other employees are in the immediate work area.

3.0 Use of Weed Whips

- 3.1 Weed whips may be used to clear vegetation such as grass, light brush, briars and tree seedlings. The L-shaped weed whip cuts grass and weeds but is unstable for use on larger growth; the triangular-frame weed whip cuts briars and woody stems up to a half-inch in diameter. A "Suwannee" sling is a heavy duty weed whip that also has an axe blade. It does the same work as a weed whip, but can also cut through large materials. The heavier weight of this tool allows it to more easily cut off larger material than a weed whip.
- 3.2 When using weed whips, employees should follow these safety procedures:
 - 3.2.1 Select the correct tool for the types and size of vegetation present across the landfill.
 - 3.2.2 Employees will wear gloves that provide impact, abrasion, cut, tear, and puncture resistance when using weed whips.
 - 3.2.3 Weed whips are meant to be swung back and forth with both hands. Avoid using a golf swing. The tool should be swung no higher than an employee's side.
 - 3.2.4 Strong swings should be made to prevent the blade from bouncing or glancing off springy growth.
 - 3.2.5 Screws hold the serrated double-edge blade in place. These screws can work loose so check them before each use.
 - 3.2.6 At the end of the day, inspect the whips for damage. Clean, sharpen, and oil as necessary and store with a sheath in place.

4.0 Chain Saws

- 4.1 Refer to *S3AM-305-ATT1 Chainsaw*.

5.0 Felling Trees Manually

- 5.1 Before cutting begins, survey the work area for dead limbs, the lean of the tree to be cut, wind conditions and the location of other trees.

- 5.2 Remove lodged trees (tree has not fallen to the ground after being separated from its stump) as soon as possible. Never work under a lodged tree.
- 5.3 The distance between workers should be maintained at twice the height of the trees being felled.

6.0 Chipping Operations

- 6.1 Prior to use, make sure all safety devices and controls, such as emergency shut-off devices, are tested and verified to be functioning properly.
- 6.2 Access covers and doors shall not be opened until the drum or disk is at a complete stop.
- 6.3 Infeed and discharge ports shall be designed to prevent employee contact with disc, knives and blower blades.
- 6.4 The operator must be completely familiar with the controls and proper use of the equipment.
- 6.5 Workers feeding material into self-feeding wood chippers are at risk of being fed through the chipper if they reach or fall into the infeed hopper or become entangled in branches feeding into the machine.
 - 6.5.1 Make sure two workers (buddy system) are in close contact with each other when operating the chipper.
 - 6.5.2 Stand to the side of the chipper while inserting limbs into chipper, never stand directly in front.
 - 6.5.3 Insert trunk portion of tree/limb first. This will prevent the branches from getting entangled with clothing, etc. and pulling you in with the tree/limb.
 - 6.5.4 Bystanders should be kept at least 25 feet (7.6m) away when in operation.
 - 6.5.5 Keep the area around the wood chipper free of tripping hazards.
- 6.6 Never wear loose clothing that may get caught on feed material or moving parts.

7.0 Personal Protective Equipment

- 7.1 Wear proper apparel for the task.
 - 7.1.1 Long hair, loose or baggy clothing, ties, or jewellery can become caught in moving parts.
 - 7.1.2 Wear clothing with long sleeves and full length pants of durable material.
- 7.2 Use gloves that provide impact, abrasion, cut, tear and puncture resistance.
- 7.3 Safety toed boots with ankle support.
- 7.4 Safety glasses with side shields and face shield.
- 7.5 Hearing protection as necessary.

Pneumatic Tools

S3AM-305-ATT14

1.0 Objective / Overview

- 1.1 Pneumatic tools utilize air pressure to perform the tool's task.
- 1.2 Safe measures for use include proper training, good body mechanics and operating technique, well-maintained equipment, and protective equipment.
- 1.3 There are several dangers associated with the use of pneumatic tools. First and foremost is the danger of getting hit by one of the tool's attachments or by some kind of fastener the worker is using with the tool.

2.0 Hazards

- 2.1 Improperly secured air hoses
- 2.2 Noise
- 2.3 Flying debris
- 2.4 Defective tool
- 2.5 Improper operation

3.0 Safe Operating Guidelines

- 3.1 Review the manufacturer's operating manual, *S3AM-305-PR1 Hand & Power Tools*, and *S3AM-305-ATT17 Electric & Battery Hand Tools* for additional guidelines.
- 3.2 Never use bottled gas as a power source for pneumatic tools.
- 3.3 Drain water from air compressor tank and condensation from air lines.
 - 3.3.1 Blow out the air line before connecting a tool. Hold hose firmly and blow away from yourself and others.
- 3.4 Pneumatic tools must be checked to see that the tools are fastened securely to the air hose to prevent them from becoming disconnected. Pneumatic tools must have the air supply controlled according to manufacturer's specifications.
- 3.5 Make sure that hose connections fit properly and are equipped with a mechanical means of securing the connection between tool/hose/compressor to prevent whipping in case of disconnection or failure (e.g. chains, tie wires, whip checks or equivalent retaining devices).
- 3.6 Safety clips or tool retainers must be in place on pneumatic impact tools to prevent accessories (e.g. chisel on a chipping hammer) or attachments from being ejected.
- 3.7 If an air hose is more than 1/2-inch (12.7 mm) in diameter, a safety excess flow valve must be installed at the source of the air supply to reduce pressure in case of hose failure.
- 3.8 In general, the same precautions should be taken with an air hose that are recommended for electric cords, as the hose is subject to the same kind of damage or accidental striking, and because it also presents tripping hazards. Avoid creating trip hazards caused by hoses laid across walkways, curled underfoot, on ladders.
- 3.9 Airless spray guns that atomize paints and fluids at pressures of 1,000 pounds or more per square inch (6,890 kPa) must be equipped with automatic or visible manual safety devices that will prevent pulling the trigger until the safety device is manually released.

- 3.10 Ensure that the compressed air supplied to the tool is clean and dry. Dust, moisture, and corrosive fumes can damage a tool. An in-line regulator filter and lubricator increases tool life.
- 3.11 Keep tools clean and lubricated, and maintain them according to the manufacturers' instructions.
- 3.12 Use only the attachments that the manufacturer recommends for the tools in use.
- 3.13 Use the proper hose and fittings of the correct diameter and type for the pneumatic or hydraulic application.
 - 3.13.1 The manufacturer's recommended safe operating pressure for hoses, valves, pipes, filters, and other fittings must not be exceeded.
 - 3.13.2 Use hoses specifically designed to resist abrasion, cutting, crushing and failure from continuous flexing.
 - 3.13.3 Choose air supply hoses that have a minimum working pressure rating of 150 pounds per square inch gauge or 150 percent of the maximum pressure produced in the system, whichever is higher.
 - 3.13.4 Check hoses regularly for cuts, bulges and abrasions. Tag and replace, if defective.
- 3.14 Install quick disconnects of a pressure-release type rather than a disengagement type. Attach the male end of the connector to the tool, NOT the hose.
- 3.15 Reduce physical fatigue by supporting heavy tools with a counter-balance wherever possible.
- 3.16 Do not operate the tool at a pressure above the manufacturer's rating.
- 3.17 Turn off the air pressure to the hose, exhaust the airline and disconnect the tool from the air supply when not in use, before servicing or when changing power tools or attachments.
- 3.18 Do not carry a pneumatic tool by its hose.
- 3.19 Do not use compressed air for cleaning purposes unless the pressure is reduced to 30 pounds per square inch (psi) or less. This rule does not apply for concrete form, mill scale, green cutting, and similar cleaning operations. Proper respiratory, hand, eye, and ear protection must be worn.
- 3.20 Compressed air guns shall never be pointed toward anyone.
 - 3.20.1 Employees shall never "dead-end" them against themselves or anyone else.
 - 3.20.2 A chip guard shall be used when compressed air is used for cleaning.
 - 3.20.3 Never use compressed air to blow debris or to clean dirt from clothes or body.

4.0 Personal Protective Equipment

- 4.1 Gloves providing appropriate protection to the task (e.g. impact, puncture, chemical, etc.)
- 4.2 Safety toed boots
- 4.3 Use hearing protection, where required.
- 4.4 Wear safety glasses with side shields at all times and face shield if flying debris may be encountered.

Manual Hand Tools

S3AM-305-ATT15

1.0 General

- 1.1 Review manufacturer's operating manual and *S3AM-305-PR1 Hand & Power Tools* for additional guidelines.
- 1.2 Carry tools using a heavy belt or apron and hang tools at your sides.
- 1.3 Never carry tools in your pockets or hanging behind your back.

2.0 Hammers

- 2.1 Hammers are designed according to the intended purpose. Select a hammer that is comfortable for you and that is the proper size and weight for the job. Misuse can cause the striking face to chip, possibly causing a serious injury.
- 2.2 Choose a hammer with a striking face diameter approximately ½ inch (1.3 centimeters) larger than the face of the tool being struck (e.g., chisels, punches, wedges, etc.).
- 2.3 Strike a hammer blow squarely with the striking face parallel to the surface being struck. Always avoid glancing blows and over and under strikes. (Hammers with beveled faces are less likely to chip or spall).
- 2.4 Look behind and above you before swinging the hammer.
- 2.5 Watch the object you are hitting.
- 2.6 Hold the hammer with your wrist straight and your hand firmly wrapped around the handle.
- 2.7 Do not use handles that are rough, cracked, broken, splintered, sharp-edged or loosely attached to the head. Remove from service and replace the handle if possible.
- 2.8 Do not use any hammer head with dents, cracks, chips, mushrooming, or excessive wear.
- 2.9 Do not use a hammer for any purpose for which it was not designed or intended.
- 2.10 Do not use one hammer to strike another hammer, other hard metal objects, stones or concrete.
- 2.11 Do not redress, grind, weld or reheat-treat a hammer head.
- 2.12 Do not strike with the side or cheek of the hammer.

3.0 Pipe Cutters, Reamers, Taps and Threaders

- 3.1 Replace pipe cutter wheels which are nicked or otherwise damaged.
- 3.2 Use a three- or four-wheeled cutter, if there is not enough space to swing the single wheel pipe cutter completely around the pipe.
- 3.3 Choose a cutting wheel suitable for cutting the type of pipe material required:
 - 3.3.1 Thin wheel for cutting ordinary steel pipe.
 - 3.3.2 Stout wheel for cutting cast iron.
 - 3.3.3 Other wheels for cutting stainless steel, plastic and other materials.
- 3.4 Select the proper hole diameter and correct tap size to tap a hole. The hole should be sized so that the thread cut by the tap will be about 75 percent as deep as the thread on the tap.
- 3.5 Use a proper tap wrench (with a "T" handle) for turning a tap.
- 3.6 Use lubricant or machine cutting fluid with metals other than cast iron.

- 3.7 Do not permit chips to clog flutes (grooves in the tap that allow metal chips to escape from the hole). The chips may prevent the tap from turning – this may result in the tap breaking if you continue to apply pressure.
- 3.8 Do not attempt to thread hardened steel. This can chip or damage the die.
- 3.9 Do not thread any rod or other cylindrical object that is larger in diameter than the major diameter of the die thread.
- 3.10 Do not use a spiral reamer on a rotating pipe. The reamer may snag and cause serious injury.

4.0 Pliers and Wire Cutters

- 4.1 Pliers are made in various shapes and sizes and for many uses. Use the correct pliers or wire cutters for the job.
- 4.2 Choose pliers or wire cutters that have a grip span of 2½ – 3½ inches (6.4 – 8.9 centimeters) to prevent palm or fingers from being pinched when the tools are closed.
- 4.3 Use adjustable pliers that allow for a firm grip of the work piece while maintaining a comfortable handgrip (i.e., hand grasp is not too wide).
- 4.4 Use tools only if they are in good condition.
 - 4.4.1 Make sure that the cutting edges are sharp. Dull and worn-down cutting edges require many times more force for cutting.
 - 4.4.2 Make sure that the toothed jaws are clean and sharp. Greasy or worn-down jaws can result in compromised safety. Such tools also require increased force to hold the work piece which, in turn, increases the risk of muscular fatigue and repetitive strain injuries.
- 4.5 Oil pliers and wire cutters regularly. A drop of oil on the hinge will make the tools easier to use.
- 4.6 Pull on the pliers; do not push away from you when applying pressure. If the tool slips unexpectedly, you may lose your balance or injure your hand.
- 4.7 Cut at right angles. Never rock the cutting tool from side to side or bend wire back and forth against the cutting edges.
- 4.8 Do not cut hardened wire unless the pliers or wire cutters are specifically manufactured for this purpose.
- 4.9 Do not expose pliers or wire cutters to excessive heat.
- 4.10 Do not bend stiff wire with light pliers. Needle-nose pliers can be damaged by using the tips to bend large wire. Use a sturdier tool.
- 4.11 Do not use pliers as a hammer.
- 4.12 Do not hammer on pliers or wire cutters to cut wires or bolts.
- 4.13 Do not extend the length of handles to gain greater leverage. Use a larger pair of pliers for gripping or a bolt cutter for cutting.
- 4.14 Do not use cushion grip handles for jobs requiring tools with electrically insulated handles. Cushion grips are for comfort primarily and do not protect against electric shock.
- 4.15 Do not use pliers on nuts and bolts; use a wrench.

5.0 Screwdrivers

- 5.1 Screwdrivers are made in various shapes and sizes and for many uses. Use the correct screwdriver for the job.
- 5.2 Choose contoured handles that fit the shank tightly, with a flange to keep the hand from slipping off the tool.

- 5.3 Use a slot screwdriver with a blade tip width that is the same as the width of the slotted screw head.
- 5.4 For cross-head screws, use the correct size and type of screwdriver; a Phillips screwdriver may slip out of a screw head designed for use with the slightly flatter-tipped Pozidriv screwdriver.
- 5.5 Use a vise or clamp to hold the stock if the piece is small or moves easily.
- 5.6 Keep the screwdriver handle clean. A greasy handle could cause an injury or damage from unexpected slippage.
- 5.7 If work must be carried out on "live" electrical equipment, use screwdrivers that have insulated handles designed for electrical work and a non-conducting shaft. Remember, most plastic handles are designed for grip and comfort.
- 5.8 Use non-magnetic tools when working near strong magnets (e.g., in some laboratories).
- 5.9 Use a screw-holding screwdriver (with screw-holding clips or magnetic blades) to get screws started in awkward, hard-to-reach areas. Square-tipped screwdrivers (e.g., Robertson) that hold screws with recessed square holes are also useful in such situations.
- 5.10 Use an offset screwdriver in close quarters where a conventional screwdriver cannot be used.
- 5.11 Use a screwdriver that incorporates the following features when continuous work is needed:
 - 5.11.1 Use a pistol grip to provide for a straighter wrist and better leverage.
 - 5.11.2 Use a "Yankee drill" mechanism (spiral ratchet screwdriver or push screwdriver) which rotates the blade when the tool is pushed forward.
 - 5.11.3 Use a ratchet device to drive hard-to-move screws efficiently, or use a powered screwdriver.
- 5.12 File a rounded tip square making sure the edges are straight. A dull or rounded tip can slip out of the slot and cause hand injury or damage to materials.
- 5.13 Store screwdrivers in a rack or partitioned pouch so that the proper screwdriver can be selected quickly.
- 5.14 Do not lean or push on a screwdriver with any more force than necessary to keep contact with the screw. A screw properly piloted and fitted will draw itself into the right position when turned. Keep the shank directly over the screw being driven.
- 5.15 Do not hold the stock in one hand while using the screwdriver with the other as an injury may result if the screwdriver slips out of the slot.
- 5.16 Do not hammer screws that cannot be turned.
- 5.17 Do not grind the screwdriver tip to fit another size screw head.
- 5.18 Do not try to use screwdrivers on screw heads for which they are not designed (e.g., straight blade screwdrivers on Phillips, clutch head, Torx or multi-fluted spline screw heads).
- 5.19 Do not use defective screwdrivers (e.g. rounded or damaged edges or tips; split or broken handles; bent shafts).
- 5.20 Do not use a screwdriver for prying, punching, chiseling, scoring, scraping or stirring paint.
- 5.21 Do not use pliers on the handle of a screwdriver for extra turning power. A wrench should be used only on the square screwdriver shank designed for that purpose.
- 5.22 Do not expose a screwdriver blade to excessive heat. Heat can affect the temper of the metal and weaken the tool.
- 5.23 Do not use a screwdriver to check if an electrical circuit is live. Use a suitable meter or other circuit testing device.
- 5.24 Do not carry screwdrivers in clothing pockets.

6.0 Snips

- 6.1 Wear safety glasses and protective gloves when working with snips. Small pieces of metal may go flying in the air and cut edges of metal are sharp.
- 6.2 Snips are made in various shapes and sizes for various tasks. The handle can be like those on scissors with finger and thumb holes or like plier handles. Models are available for cutting in straight lines and in curves to the left or right.
- 6.3 Select the right size and type of snips for the job; check the manufacturer's specifications about the intended use of the snips (e.g., type of cut - straight, wide curve, tight curve, right or left, and maximum thickness and kind of metal or other material that can be cut).
 - 6.3.1 Universal snips can cut in both straight and wide curves.
 - 6.3.2 Straight snips and duckbill snips (flat blade, "perpendicular" to the handle, with pointed tips) are generally designed to cut in straight lines; some duckbill snips are designed for cutting curved lines.
 - 6.3.3 Hawk's bill snips (with crescent-shaped jaws) are used for cutting tight circles.
 - 6.3.4 Aviation snips have compound leverage that reduces the effort required for cutting.
 - 6.3.5 Offset snips have jaws that are set at an angle from the handle.
- 6.4 Use only snips that are sharp and in good condition.
- 6.5 Use snips for cutting soft metal only. Hard or hardened metal should be cut with tools designed for that purpose.
- 6.6 Use ordinary hand pressure for cutting. If extra force is needed, use a larger tool.
- 6.7 Cut so that the waste is on the right if you are right-handed or on the left if you are left-handed.
- 6.8 Avoid springing the blades. This results from trying to cut metal that is too thick or heavy for the snips you are using.
- 6.9 Keep the nut and the pivot bolt properly adjusted at all times.
- 6.10 Oil the pivot bolt on the snips occasionally.
- 6.11 Do not try to cut sharp curves with straight cut snips.
- 6.12 Do not cut sheet metal thicker than the manufacturer's recommended upper limit (e.g., cuts up to 16-gauge cold, rolled steel or 18-gauge stainless steel). Do not extend the length of handles to gain greater leverage.
- 6.13 Do not hammer or use your foot to exert extra pressure on the cutting edges.
- 6.14 Do not use cushion grip handles for tasks requiring insulated handles. They are for comfort primarily and not for protection against electric shocks.
- 6.15 Do not attempt to re-sharpen snips in a sharpening device designed for scissors, garden tools, or cutlery.

7.0 Wrenches

- 7.1 Use the correct wrench for the job - pipe wrenches for pipes and plumbing fittings, and general-use wrenches for nuts and bolts.
 - 7.1.1 Do not use pipe wrenches on nuts and bolts.
 - 7.1.2 Use a box or socket wrench with a straight handle, rather than an off-set handle, when possible.
 - 7.1.3 Do not use a conventional adjustable wrench for turning a tap – it will cause uneven pressure on the tap that may cause it to break.
 - 7.1.4 Do not use a makeshift wrench.

- 7.2 Inspect pipe wrenches periodically for worn or unsafe parts and replace them:
 - 7.2.1 Wrenches must not be used when jaws are sprung to the point that slippage occurs.
 - 7.2.2 Ensure that the teeth of a pipe wrench are sharp, clean and free of oil and debris.
 - 7.2.3 Do not use worn adjustable wrenches. Inspect the threads, knurl, jaw and pin for wear.
 - 7.2.4 Discard any bent or damaged wrenches (e.g., open-ended wrenches with spread jaws or box wrenches with broken or damaged points).
- 7.3 Select the correct jaw size to avoid slippage.
 - 7.3.1 Ensure that the jaw of an open-ended wrench is in full contact (fully seated, "flat," not tilted) with the nut or bolt before applying pressure.
 - 7.3.2 Face a pipe wrench or adjustable wrench "forward," adjust tightly and turn the wrench so pressure is against the permanent or fixed jaw. Do not pull on a wrench that is loosely adjusted.
 - 7.3.3 Adjust the pipe wrench grip to maintain a gap between the back of the hook jaw and the pipe. This concentrates the pressure at the jaw teeth, producing the maximum gripping force. It also aids the ratcheting action.
 - 7.3.4 Do not insert a shim in a wrench for better fit.
 - 7.3.5 Before applying pressure, ensure that the jaws have a good bite.
 - 7.3.6 Make sure adjustable wrenches do not "slide" open during use.
 - 7.3.7 Do not increase the leverage by adding sleeved additions (e.g., a pipe) to increase tool handle length. Use a larger wrench as necessary.
- 7.4 Ensure that the pipe or fitting is clean to prevent unexpected slippage and possible injury.
- 7.5 Maintain a proper stance with feet firmly placed to maintain balance.
 - 7.5.1 Position the body in a way that will prevent loss of balance and injury if the wrench slips or something (e.g., a bolt) suddenly breaks.
 - 7.5.2 Pull, rather than push on the wrench handle as body balance is more likely to be maintained if the wrench slips.
 - 7.5.3 Pull using a slow, steady pull; do not use fast, jerky movements.
- 7.6 Apply a small amount of pressure to a ratchet wrench initially to ensure that the ratchet wheel (or gear) is engaged with the pawl (a catch fitting in the gear) for the direction you are applying pressure.
- 7.7 Support the head of the ratchet wrench when socket extensions are used.
- 7.8 Stand aside when work is done with wrenches overhead.
- 7.9 Do not use a wrench on moving machinery.
- 7.10 Do not use the wrong tools for the job. For example: Do not use pliers instead of a wrench or a wrench as a hammer. Do not use pipe wrenches for lifting or bending pipes.
- 7.11 Do not strike a wrench (except a "strike face" wrench) with a hammer or similar object to gain more force.
- 7.12 Do not expose a wrench to excessive heat (like from a blow torch) that could affect the temper of the metal and ruin the tool.

8.0 Files/Rasps

- 8.1 Do not use a file as a pry bar, hammer, screwdriver, or chisel.
- 8.2 When using a file or a rasp, grasp the handle in one hand and the toe of the file in the other.
- 8.3 Do not hammer on a file.

9.0 Chisels and Punches

- 9.1 Use the right size and type of chisel (metal or wood) or punch (drift pin, centre, pin) for the job.
- 9.2 Use tools only if they are good condition (i.e., cutting edges are sharp, struck head is not mushroomed or chipped).
 - 9.2.1 Do not use chisels or punches if the cutting edge is dull, mushroomed or chipped, or if the point of a punch is slanted or damaged.
 - 9.2.2 Choose smooth, rectangular handles that have no sharp edges and are attached firmly to the chisel. Replace broken or splintered handles.
 - 9.2.3 Redress striking tools with burred or mushroomed heads.
 - Redress the point or cutting edge to its original shape.
 - Do not use a grinder to redress heat-treated tools. Use a whetstone.
 - Grind to a slightly convex cutting edge.
 - The point angle of the chisel should be 70° for hard metals, 60° for soft.
 - Do not apply too much pressure to the head when grinding a chisel. The heat generated can remove the temper. Immerse the chisel in cold water periodically when grinding.
 - 9.2.4 Replace any chisel or punch that is bent, cracked, shows excessive wear or cannot successfully be redressed.
- 9.3 Check stock thoroughly for knots, staples, nails, screws, or other foreign objects before chiseling or punching.
- 9.4 Hold the chisel, for shearing and chipping, at an angle which permits the bevel of the cutting edge to lie flat against the shearing plane.
- 9.5 Use the appropriate type and size of hammer for the chisel or punch, such as:
 - 9.5.1 A wooden or plastic mallet with a large striking face on chisels.
 - 9.5.2 Heavy-duty or framing chisels made of a solid or molded handle can be struck with a steel hammer.
 - 9.5.3 Ball-peen hammers are generally chosen for use with punches.
 - 9.5.4 Refer to the 'Hammers' section of this document for further guidance.
- 9.6 Chip or cut away from the body. Keep hands and body behind the cutting edge.
- 9.7 Make finishing or paring cuts with hand pressure alone.
- 9.8 Provide hand protection if possible:
 - 9.8.1 Use a sponge rubber shield, punch or chisel holder.
 - 9.8.2 Clamp small work pieces in a vise and chip towards the stationary jaw when working with a chisel.
 - 9.8.3 Do not allow bull point chisels to be hand-held by one employee and struck by another. Use tongs or a chisel holder to guide the chisel so that the holder's hand will not be injured.
- 9.9 Do not use cold chisels for cutting or splitting stone or concrete.
- 9.10 Do not use a drift pin punch (also called an aligning punch) as a pin punch intended for driving, removing, or loosening pins, keys, and rivets.
- 9.11 Do not use a wood chisel on metal.
- 9.12 Do not use a wood chisel as a pry or a wedge.
- 9.13 Place chisels safely within the plastic protective caps to cover cutting edges when not in use.

- 9.14 Store chisels in a “storage roll,” a cloth or plastic bag with slots for each chisel, and keep them in a drawer or tray.

10.0 Hacksaws

- 10.1 Select correct blade for material being cut.
- 10.2 Keep saw blades clean and lightly oiled using light machine oil on the blade to keep it from overheating and breaking.
- 10.3 Secure blade with the teeth pointing forward. Tighten the nut until the blade is under tension.
- 10.4 Keep blade rigid, and frame properly aligned.
- 10.5 Cut using steady strokes, directed away from you.
- 10.6 Use entire length of blade in each cutting stroke.
- 10.7 Cut harder materials more slowly than soft materials.
- 10.8 Clamp thin, flat pieces requiring edge cutting.
- 10.9 Do not apply too much pressure on the blade as the blade may break.
- 10.10 Do not twist when applying pressure.
- 10.11 Do not use when the blade becomes loose in the frame.

11.0 Vises

- 11.1 When clamping a long work piece in a vise, support the far end of the work piece by using an adjustable pipe stand, saw horse or box.
- 11.2 Position the work piece in the vise so that the entire face of the jaw supports the work piece.
- 11.3 Do not use a vise that has worn or broken jaw inserts, or has cracks or fractures in the body of the vise.
- 11.4 Do not slip a pipe over the handle of a vise to gain extra leverage.

12.0 Clamps

- 12.1 Do not use a C-clamp for hoisting materials.
- 12.2 Do not use a C-clamp as a permanent fastening device.

13.0 Pry Bars

- 13.1 Establish balance and stable footing when using a bar for prying.
- 13.2 Pry bars must be appropriate to the task to prevent slipping or tool breakage.

14.0 Jacks

- 14.1 All jacks—including lever and ratchet jacks, screw jacks, and hydraulic jacks—must have a stop indicator, and the stop limit must not be exceeded.
- 14.2 The manufacturer’s load limit must be permanently marked in a prominent place on the jack, and the load limit must not be exceeded.
- 14.3 A jack should never be used to support a lifted load. Once the load has been lifted, it must immediately be blocked up. Put a block under the base of the jack when the foundation is not firm, and place a block between the jack cap and load if the cap might slip.
- 14.4 To set up a jack, make certain of the following:

- 14.4.1 The base of the jack rests on a firm, level surface;
 - 14.4.2 The jack is correctly centered;
 - 14.4.3 The jack head bears against a level surface; and
 - 14.4.4 The lift force is applied evenly.
- 14.5 Clear all tools, equipment and any other obstructions from under the load before lowering the jack.
- 14.6 Proper maintenance of jacks is essential for safety. All jacks must be lubricated regularly. In addition, each jack must be inspected according to the following schedule:
- 14.6.1 For jacks used continuously or intermittently at one site—inspected at least once every 6 months;
 - 14.6.2 For jacks sent out of the shop for special work—inspected when sent out and inspected when returned; and
 - 14.6.3 For jacks subjected to abnormal loads or shock—inspected before use and immediately thereafter.

Small Engines

S3AM-305-ATT16

1.0 Objective / Overview

- 1.1 Operate small engine machines (liquid fuel tools), such as push mowers, weed trimmers, pumps and leaf blowers, in a safe manner.
- 1.2 Workers must be trained and competent in the safe operation and maintenance of the tool.

2.0 Potential Hazards

- 2.1 Flying debris
- 2.2 Noise
- 2.3 Moving and sharp parts
- 2.4 Hot surfaces

3.0 Safe Operating Guidelines

- 3.1 Review *S3AM-305-PR1 Hand & Power Tools* and the manufacturer's operating manual for further guidance.
- 3.2 Do not wear loose or baggy clothing around tools with rotating parts.
- 3.3 Never run the engine indoors, in poorly ventilated areas, or in a location where the exhaust could be drawn into a building through an opening.
 - 3.3.1 When an engine must be operated in an enclosed space, effective ventilation and/or proper respirators such as atmosphere-supplying respirators must be utilized to avoid breathing carbon monoxide.
- 3.4 Never store engine with fuel in fuel tank inside a building with potential sources of ignition such as hot water and space heaters, clothes dryers, electric motors, etc.
- 3.5 Ensure the fuel cap is in place. Never start or operate the engine with the fuel fill cap removed.
- 3.6 Refuelling:
 - 3.6.1 Never remove fuel cap or add fuel when engine is running.
 - 3.6.2 Shut down the engine and allow it to cool prior to refueling to prevent accidental ignition of hazardous vapors.
 - 3.6.3 Never pour gasoline on hot surfaces.
 - 3.6.4 Fill in well-ventilated area.
 - 3.6.5 Do not re-fuel around an open flame or while smoking.
- 3.7 Use only properly labelled, American National Standards Institute/Canadian Standards Association-approved red gasoline containers to store and dispense fuel.
- 3.8 The worker must be careful to handle, transport, and store gas or fuel only in approved flammable liquid containers, according to proper procedures for flammable liquids.
- 3.9 Noise hazards associated with gasoline engines must be mitigated by the use of proper hearing protection. Ear plugs, ear muffs or a combination of the two must be used to protect workers from excessive noise levels.
- 3.10 Appropriate fire extinguishers must also be available in the area.

- 3.11 Do not pour fuel from engine or siphon fuel by mouth.
- 3.12 Never leave the engine unattended while it is running.
- 3.13 Never operate the engine with an unguarded engine shaft.
- 3.14 Do not modify the engine or tamper with the factory setting of the engine governor.
- 3.15 Never operate the engine without a muffler guard in place and avoid touching hot areas of the engine.
- 3.16 Keep all flammable materials away from the muffler and the rest of the engine; do not idle or park the engine in dry grass or ground cover.
- 3.17 When working on the equipment, avoid accidental starts by removing the ignition key, turn off all engine switches, disconnect the battery and disconnect the spark plug, keeping it away from metal part.

4.0 Personal Protective Equipment

- 4.1 Always wear safety glasses with shields. Add face shield if potential for flying debris.
- 4.2 Gloves providing the appropriate protection (e.g. impact, abrasion, chemical, etc.).
- 4.3 Wear proper apparel for the task. Long hair, loose or baggy clothing, ties, or jewellery can become caught in moving parts. Long pants and long sleeve shirt.
- 4.4 Safety toe work boots.
- 4.5 Hearing protection (earmuffs or earplugs).

Electric & Battery Hand Tools

S3AM-305-ATT17

1.0 Objective / Overview

- 1.1 Electric and battery hand tools, also known as power tools, allow the user to perform their task more easily by providing more torque, speed, etc.

2.0 Hazards

- 2.1 Electricity

3.0 Safe Work Practices (General)

- 3.1 Review manufacturer's operating manual and *S3AM-305-PR1 Hand & Power Tools* for additional guidelines.
- 3.2 All electrical tools and equipment must be operated in accordance with the requirements of *S3AM-302-PR1 Electrical Safety*.
- 3.3 Keep all people not involved with the work at a safe distance from the work area.
- 3.4 Inspect power tools prior to each use.
 - 3.4.1 Ensure that the power tool has the correct guard, shield or other attachment that the manufacturer recommends.
 - 3.4.2 Ensure that the tools are properly grounded using a three-prong plug (no loose or faulty prongs), are double insulated (and are labeled as such), or are powered by a low-voltage isolation transformer; this will protect users from an electrical shock.
 - 3.4.3 Check the handle and body casing of the tool for cracks or other damage.
 - 3.4.4 If the tool has auxiliary or double handles, check to see that they installed securely.
 - 3.4.5 Inspect cords for defects: check the plug and power cord for cracking, fraying, and other signs of wear or faults in the cord insulation.
 - 3.4.6 Ensure power tool switches and triggers are fully functional.
 - 3.4.7 If equipped with a trigger-lock, ensure it is disabled.
 - 3.4.8 If a power tool is defective, remove it from service, and tag it clearly "Out of service for repair" or "Do Not Use". Replace damaged equipment immediately – do not use defective tools "temporarily." DO NOT ATTEMPT FIELD REPAIRS.
- 3.5 Maintain tools with care; keep them sharp and clean for best performance.
- 3.6 Follow instructions in the user's manual for lubricating and changing accessories.
- 3.7 Do not over-reach. Be sure to keep good footing and maintain good balance when operating power tools.
- 3.8 If they are available, choose tools with double handles to permit easier holding and better manipulation of the tool.
- 3.9 Do not brush away sawdust, shavings or turnings while the power tool is running. Never use compressed air for cleaning surfaces or removing sawdust, metal turnings, etc.
- 3.10 Do not operate power tools that are not specified as intrinsically safe in an area containing explosive vapors or gases.
- 3.11 Do not clean tools with flammable or toxic solvents.
- 3.12 Do not surprise or touch anyone who is operating a power tool. Startling an operator could result in injury or

property damage.

- 3.13 Hand-held power tools must be equipped with a constant-pressure switch or control that shuts off the power when pressure is released.
 - 3.13.1 Powered hand tools shall not be capable of being locked in the ON position. Trigger locks are not permitted.
 - 3.13.2 All power tools should be ordered without trigger locks; if a tool is found with a trigger lock intact it must be disabled.
- 3.14 Avoid accidental starting. Do not hold fingers on the switch button, and ensure it is in the OFF position while plugging the tool in or while carrying an energized (plugged-in, battery in place) tool.
- 3.15 Do not leave a running tool unattended and ensure the power tool will not re-energize when not in use and when servicing, cleaning, making adjustments, applying flammable solutions or changing accessories:
 - 3.15.1 Ensure it has stopped running completely.
 - 3.15.2 Ensure the trigger or switch is OFF.
 - 3.15.3 Ensure the power tool is disconnected from the power supply (unplugged or battery removed).
- 3.16 Operate power tools within their design limitations.
- 3.17 Store power tools, batteries and electrical cords in a clean, dry area off the ground when not in use.
- 3.18 Do not use power tools in damp or wet locations unless they are approved for that purpose.
- 3.19 Keep work areas well lighted when operating power tools.
- 3.20 Equipment must have proper guards or shields and they must remain in place to protect the operator and others from the following:
 - 3.20.1 Point of operation.
 - 3.20.2 In-running nip points.
 - 3.20.3 Rotating parts.
 - 3.20.4 Flying chips and sparks.
- 3.21 If a guard is removed to clean or repair parts, replace it before testing the equipment and returning the machine to service
- 3.22 If, due to damage or deterioration, the original guard provided on a piece of equipment cannot be put in place, the tool must be removed from service.
- 3.23 Do not modify, remove, or disable any machine guards.
- 3.24 Remove any wrenches and adjusting tools before turning on a tool.
- 3.25 Use clamps, a vice or other devices to hold and support the piece being worked on, when practical to do so. This will allow you to use both hands for better control of the tool and will help prevent injuries if a tool jams or binds in a work piece.

4.0 Battery Powered Tools

- 4.1 Use only the type of battery specified by the tool manufacturer for the battery-powered tool to be used.
- 4.2 Recharge a battery or battery-powered tool only with a charger that specified for the battery.
- 4.3 Store a battery pack safely so that no metal parts, nails, screws, wrenches and so on can come in contact with the battery terminals; this could result in shorting out the battery and possibly cause sparks, fires or burns.

5.0 Safe Work Practice (Electric)

- 5.1 During use, keep power cords clear of tools and the path that the tool will take.
- 5.2 Employees' hands shall not be wet when plugging and unplugging cord and plug connected equipment and extension cords.
- 5.3 Portable electric equipment shall be disconnected when not in use, before servicing, and when changing accessories such as blades, bits, and cutters.
- 5.4 Portable electric equipment and extension cords used in potentially wet locations shall be approved for use in those locations by a nationally recognized testing laboratory, inspection agency, or other organization concerned with product evaluation (e.g., F.M., UL, etc.).
- 5.5 The outlet box for portable extension cords for outdoor use shall be weatherproof and shall be maintained in good condition.
- 5.6 Maintain electrical cords and connections in good working order:
 - 5.6.1 Cords and connection must be American National Standards Institute/Canadian Standards Association approved and bear a standardized certification marking (e.g., CSA, ANSI, UL, CE etc.).
 - 5.6.2 To prevent overheating, use only approved extension cords that have the proper wire size for the length of cord and power requirements of the electric tool to be used.
 - Do not connect or splice extension cords together to make a longer connection.
 - For outdoor work, use outdoor extension cords marked "W-A" or "W."
 - 5.6.3 Eliminate octopus connections: if more than one receptacle plug is needed, use a power bar or power distribution strip that has an integral power cord and a built-in overcurrent protection.
 - 5.6.4 Portable electrical equipment shall not be carried by the cord, nor raised or lowered by the cord.
 - 5.6.5 Electrical cords shall not be removed from a receptacle by pulling on the cord line.
 - 5.6.6 Cords shall not be placed across walkways unless appropriate cord and worker protection is in place to prevent damage to the cord and worker tripping hazards (e.g. cable protectors, cords suspended over walkway, etc.).
 - 5.6.7 Do not walk on or allow vehicles or other moving equipment to pass over unprotected power cords. Cords should be put in conduits or protected by placing planks on each side of them.
 - 5.6.8 A cord should not be pulled or dragged over nails, hooks, or other sharp objects that may cause cuts in the insulation.
 - 5.6.9 Keep cords away from heat, oil, sharp edges and moving parts.
 - 5.6.10 Never use extension cords as permanent wiring as they are for temporary use only. Do not run behind bookshelves, or furniture if the cord cannot be monitored for severe bending or damage.
 - 5.6.11 Inspect cords frequently for such damage such as fraying, kinks, cuts, and cracked or broken outer jackets. Any cord that exhibits damage or feels more than comfortably warm to the touch shall be removed from service, tagged "Do Not Use" and checked by an electrician.
 - 5.6.12 Do not tie power cords in knots. Knots can cause short circuits and shocks. Loop the cords or use a twist lock plug.
- 5.7 Electrical shock associated with power tool use can cause heart failure and burns, as well as injury from falls. Under certain conditions, even a small amount of electric current can result in fibrillation of the heart and death.
 - 5.7.1 Verify that the power source is the same voltage and current as indicated on the nameplate of the tool. Using a higher voltage can cause serious injury to the operator as well as burn out the tool.
 - 5.7.2 All electrical connections for these tools must be suitable for the type of tool and the working

conditions (wet, dusty, flammable vapors).

- 5.7.3 To protect the worker from shock and burns, electric tools must have a three-wire cord with a ground and be plugged into a grounded receptacle, be double insulated, or be powered by a low-voltage isolation transformer.
- 5.7.4 All outdoor receptacles must be protected by means of a ground fault circuit interrupter (GFCI or GFI) available in portable or fixed models. Do not use any electric power tools outdoors in a receptacle that is not properly protected.
- 5.7.5 Three-wire cords contain two current-carrying conductors and a grounding conductor. Any time an adapter is used to accommodate a two-hole receptacle, the adapter wire must be attached to a known ground.
- 5.7.6 The third prong must never be removed from the plug.
- 5.7.7 Double-insulated tools are available that provide protection against electrical shock without third-wire grounding. On double-insulated tools, an internal layer of protective insulation completely isolates the external housing of the tool.
- 5.7.8 Avoid body contact with grounded surfaces like refrigerators, pipes and radiators when using electric powered tools; this will reduce the likelihood of shock if the operator's body is grounded.
- 5.7.9 Report all shocks and/or sparks from electrical tools, no matter how minor. The tool in question should be tagged out and not be used until it has been checked for ground fault.
- 5.8 Only authorized persons are permitted to activate, de-activate or lockout electrical equipment.
- 5.9 Where there is or may be a danger to a worker, from the inadvertent operation of electrical equipment, then that equipment must be locked out and tagged prior to commencing work. Refer to *S3AM-325-PR1 Lockout Tagout*.
 - 5.9.1 Switch off all appropriate devices (MCC, Distribution Panel, Disconnect).
 - Stand to one side when engaging or disengaging an electrical circuit breaker to avoid electrical flash backs Lock and tag Electrical Supply devices in the "OFF" position.
 - 5.9.2 Test to be sure the equipment cannot be operated at the STOP-START switch.
 - 5.9.3 Test to be sure electrical equipment is de-energized.
 - 5.9.4 After completion of task, remove padlocks and destroy tags.

6.0 Personal Protective Equipment (Level D PPE)

- 6.1 Wear proper apparel for the task. Long hair, loose or baggy clothing, ties, or jewellery can become caught in moving parts.
- 6.2 Use gloves with protection appropriate to the task (e.g. impact, abrasion, puncture, etc.).
- 6.3 Safety toed boots.
- 6.4 Use hearing protection as necessary.
- 6.5 Kickback aprons as necessary.
- 6.6 Wear safety glasses with side shields at all times (or safety goggles) and face shield if flying debris may be encountered.

7.0 Belt Sanders

- 7.1 Refer to *S3AM-305-ATT11 Sanders*.

8.0 Drills

- 8.1 Refer to *S3AM-305-ATT8 Power Drill*.

9.0 Planers and Joiners

- 9.1 Use blades of the same weight and set at the same height.
- 9.2 Ensure that the blade-locking screws are tight.
- 9.3 Guard planers and joiners to prevent contact with the blades throughout the full length of the cutting area.
- 9.4 Support the material (stock) in a comfortable position that will allow the job to be done safely and accurately.
- 9.5 Check stock thoroughly for staples, nails, screws, or other foreign objects before using a planer.
- 9.6 Start a cut with the infeed table (front shoe) resting firmly on the stock and with the cutter head slightly behind the edge of the stock.
- 9.7 Use two hands to operate a planer - one hand on the trigger switch and the other on a front handle.
- 9.8 Do not put fingers or any object in a deflector to clean out chips while a planer is running.
- 9.9 Disconnect the power supply when stopping to dump out chips.
- 9.10 Do not set a planer down until blades have stopped turning.
- 9.11 Keep all cords clear of cutting area.

10.0 Routers

- 10.1 Ensure that the bit is securely mounted in the chuck and the base is tight.
- 10.2 Put the base of the router on the work, template or guide. Make sure that the bit can rotate freely before switching on the motor.
- 10.3 Secure stock. Never hold or have another individual hold the material. Sudden torque or kickback from the router can cause damage and injury.
- 10.4 Before using a router, check stock thoroughly for staples, nails, screws or other foreign objects.
- 10.5 Keep all cords clear of cutting area.
- 10.6 Always hold both hands on router handles, until a motor has stopped. Do not set the router down until the exposed router bit has stopped turning.
- 10.7 When inside routing, start the motor with the bit above the stock. When the router reaches full power, lower the bit to two times the required depth.
- 10.8 When routing outside edges, guide the router counter clockwise around the work.
- 10.9 When routing bevels, moldings and other edge work, make sure the router bit is in contact with the stock to the left of a starting point and is pointed in the correct cutting direction.
- 10.10 Feed the router bit into the material at a firm, controlled speed.
- 10.11 Softwood may enable fast router cutting speed. With hardwood, knotty and twisted wood, or with larger bits, cutting may be very slow.
- 10.12 The sound of the motor can indicate safe cutting speeds. When the router is fed into the material too slowly, the motor makes a high-pitched whine. When the router is pushed too hard, the motor makes a low growling noise.
- 10.13 When the type of wood or size of the bit requires going slow, make two or more passes to prevent the router from burning out or kicking back.
- 10.14 To decide the depth of cut and how many passes to make, test the router on scrap lumber similar to the work.

11.0 Circular Saws

- 11.1 Refer to *S3AM-305-ATT2 Circular Saw*.

12.0 Other Saws

- 12.1 Use lubricants when cutting metals.
- 12.2 Keep all cords clear of cutting area.
- 12.3 Cut green or wet material slowly and with caution. Check all material being cut for nails, hard knots, etc.
- 12.4 Make sure guards are installed and are working properly.
- 12.4.1 Table saws must be fitted with blade guards and a splitter to prevent the work from squeezing the blade and kicking back on the operator.
- Exposed parts of the saw blade under the table must be properly guarded.
 - All swing cutoff and radial saws that are drawn across a table with limit stops to prevent the saw from traveling beyond the edge of the table
- 12.4.2 Ensure band saw blades are fully enclosed except at the point of operation.
- 12.4.3 Ensure swing cut-off saws have a guard completely covering the upper half of the saw.
- 12.5 Remember sabre saws cut on the upstroke.
- 12.6 Position the saw beside the material before cutting and avoid entering the cut with a moving blade.
- 12.7 Secure and support stock as close as possible to the cutting line to avoid vibration.
- 12.7.1 Hold the material being cut firmly against a back guide or fence and cut with a single, steady pass.
- 12.7.2 Use a push stick or guide when cutting operation requires the hands of the operator to come close to the blade.
- 12.7.3 When cutting long stock, provide extension tables and a helper to assist the operator.
- 12.7.4 Keep the base or shoe of the saw in firm contact with the stock being cut.
- 12.7.5 Automatic feed devices should be used whenever feasible.
- 12.8 Select the correct blade for the material being cut and allow it to cut steadily. Do not force it. Clean and sharp blades operate best.
- 12.9 Set the blade to go no further than 1/8 to 1/4 inch deeper than the material being cut.
- 12.10 Do not start cutting until the saw reaches its full power.
- 12.11 Do not force a saw along or around a curve. Allow the machine to turn with ease.
- 12.12 Do not insert a blade into or withdraw a blade from a cut or lead hole while the blade is moving.
- 12.13 Do not put down a saw until the motor has stopped.
- 12.14 Do not reach under or around the stock being cut.
- 12.15 Maintain control of the saw always. Avoid cutting above shoulder height.
- 12.16 External Cuts
- 12.16.1 Make sure that the blade is not in contact with the material or the saw will stall when the motor starts.
- 12.16.2 Hold the saw firmly down against the material and switch the saw on.
- 12.16.3 Feed the blade slowly into the stock, maintaining an even forward pressure.

12.17 Internal Cuts

12.17.1 Drill a lead hole slightly larger than the saw blade. With the saw switched off, insert the blade in the hole until the shoe rests firmly on the stock.

12.17.2 Do not let the blade touch the stock until the saw has been switched on.

Americas

Hand & Power Tool Maintenance Inventory

S3AM-305-FM1

EQUIPMENT (MAKE, MODEL, SERIAL #)	EQUIPMENT OWNER	EQUIPMENT STATUS (ON HIRE, ACTIVE, DECOMMISSIONED)	FREQUENCY OF SERVICE	SERVICE TYPE	MANUFACTURER'S STANDARDS	INDUSTRY STANDARDS	LEGISLATED REQUIREMENTS	LOCATION OF EQUIPMENT

Americas

Hand & Power Tool Inspection Report

S3AM-305-FM2

[illegible]

Heavy Equipment

S3AM-309-PR1

1.0 Purpose and Scope

- 1.1 Outline the safe working requirements for working with and near heavy equipment and heavy equipment operation.
- 1.2 Military related vehicles and equipment (e.g. tanks) are not covered under this standard.
- 1.3 This procedure applies to all AECOM Americas-based employees and operations.

2.0 Terms and Definitions

- 2.1 **Heavy equipment** –All excavating equipment (e.g. scrapers, loaders, crawler or wheel tractors, excavators, backhoes, bulldozers, graders, agricultural and industrial tractors, etc.), cranes, lift trucks, drills, etc. This may include off-highway trucks (e.g. dump truck, heavy haul truck, etc.). For requirements related to crew trucks refer to *S3AM-005-PR1 Driving*.
- 2.2 **Operator** – Any person who operates the controls while the heavy equipment is in motion or the engine is running.
- 2.3 **Ground personnel/workers** – Personnel performing work on the ground around heavy equipment (note: operators are considered ground personnel when outside of the equipment cab).

3.0 References

- 3.1 S3AM-005-PR1 Driving
- 3.2 S3AM-202-PR1 Competent Person Designation
- 3.3 S3AM-213-PR1 Subcontractor Management
- 3.4 S3AM-303-PR1 Excavation
- 3.5 S3AM-322-PR1 Overhead Lines
- 3.6 S3AM-325-PR1 Lockout Tagout
- 3.7 S3AM-331-PR1 Underground Utilities & Subsurface Installation Clearance

4.0 Procedure

- 4.1 Roles and Responsibilities
 - 4.1.1 **Managers / Supervisors**
 - Responsible for confirming all equipment is in good working order and all equipment operators are verified as qualified on the piece of machinery they are assigned.
 - As applicable, review as-built drawings.
 - Maintain operation manuals at the site for each piece of equipment that is present on the site and in use.
 - Maintain a list of operators for the project, and the specific equipment that they are authorized to operate.
 - Prohibit equipment from being operated by any personnel who have not been specifically authorized to operate it.

- Confirm an equipment maintenance inventory is maintained, schedules adhered to and appropriate inspections of equipment are conducted.
- Confirm drilling subcontractors are properly pre-qualified in accordance with *S3AM-213-PR1 Subcontractor Management*.
- Require that subcontractor employees follow established safety procedures in operation, inspection, and maintenance of vehicles and equipment.
- Confirm subcontractor machinery and mechanized equipment is approved for use in accordance with the requirements of *S3AM-309-FM1 Approval of Machinery & Mechanized Equipment*.
- Confirm that all rented equipment bears any required current certification marks and arrives in proper working order with the manufacturer's operating manual before acceptance from the supplier.
- Confirm that AECOM and subcontractor machinery and mechanized equipment is certified, as applicable, in accordance with manufacturer specifications and/or regulatory requirements.
- Visually observe the subcontractors' vehicles and equipment, for any unsafe conditions or practices. Equipment or operation not in compliance with applicable safety standards is prohibited.

4.1.2 **Employees / Ground Personnel**

- Confirm that all rented equipment arrives in proper working order with the manufacturer's operating manual before acceptance from the supplier.
- Ground personnel when working in the vicinity of heavy equipment shall have received training, and comply with the applicable rules of engagement.

4.1.3 **Operators (of heavy equipment)**

- Operate the equipment safely, maintain full control of the equipment, and comply with manufacturer's operation manual and the laws governing the operation of the equipment.
- Immediately report defects and conditions affecting the safe operation of the equipment to the appropriate Supervisor.
- Trainees may operate equipment in accordance with jurisdictional requirements and under the direct supervision of a trainer.

4.2 **Communication**

- 4.2.1 Communication between site Managers / Supervisors, heavy equipment Operators, and site Employees / Ground Personnel is a key method of preventing serious injury or death during heavy equipment operations.
- 4.2.2 Managers shall confirm the Industrial site or project specific SH&E Plan is developed and communicated to all affected and involved employees. Refer to *S3AM-209-PR1 Risk Assessment & Management*.
- 4.2.3 Task Hazard Assessments and Daily Tailgate meetings shall be conducted in accordance with *S3AM-209-PR1 Risk Assessment & Management*.
- 4.2.4 Concerning worksites in which other employers control concurrent operations and SH&E issues related to the worksite, the manager shall coordinate with those conducting concurrent operations to confirm appropriate control measures are in place to protect employees from the hazards associated with activities to be performed.
 - Coordination shall occur prior to work commencing, periodically thereafter, and as necessary given changes in scope and/or working conditions.

- Affected employees (including managers and supervisors) shall seek to participate in all site SH&E meetings related to concurrent operations.

4.2.5 The following points outline the communication requirements during heavy equipment operations:

- Site Supervisors/t Managers shall confirm that all operators are notified/informed of when, where, and how many ground personnel will be working on site.
- Site Supervisors/ Managers shall inform all ground personnel before changes are made in the locations of designated work areas.
- Prior to work initiating on site, the Site Supervisor/ Manager is to confirm all operators and ground personnel are trained on the hand signals that will be used to communicate between operators and ground personnel.
- Ground Personnel working around heavy equipment operations are to maintain eye contact with operators to the greatest extent possible (always face equipment). Never approach equipment from a blind spot or angle.
- All heavy equipment whose backup view can be obstructed shall be equipped with reverse warning devices (e.g., backup alarms) that can be significantly heard over equipment and other background noise. Reverse signaling lights shall be in working order.
- When feasible, two-way radios shall be used to verify the location of nearby ground personnel.
- When an operator cannot adequately survey the working or traveling zone, a signal person shall use a standard set of hand signals to provide directions. Flags or other high visibility devices may be used to highlight these signals.

4.3 Ground Personnel

4.3.1 Ground clearance around heavy equipment may significantly reduce hazards posed during heavy equipment operations.

4.3.2 The following points outline the clearance requirements during heavy equipment operations:

- Ground Personnel shall always yield to heavy equipment.
- Ground Personnel shall maintain a suitable “buffer” area of clearance from all active heavy equipment.
- A task hazard assessment that identifies any special precautions shall be completed and communicated to all AECOM personnel associated with or affected by the activity.
- Site Supervisors/ Managers shall designate areas of heavy equipment operation and confirm that all ground personnel are aware of designated areas.
 - Designated areas shall include work zone boundaries and travel routes for heavy equipment.
 - Travel routes shall be set up to reduce crossing of heavy equipment paths and to keep heavy equipment away from ground personnel.
 - Work zone boundaries shall consider line of fire hazards related to the equipment and associated activities. Refer also to *S3AM-309-ATT2 Operator Line of Sight*.
 - If working near heavy equipment, Ground Personnel shall stay clear of loads to be lifted or suspended loads, and out of the travel and swing areas (excavators, all-terrain forklifts, hoists, etc.) of all heavy equipment.
 - During winch use, all swampers or other personnel will remain outside the “whip area” of the winch line or tow cable.
 - At a minimum, employees shall maintain a distance of at least two pile lengths from where piles are being cut and dropped, other than in situations where cut piles are being guided

to the ground utilizing mechanical means (e.g., pile driver and shackle) to control the direction and speed of fall of the cut pile.

- When feasible, Site Supervisors/ Managers shall set up physical barriers (e.g., caution tape, orange cones, concrete jersey barriers) around designated areas and confirm that unauthorized ground personnel do not enter such areas.
- Operators shall stop work whenever unauthorized personnel or equipment enter the designated area and only resume when the area has been cleared.
- Operators shall only move equipment when aware of the location of all workers and when the travel path is clear.
- Ground Personnel shall never stand between two pieces of operating heavy equipment or other objects (e.g., steel support beams, trees, buildings, etc.).
- Ground Personnel shall never stand directly below heavy equipment located on higher ground unless it can be verified ground stability is not a factor and grade of slope is such that it would not contribute to equipment tip-over.
- Ground Personnel may only enter the swing area, work area or path of travel of any operating equipment when:
 - They have attracted the operator's attention and established eye contact, and
 - The operator has idled the equipment down, placed it in neutral, grounded engaging tools, set brakes and communicated entry is permitted.
- Employees shall keep all extremities, hair, tools, and loose clothing away from pinch points and other moving parts on heavy equipment.
- Employees shall not talk, text, or otherwise use a cell phone while standing or walking on a roadway or other heavy equipment path.

4.3.3 At a minimum, all Ground Personnel and Operators outside of heavy equipment shall wear the following:

- High visibility safety vest (fluorescent background material and retro-reflective striping) meeting jurisdictional requirements that is visible from all angles.
 - Background material: should be fluorescent yellow-green, fluorescent orange-red or fluorescent red.
 - Combined-performance retro-reflective material (e.g. the stripes): should be fluorescent yellow-green, fluorescent orange-red or fluorescent red - and shall be in contrast (that is, have a distinct color difference) to the background material.
 - Hazards may require high visibility garments that cover torso, legs and arms.
 - Confirm that vest is not faded or covered with outer garments, dirt, etc.
- American National Standards Institute/Canadian Standards Association- (ANSI/CSA-) approved hard hat
- ANSI/CSA-approved safety glasses with side shields
- At a minimum, CSA or ASTM approved, high-cut (min. 6"), puncture, impact and compression resistant footwear.
- ANSI/CSA-approved hearing protection as needed
- Appropriate work clothes (e.g., full-length jeans/trousers and a sleeved shirt; no tank, crew tops or other loose clothing permitted).

4.4 Prior to work commencing

- 4.4.1 All heavy equipment will be inspected pre-shift and then regularly as required with the details of the inspection recorded in a log book.
- Roll-over protection systems (ROPS) and appropriate overhead protection (Fall Object Protection FOP) shall be in place given the specific equipment requirements. Utilize equipment with enclosed cabs where feasible or accessible.
 - Where use of equipment with enclosed cabs is not feasible or said equipment is not accessible, operators shall use any additional personal protective equipment determined as necessary (e.g. goggles, additional hearing protection, etc.).
 - Equipment operated in hazardous atmosphere environments shall be equipped with the proper safety equipment (e.g., spark arrestors, positive air shut off, etc.).
 - Operation of equipment that has or had cab glass (per the manufacturer's specifications) that is cracked/broken (obstructing the operator's view) or missing is prohibited.
 - A locking device shall be provided that will prevent the accidental separation of towed and towing vehicles on every fifth-wheel mechanism and two-bar arrangement.
 - Trip handles for tailgates of dump trucks and heavy equipment shall be arranged so that when dumping, the operator will be in the clear.
 - The Operator will report defects and conditions affecting the safe operation of the equipment to the Site Supervisor or employer. Any repair or adjustment necessary for the safe operation of the equipment will be made before the equipment is used.
 - Exposed moving parts on heavy equipment (belts, gears, shafts, pulleys, sprockets, spindles, drums, fan belts, flywheels, chains, or other reciprocating, rotating or moving parts) which are a hazard to the operator or to other workers will be guarded.
 - If a part will be exposed for proper function it will be guarded as much as is practicable consistent with the intended function of the component.
- 4.4.2 An approved 4A40BC fire extinguisher shall be present on all heavy equipment. An approved 4A40BC fire extinguisher of appropriate rating shall be present and readily accessible on all heavy equipment.
- Fire extinguishers shall be inspected by the operator prior to heavy equipment operation each shift. Monthly and annual inspections shall be documented.
- 4.4.3 All Operators shall inspect the area adjacent to the machine prior to starting.
- Evaluate ground conditions, concurrent operations and obstructions to identify approved routes of travel and work areas.
 - As applicable, check that there is sufficient swing room and that the outriggers are adequately supported on solid and stable ground
- 4.4.4 Managers / Supervisors shall inform the operators of the equipment that AECOM employees are in the area and inquire if there are any restricted areas or specific rules or requirements. In some industrial facilities, heavy equipment has the 'right of way'.
- 4.4.5 Where the Operator will not have a full view of the path of travel, a signal person will be used on the ground that has a full view of the load, the operator, and the path.
- 4.4.6 All heavy equipment with limited visibility (operator cannot directly or by mirror or other effective device see immediately behind the machine) operated around workers or on a construction site:
- Shall have an audible back-up alarm installed that functions automatically when the vehicle or equipment is put into rear motion.

- All bi-directional equipment shall be equipped with a horn, distinguishable from the surrounding noise level, which shall be operated as needed when the machine is moving in either direction.
- Backing up or movement in both directions for bidirectional equipment shall occur only when a signal person communicates that it is safe to do so if alarms or horns are not feasible.

4.5 Operation

- 4.5.1 The Operator of heavy equipment is the only worker permitted to ride the equipment unless the equipment is equipped by the manufacturer for passengers. Manufacturer operator's manual shall be complied with.
- 4.5.2 A person will not operate heavy equipment unless the person has received adequate instruction and training in the safe use of the equipment, and has demonstrated to a qualified supervisor or instructor competency in operating the equipment.
- Oilers, apprentices, and other operators will not be allowed to operate equipment unless authorized by the Manager.
- 4.5.3 The Operator of heavy equipment will operate the equipment safely, maintain full control of the equipment, and comply with the manufacturer's operator manual and the laws governing the operation of the equipment.
- Operation of company-owned, leased, or rented vehicles or equipment while under the influence of alcohol or illegal drugs or otherwise impaired is prohibited.
 - Do not operate any equipment beyond its safe load or operational limits.
 - Operator shall not talk on, text, or otherwise use mobile phones while operating heavy equipment.
 - Never use bucket teeth or boom for lifting or moving heavy objects.
- 4.5.4 When heavy equipment is used for lifting or hoisting or similar operations there shall be a permanently affixed notation stating the safe working load capacity of the equipment and the notation shall be kept legible and clearly visible to the operator.
- 4.5.5 A Supervisor or Manager will not knowingly operate or permit a worker to operate heavy equipment which is, or could create, an undue hazard to the health or safety of any person. Where compliance is refused, the Manager or his or her designate should be notified immediately.
- 4.5.6 The Operator of heavy equipment will not leave the controls unattended unless the equipment has been secured against inadvertent movement.
- The Operator is not to leave suspended load, machine or part or extension unattended, unless it has been immobilized and secured against inadvertent movement.
 - Turn off heavy equipment, place gear in neutral and set parking brake prior to leaving vehicle unattended.
 - Buckets and blades are to be placed on the ground and with hydraulic gears in neutral when not in use.
 - Brakes shall be set and, as necessary, wheels chocked or equivalent (as applicable) when not in use.
- 4.5.7 The Operator will maintain the cab, floor and deck of heavy equipment free of material, tools or other objects which could create a tripping hazard, interfere with the operation of controls, or be a hazard to the operator or other occupants in the event of an accident.
- 4.5.8 If heavy equipment has seat belts required by law or manufacturer's specifications, the Operator and passengers will use the belts whenever the equipment is in motion, or engaged in an operation which could cause the equipment to become unstable.

- Seat belts shall be maintained in functional condition, and replaced when necessary to ensure proper performance.
- 4.5.9 All vehicles transporting material or equipment on public roads shall comply with local laws pertaining to weight, height, length, and width. Obtain any permits required for these loads.
- 4.5.10 Never jump on to or off of a piece of heavy equipment, always maintain 3-points of contact at a minimum.
- 4.5.11 Never exit heavy equipment while it is in motion.
- 4.5.12 Do not ride with arms or legs outside of the truck body of equipment cab.
- Never ride on the outside of a piece of heavy equipment (e.g. in a standing position on the body, on running boards, or seated on side fenders, cabs, cab shields, rear of truck bed, on the load, bucket, etc.).
- 4.5.13 Have vehicle headlights on at all times when driving in the area.
- 4.5.14 Park motor vehicles off the haul roads, or away from the work areas.
- 4.5.15 Do not wear loose clothing or jewelry where there is a danger of entanglement in rotating equipment.
- 4.5.16 Do not enter the swing area of machines such as cranes, heavy drill rigs, or excavators, without first making eye contact with the operator, and receiving permission to do so. Refer to *S3AM-309-ATT2 Operator Line of Sight*.
- 4.5.17 Stay out of the blind areas around heavy equipment and never assume that the equipment operators have seen you or are aware of your presence.
- 4.5.18 Maintain a distance of at least 2 feet (60 centimeters) between the counterweight of swing machines and the nearest obstacle. If this distance cannot be maintained, a spotter shall observe and be in constant communication with the operator to prevent contact.
- 4.5.19 Vibrations from moving traffic or heavy equipment can cause excavations or spoil piles to become unstable.
- Excavation activity shall be conducted according to *SOP S3AM-303-PR1 Excavation*.
 - Equipment not involved in the excavating activity or not required to be in the vicinity shall keep clear. Equipment that shall operate in the vicinity shall maintain appropriate setback distances from edges of excavations or spoil piles.
- 4.5.20 All heavy equipment shall be operated in a safe manner that will not endanger persons or property.
- When ascending or descending grades in excess of 5 percent, loaded equipment shall be driven with the load up grade.
 - When operating an electric-powered, remote controlled, hydraulic device used for demolishing concrete structures and refractory linings as well as excavating, refer to the *S3AM-309-ATT1 Brokk 180* for more specifics.
- 4.5.21 All heavy equipment shall be operated at safe speeds. Do not drive any vehicle at a speed greater than is reasonable and safe for weather conditions, traffic, intersections, width, and character of the roadway, type of motor vehicles, and any other existing condition.
- 4.5.22 Always move heavy equipment up and down the face of a slope. Never move equipment across the face of a slope.
- 4.5.23 Slow down and stay as far away as possible while operating near steep slopes, shoulders, ditches, cuts, or excavations.
- 4.5.24 When feasible, Operators shall travel with the “load trailing”, if the load obstructs the forward view of the operator.

- 4.5.25 Slow down and sound horn when approaching a blind curve or intersection. Signal people equipped with 2-way radio communications may be required to adequately control traffic.
- 4.5.26 All haulage equipment / trucks, whose payload is loaded by means of cranes, power shovels, loaders, or similar equipment, shall have a cable shield and/or canopy adequate to protect the operator from shifting or falling material. If protection is not available for the operator, the operator shall leave the vehicle and wait in a designated safe location until it is loaded..
- 4.5.27 Equipment shall be shut down prior to and during fueling.
 - Confirm proper grounding/ bonding between equipment and fuel vehicle prior to fueling operations.
 - During fuel operations confirm fuel nozzle remains in contact with the tank.
 - Do not smoke, use electrical devices or have an open flame present while fueling.
 - Fuel shall not be carried in or on heavy equipment, except in permanent fuel tanks or approved safety cans.
- 4.5.28 Site vehicles will be parked in a designated parking location away from heavy equipment.
- 4.5.29 Operators shall never push/pull “stuck” or “broken-down” equipment unless a spotter determines that the area is cleared of all personnel around and underneath the equipment.
- 4.5.30 If designated for work in contaminated areas/zones, equipment shall be kept in the exclusion zone until work or the shift has been completed. Equipment will be decontaminated within designated decontamination areas.
- 4.5.31 Equipment left unattended at night adjacent to travelled roadways shall have appropriate lights or reflectors, or barricades equipped with appropriate lights or reflectors, to identify the location of that equipment, and shall not be closer than 6 feet (1.8m) (or the regulatory requirement for the work location) to the active roadway.
- 4.5.32 Rubber / pneumatic-tired earthmoving haulage equipment shall be equipped with fenders on all wheels. Mud flaps may be used in lieu of fenders whenever motor vehicle equipment is not designed for fenders.
- 4.5.33 Lift trucks shall have the rated capacity clearly posted on the vehicle, and the ratings are not to be exceeded.
- 4.5.34 Steering or spinner knobs shall not be attached to steering wheels.
- 4.5.35 High-lift rider industrial trucks shall be equipped with overhead guards.
- 4.5.36 All hot surfaces of equipment, including exhaust pipes or other lines, that present a possible injury or fire hazard, shall be guarded or insulated.
- 4.5.37 All equipment having a charging skip shall be provided with guards on both sides and open end of the skip area to prevent persons from walking under the skip while it is elevated.
- 4.5.38 Platforms, foot walks, steps, handholds, guardrails, and toeboards shall be designed, constructed, and installed on machinery and equipment to provide safe footing and access ways.
- 4.5.39 Substantial overhead protection shall be provided for the operators of fork lifts and similar equipment.
- 4.6 Utilities
 - 4.6.1 When contacted by heavy equipment, aboveground and underground utilities may cause severe injuries or death as a result of electrocution, explosion, etc. Refer to the *S3AM-322-PR1 Overhead Lines* procedure for more specifics.
 - 4.6.2 The following outline the requirements while performing heavy equipment operations that may lead to contact with aboveground or underground utilities:

- Always be aware of surrounding utilities.
- Confirm all equipment (e.g., dump trailers, loaders, excavators, etc.) is lowered prior to moving underneath aboveground utilities.
- Confirm utilities are cleared and identified prior to beginning any earthmoving operation. Contact the local utility service providers for clearance prior to performing work. Confirm documentation of the contact is made; date, number; contact name, organization, etc. Refer to *SOP S3AM-303-PR1 Excavation* and *S3AM-331-PR1 Underground Utilities & Subsurface Installation Clearance*.

4.7 Training

- 4.7.1 The Operator or other qualified supervisor will provide all on-site personnel with an orientation to the heavy equipment and its associated hazards and controls.
- 4.7.2 Only designated, qualified personnel shall operate heavy equipment.
- 4.7.3 Operators shall have all appropriate jurisdictional licenses or training to operate a designated piece of heavy equipment.
- 4.7.4 Operators shall be evaluated through documented experience and routine monitoring of activities unless the equipment is operated by an AECOM operator in which case a practical evaluation is required. Operators shall be knowledgeable and competent in the operation of a designated piece of heavy equipment.

4.8 Inspection and Maintenance

- 4.8.1 Maintenance records for any service, repair or modification which affects the safe performance of the equipment will be maintained and be reasonably available to the operator and maintenance personnel regulatory agencies upon request during work hours.
- 4.8.2 Maintenance records will be maintained on the site or project for heavy equipment.
- 4.8.3 Conduct maintenance as prescribed by the manufacturer in the Operation Manual for each piece of equipment.
- 4.8.4 Servicing, maintenance and repair of heavy equipment will not be done when the equipment is operating.
 - Lockout and tagout safety procedures are followed. Refer to *S3AM-325-PR1 Lockout Tagout*.
 - Motors are turned off, unless required for performing maintenance or repair.
 - All ground-engaging tools are grounded or securely blocked.
 - Controls are set in a neutral position and brakes are set.
 - Electrically driven equipment is installed with provision for tagging and locking out the controls while under repair.
 - Manufacturer's requirements for maintenance and repair are followed.
 - If continued operation is essential to the process, a safe means of protection shall be provided.
 - Provide and use a safety tire rack, cage, or equivalent protection when inflating, mounting, or dismounting tires installed on split rims, or rims equipped with locking rings or similar devices.
- 4.8.5 All heavy equipment shall have a documented inspection and if necessary, repaired prior to use.
 - Operators shall not operate heavy equipment that has not been cleared for use.
 - All machinery and mechanized equipment will be verified to be in safe operating condition (refer to *S3AM-309-FM1 Approval of Machinery & Mechanized Equipment*) by a competent person (refer to *S3AM-202-PR1 Competent Person Designation*) within seven days prior to operation on a new site or project. Clearance is valid for up to one year for the given site or project.

- As applicable, all machinery and mechanized equipment shall be inspected / certified and tested at appropriate intervals as required by the manufacturer and/or regulatory requirements.
- 4.8.6 All heavy equipment shall be inspected at a minimum to the manufacturer's recommendations prior to each work shift. All defects shall be reported to the Supervisor/ Manager immediately.
- Defective heavy equipment shall be immediately tagged and taken out of service until repaired.
 - Inspection, maintenance, service and repair records shall be maintained at the site. If a manufacturer's or company-specific inspection checklist is not provided, use *S3AM-309-FM2 Heavy Machinery Pre-Operation Checklist*.
 - Records shall be made available for review upon request. Note: Documents may be electronically stored in the project files.
- 4.9 Fueling and batteries
- 4.9.1 A well-ventilated area shall be used for refueling.
- 4.9.2 Only the type and quality of fuel recommended by the engine manufacturer shall be used.
- 4.9.3 Fuel tanks shall not be filled while the engine is running. All electrical switches shall be turned off.
- 4.9.4 If there is potential to spill fuel on hot surfaces, the surfaces shall be permitted to cool down prior to fueling. Any spillage shall be cleaned before starting engine.
- 4.9.5 Spilled fuel shall be cleaned with cotton rags or cloths and disposed of in the proper receptacle; do not use wool or metallic cloth.
- 4.9.6 Open flames, lighted smoking materials, sparking equipment or any other type of ignition source shall remain a minimum of 35' (10.7m) from the fueling area and/or fuel source. This clearance shall be increased if required or conditions warrant.
- 4.9.7 Heaters in carrier cabs shall be turned off when refueling the carrier or the drill rig.
- 4.9.8 Portable containers to be filled shall be placed directly on the ground or be properly grounded prior to filling to prevent creation of a static charge. Portable fuel containers shall not be filled completely to allow expansion of the fuel during temperature changes.
- 4.9.9 Control electrostatic hazards.
- Before activating fuel pump, touch some part of vehicle / equipment to de-energize any static electricity that may be present.
 - The fuel nozzle shall be kept in contact with the tank being filled to prevent static sparks from igniting the fuel.
 - Fuel containers and transfer hoses shall be kept in contact with a metal surface during travel to prevent build-up of a static charge.
- 4.9.10 Portable fuel containers shall not travel in the vehicle or carrier cab with personnel.
- 4.9.11 Batteries shall be serviced in a ventilated area while wearing appropriate Personal Protective Equipment.
- 4.9.12 When a battery is removed from a vehicle or service unit, the battery shall be disconnected ground post first. Consult the SDS applicable to the battery and/or contents for additional information including; handling, precautions, and first aid measures.
- Spilled battery acid shall be immediately flushed off the skin with a continuous supply of water. Battery storage or maintenance areas shall have readily accessible eye wash stations.
 - Should battery acid get into the eyes, the eyes shall be flushed immediately with copious amounts of water and medical attention shall be sought immediately.
- 4.9.13 When installing a battery, the battery shall be connected ground post last.

- 4.9.14 When charging a battery, cell caps shall be loosened prior to charging to permit gas to escape.
- 4.9.15 When charging a battery, the power source shall be turned off to the battery before either connecting or disconnecting charger loads to the battery posts.
- 4.9.16 To avoid battery explosions, the cells shall be filled with electrolytes. A flashlight (not an open flame) shall be used to check water electrolyte levels. Avoid creating sparks around batteries by shorting across a battery terminal. Lighted smoking materials and flames shall be kept at least a minimum of 35 feet (10.7 meters) away from battery-charging stations.

5.0 Records

- 5.1 Inspection, maintenance, service and repair records shall be maintained with the equipment.

6.0 Attachments

- 6.1 [S3AM-309-ATT1](#) [Brokk180 Safety Card](#)
- 6.2 [S3AM-309-ATT2](#) [Operator Line of Sight](#)
- 6.3 [S3AM-309-FM1](#) [Approval of Machinery & Mechanized Equipment](#)
- 6.4 [S3AM-309-FM2](#) [Heavy Machinery Pre-Operation Checklist](#)
- 6.5 [S3AM-309-FM3](#) [Rubber Tire Backhoe Operator Skill Evaluation](#)
- 6.6 [S3AM-309-FM4](#) [Scraper Operator Skill Evaluation](#)
- 6.7 [S3AM-309-FM5](#) [Bull Dozer Operator Skill Evaluation](#)
- 6.8 [S3AM-309-FM6](#) [Dump Truck Operator Skill Evaluation](#)
- 6.9 [S3AM-309-FM7](#) [Roller Compactor Operator Skill Evaluation](#)
- 6.10 [S3AM-309-FM8](#) [Front End Loader Operator Skill Evaluation](#)
- 6.11 [S3AM-309-FM9](#) [Grader Operator Skill Evaluation](#)
- 6.12 [S3AM-309-FM 10](#) [Excavator Operator Skill Evaluation](#)
- 6.13 [S3AM-309-FM11](#) [Water Truck Operator Skill Evaluation](#)
- 6.14 [S3AM-309-FM12](#) [Heavy Equipment Maintenance Inventory](#)
- 6.15 [S3AM-309-FM13](#) [Heavy Equipment Inspection Report](#)

1.0 Objective/Overview

- 1.1 The Brokk 180 is an electric-powered, remote controlled, hydraulic device used for demolishing concrete structures and refractory linings as well as excavating. This machine includes attachments designed exclusively for demolishing work (e.g., grapple, bucket, hydraulic hammer, etc.). By using the remote control unit, an operator can move the machine and attachments in different directions and speeds from afar.

2.0 Potential Hazards

- 2.1 Flying debris
- 2.2 Crush/impact/pinch from extendable boom, tracks, and tipping over
- 2.3 Struck-by
- 2.4 Electricity (subsurface utilities when excavating)
- 2.5 Gas lines (subsurface utilities when excavating)
- 2.6 Noise



3.0 Safe Operating Guidelines

- 3.1 Prior to use, complete a pre-operation inspection to determine if the unit is in safe working condition.
- 3.2 Position the unit to safely perform the intended task, then deploy the outriggers to stabilize the unit.
- 3.3 Confirm that the operator knows what the lifting capacity is; do not exceed the lifting capacity.
- 3.4 Complete a subsurface utility clearance prior to excavating.
- 3.5 Operator should define a swing radius area and exclude workers from the area. Establish a minimum 15-foot (4.5-meter) clearance around the unit while operating.
- 3.6 Do not allow debris to build up around the unit. Maintain good housekeeping practices.
- 3.7 Prior to removing debris from under the boom, stop, disengage the unit, and position the boom so that the attachment is at rest on the ground.
- 3.8 Personnel operating the unit with the remote control device will be properly trained and certified by a competent person.
- 3.9 The operator will be able to maintain line of sight visual contact with the unit at all times to assess hazards and site security.
- 3.10 Maintenance in excess of preventive maintenance activities (e.g., lubrication, replenishing fluids, etc.) will be performed by manufacturer personnel ONLY.
- 3.11 All operations will comply with the manufacturer's recommended policies.

4.0 Training Requirements

- 4.1 Review of applicable Standard Operating Procedures.
- 4.2 Complete knowledge and understanding of remote control functions.
- 4.3 Review and follow manufacturers' recommended policies and practices.

5.0 Personal Protective Equipment

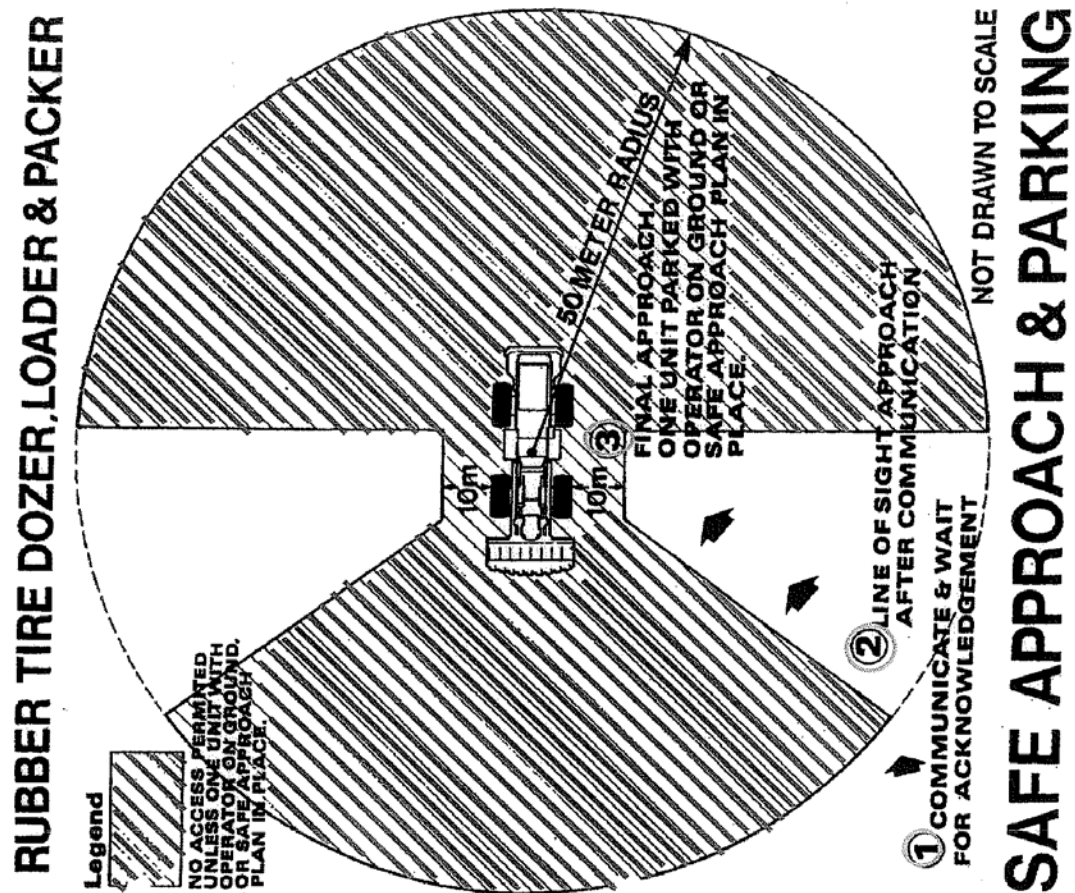
- 5.1 Class II (minimum) American National Standards Institute/Canadian Safety Association Safety Vest
- 5.2 Hard Hat
- 5.3 Safety Toe Boots
- 5.4 Safety glasses with side shields
- 5.5 Hearing protection (ear plugs and/or ear muffs)
- 5.6 Leather gloves

6.0 Other Safety Tips

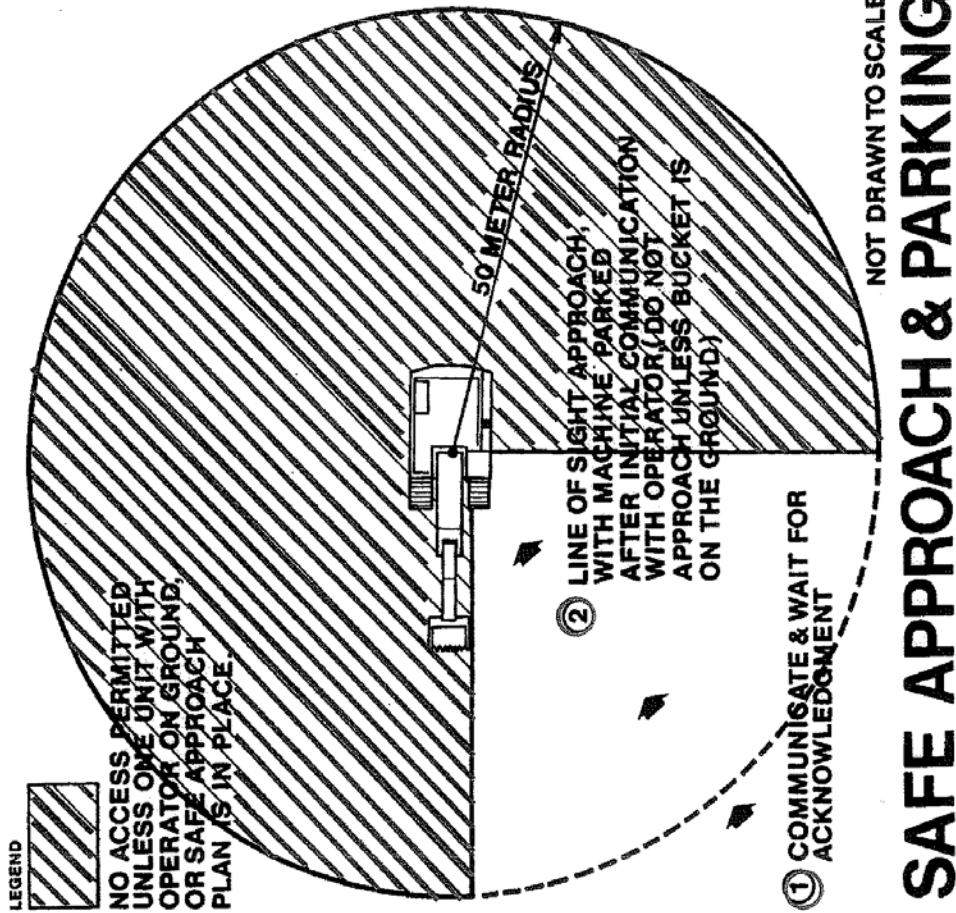
- 6.1 Never stand under a raised boom.
- 6.2 Pay close attention to power cords for potential tripping hazard and equipment entanglement.

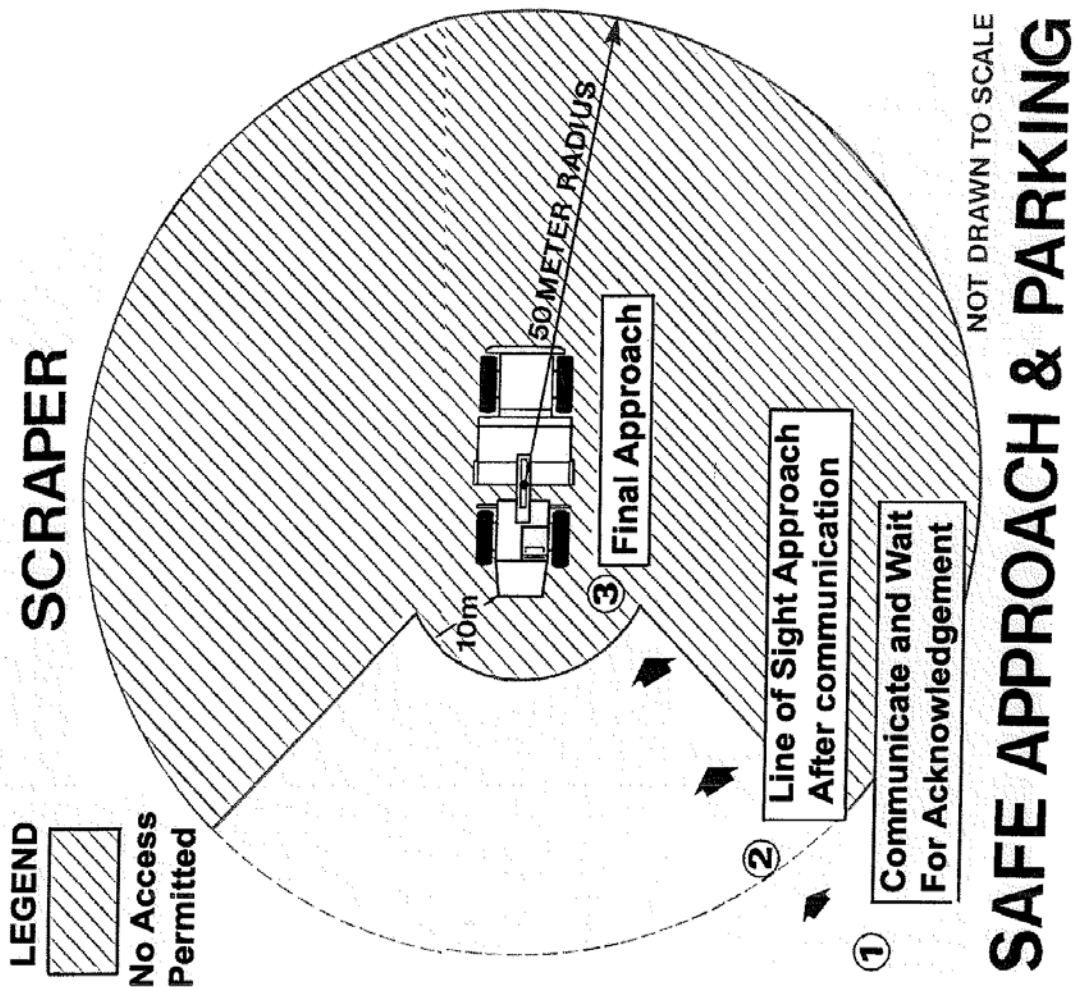
Operator Line of Sight

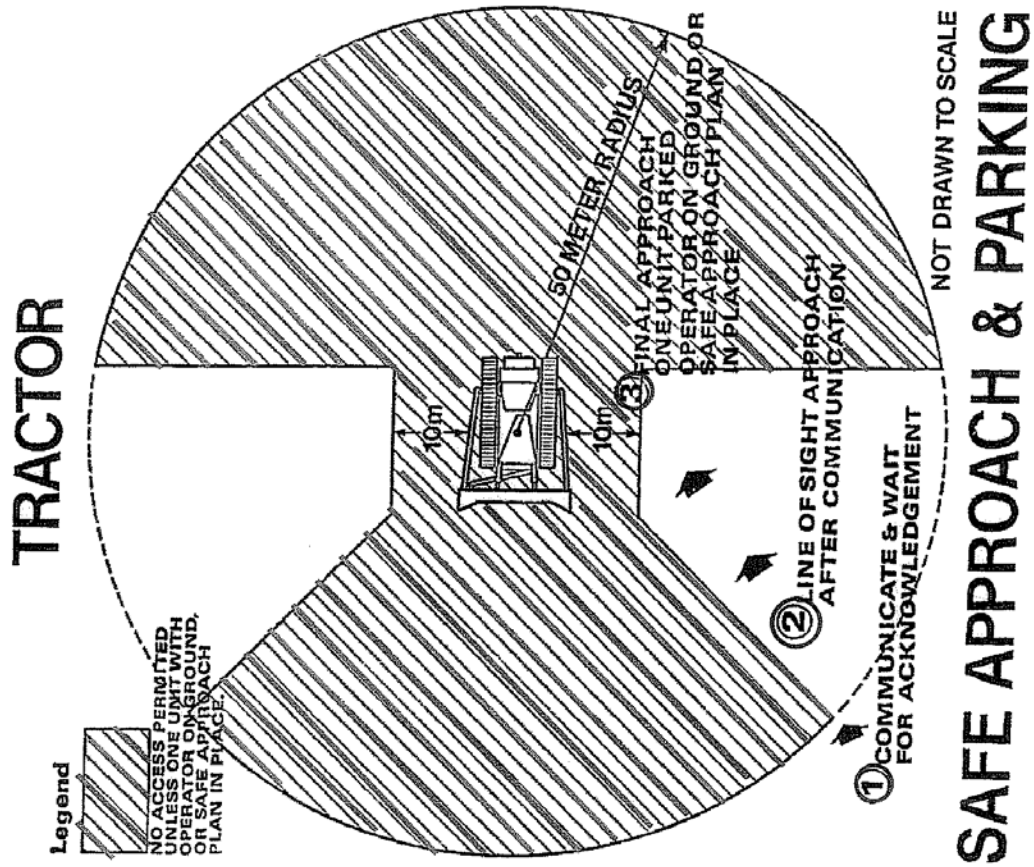
S3AM-309-ATT2

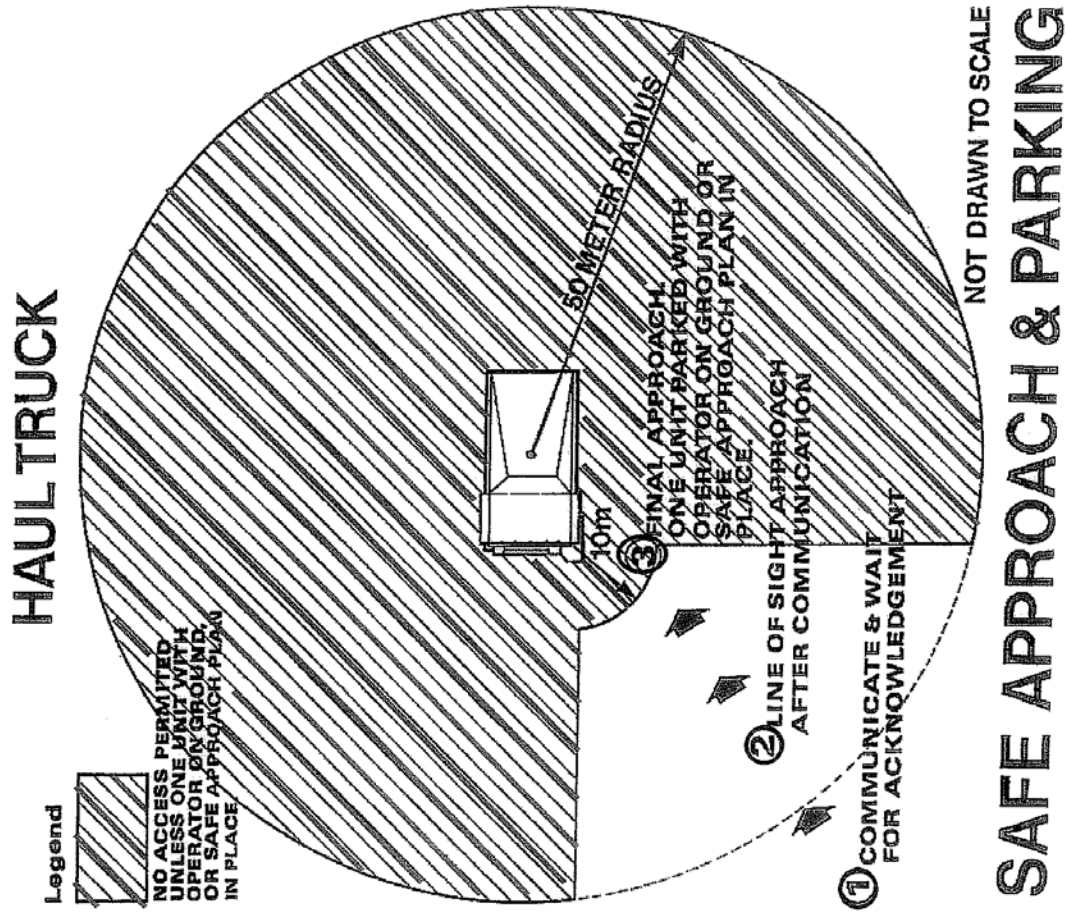


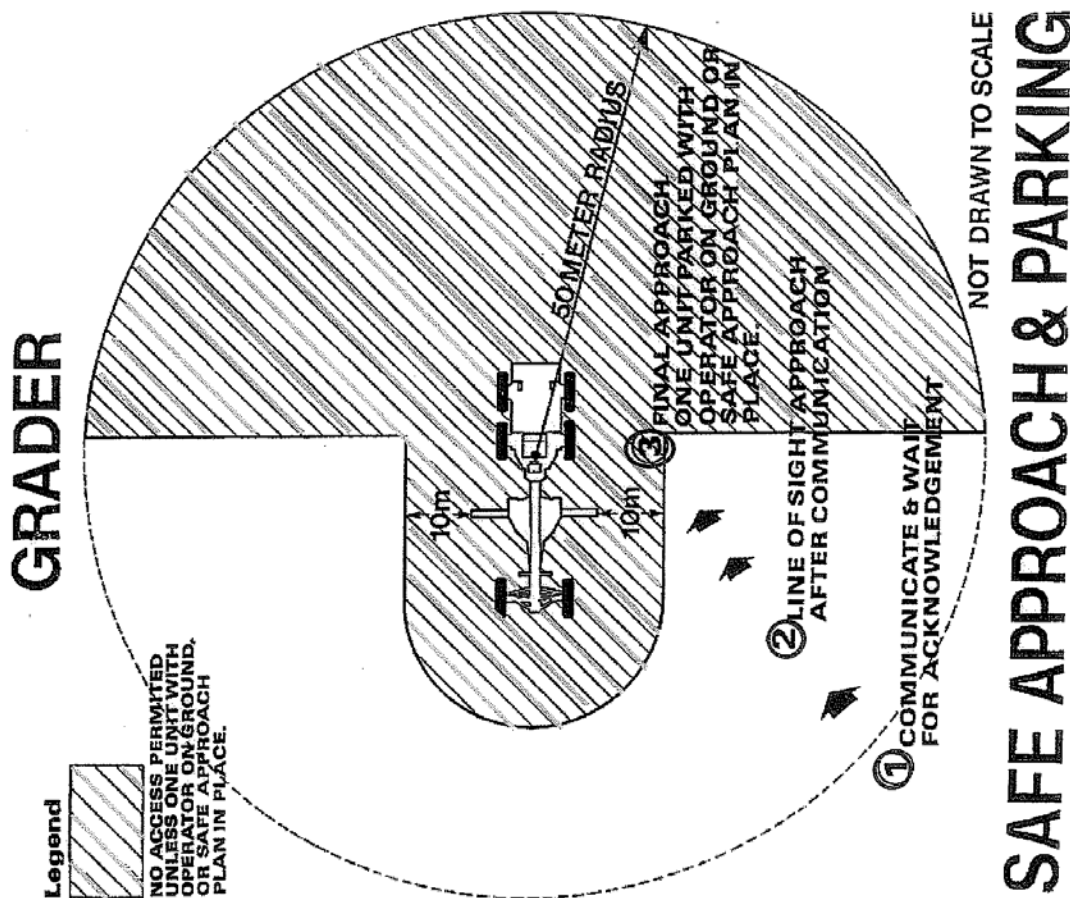
HYDRAULIC EXCAVATOR



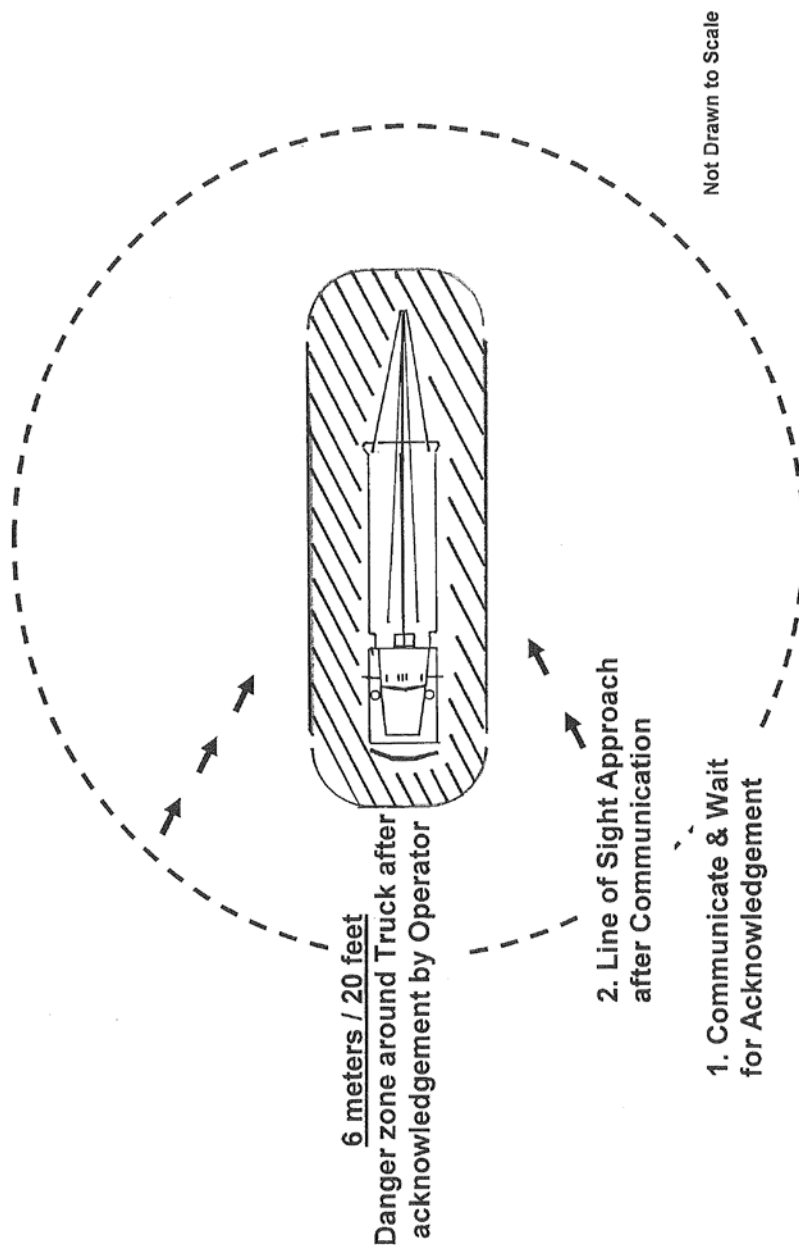








Bed / Pole Truck



SAFE APPROACH & PARKING

Americas**Approval of Machinery and Mechanized Equipment****S3AM-309-FM1****1.0 General Guidelines**

- 1.1 Subcontractor equipment shall comply with all applicable legislative requirements, local, State, Federal, Provincial, Territorial for motor vehicles and material handling heavy equipment.
- 1.2 Approval shall be obtained for all subcontractor machinery and mechanized equipment within seven calendar days of use on the project site.
- 1.3 As applicable, all machinery and mechanized equipment must be certified and tested at appropriate intervals as required by the manufacturer and/or regulatory requirements.
- 1.4 Heavy equipment includes, but is not limited to, drill rigs, front-end loaders, backhoes, trackhoes, bulldozers, forklifts, and similar equipment used for the implementation of the project Statement of Work.

2.0 Equipment Safety Inspections

- 2.1 The following presents general guidelines for certifying equipment is in safe operating condition before activities commence at the site and during site operations. The following guidelines are not meant to be all-inclusive.
 - 2.1.1 All machinery and mechanized equipment will be approved to be in safe operating condition (using the attached form) by a competent individual within seven calendar days in advance of operation on a new site or project. This approval is valid for one year for the given site or project.
 - 2.1.2 Equipment will be inspected on a daily basis by the owner/operator and daily logs will be maintained. All discrepancies shall be corrected prior to placing the equipment in service.
 - 2.1.3 Inspections shall include, but are not limited to, all hydraulic lines and fittings for wear and damage, all cable systems and pull ropes for damage and proper installation, exhaust systems, brake systems, and drill controls, etc.
 - 2.1.4 Drill rigs and related support equipment and vehicles shall be inspected by the driller in charge on a daily basis. These inspections shall be recorded on the Daily Drill Rig Checklist or on equivalent subcontractor forms.
 - 2.1.5 Preventive maintenance shall be conducted for all equipment according to manufacturer recommendations and/or the subcontractor's internal policies, schedules, and equipment Standard Operating Procedures.
 - 2.1.6 Only designated qualified persons shall operate and inspect machinery and mechanized equipment.
 - 2.1.7 The contractor shall maintain records of tests and inspections at the site and shall make the records available upon request of the designated authority; the records shall become part of the official project file.
 - 2.1.8 Equipment found to not be in safe operating condition or to have a deficiency that affects the safe operation of the equipment shall immediately be tagged, taken out of service, and its use prohibited until deficiencies have been corrected to a safe condition.
 - 2.1.9 All equipment shall be kept in the exclusion zone until decontaminated within designated decontamination areas.
 - 2.1.10 Equipment with an obstructed rear view must have an audible alarm that sounds when equipment is moving in reverse.

TO: AECOM

DATE:

FROM:

Project Name:

Project Number:

Project Location:

1. This form provides approval of machinery and mechanized equipment to be used on the referenced project for the following work:

Description of equipment work:	
Project site:	
Subcontractor providing equipment: Address:	
Dates (duration) of equipment work:	

2. Inspection and approval of machinery and mechanized equipment, as required by AECOM, has been made within seven calendar days in advance of use on the project site. This approval process shall be repeated for equipment that is used on the project or site for more than one year.

Identification of equipment (make, model, serial no.)		Date of Certification
1		
2		
3		

3. The above listed equipment has been inspected and tested as indicated on this form, and is DECLARED TO BE IN SAFE OPERATING CONDITION BY THE FOLLOWING COMPETENT INDIVIDUAL:

Name		Title
Company		
Signature		Date

4. If there are any questions regarding this certification, please contact the following AECOM representative:

Americas

Heavy Equipment Pre-Operation Checklist

S3AM-309-FM2

Project Name/Location:									Project #:								
Equipment # / Name:				Make/Model:					Annual Insp/Cert. Date:								
Hour meter reading:																	
Operator Name/Date																	
✓ = Satisfactory; in working order X = Unsatisfactory; not in working order/damaged N/A = Not Applicable																	
Check the following as appropriate	✓	X	N/A	✓	X	N/A	✓	X	N/A	✓	X	N/A	✓	X	N/A		
Side Shields/Screens/Grab Handles																	
Overhead Guard (ROPS, FOP)																	
Horn / Backup Alarm																	
Lights																	
Gauges / Temperature																	
Parking Brake / Service Brakes																	
Steering / Controls																	
Hydraulic System (full, no leaks)																	
Other Fluids (radiator, washer, etc.)																	
Blast Shields																	
Attachment (bucket, forks, compactor, jib)																	
Lift-arm Device																	
Tires / Tracks / Treads (visual)																	
Seat belt / Operator Seat Bar																	
Windows / Mirrors / Wipers																	
Exhaust Components																	
Fuel System (lines secure/no leaks)																	
Electrical Lines																	
Fire Extinguisher																	
Spark arrestor / Positive air shutoff																	
Safety signs																	
General condition (exterior clean/intact)																	
General condition (interior clean/tidy)																	
Quantity of Fuel Added																	
Quantity of Oil Added																	
Operator Signature																	
Comments (including any corrections):																	

Americas

Rubber Tire Backhoe Operator Skill Evaluation

S3AM-309-FM3

Date _____ Employee Name _____ Evaluator _____

<u>Description:</u>		
This equipment is used for primarily for excavation, although it may occasionally be used for other miscellaneous tasks for which crane or stick type equipment is required.		
STEPS	KEYPOINTS	SATISFACTORY
1)	Demonstrated abilities	<input type="checkbox"/> Yes <input type="checkbox"/> No
	b) Pre-shift inspection check list (<i>S3AM-309-FM2 Heavy Machinery Pre-Operation Checklist</i> or equivalent) <ul style="list-style-type: none"> i) Check equipment for loose bolts, leaks; oil, hydraulic and water ii) Make sure area around the equipment is clear of people and other equipment iii) Check for fire extinguisher iv) Make sure that the following equipment is operational <ul style="list-style-type: none"> a) Brakes b) Lights c) Back-up alarms d) Hand rails & ladders e) Seat belts f) Tires if applicable g) Glass, wipers h) Gauges, including temperature, oil, and fuel i) Wheel chocks v) Notify supervision of any equipment that is not operational vi) The operator can park a piece of equipment that is unsafe to operate if it poses a danger or hazard to employees or property 	
	c) Maintain three points of contact while entering and exiting the equipment	
2)	Identification of equipment controls	<input type="checkbox"/> Yes <input type="checkbox"/> No
3)	Excavating techniques <ul style="list-style-type: none"> a) Benching, sloping b) Spoil removal from side wall c) Back filling operations d) Aware of surroundings and personnel near the swing radius of boom 	<input type="checkbox"/> Yes <input type="checkbox"/> No
4)	Can arrange controls and boom for travel	<input type="checkbox"/> Yes <input type="checkbox"/> No
5)	Speed in relation to terrain (controlled speed)	<input type="checkbox"/> Yes <input type="checkbox"/> No
6)	Stock piling with front end bucket	<input type="checkbox"/> Yes <input type="checkbox"/> No
7)	Loading truck bed with bucket	<input type="checkbox"/> Yes <input type="checkbox"/> No
8)	Parking and shut down procedures <ul style="list-style-type: none"> a) Equipment line-up <ul style="list-style-type: none"> i) Straight line ii) Allow easy access for maintenance and servicing b) Turn off all accessories c) Set all park brakes d) Lower bucket to ground e) Place and position wheel chocks f) Perform a general walk around looking for items for maintenance 	<input type="checkbox"/> Yes <input type="checkbox"/> No

Any items checked 'No' require additional training of operator and the skill evaluation to be repeated until the operator successfully achieves a satisfactory status in all skill identified.

Americas

Excavator Operator Skill Evaluation

S3AM-309-FM10

Date _____ Employee Name _____ Evaluator _____

<u>Description:</u>		
Operates a rubber tire or crawler type tractor with an attached bucket on front end. Moves a lever to raise and lower and dump contents of bucket. Machine is used to load materials from stockpiles, excavation, loading trucks.		
STEPS	KEYPOINTS	SATISFACTORY
1)	Demonstrated abilities a) Pre-shift inspection check list (<i>S3AM-309-FM2 Heavy Machinery Pre-Operation Checklist</i> or equivalent) i) Check equipment for loose bolts and leaks; check oil, air, hydraulic fluid and water ii) Make sure area around the equipment is clear of people and other equipment iii) Check for fire extinguisher iv) Make sure that the following equipment is operational a) Brakes b) Lights c) Back-up alarms d) Hand rails & ladders e) Seat belts f) Tires g) Glass, wipers h) Gauges, including temperature, oil, air and fuel i) Wheel chocks (for rubber tire type excavators) v) Notify supervision of any equipment that is not operational vi) The operator can park a piece of equipment that is unsafe to operate if it poses a danger or hazard to employees or property b) Maintain three points of contact while entering and exiting the equipment	<input type="checkbox"/> Yes <input type="checkbox"/> No
2)	Identification of equipment controls	<input type="checkbox"/> Yes <input type="checkbox"/> No
3)	Loading techniques a) Use of bucket and controls b) Crowding the pile c) Pump loading, etc. d) Loading patterns e) Loading trucks f) Loading scrapers	<input type="checkbox"/> Yes <input type="checkbox"/> No
4)	Control handling of soils	<input type="checkbox"/> Yes <input type="checkbox"/> No
5)	Shifting and hauling	<input type="checkbox"/> Yes <input type="checkbox"/> No
6)	Stockpiling	<input type="checkbox"/> Yes <input type="checkbox"/> No
7)	Mixing and moisture conditioning	<input type="checkbox"/> Yes <input type="checkbox"/> No
8)	Feeding crusher	<input type="checkbox"/> Yes <input type="checkbox"/> No
9)	Rough cut and fill	<input type="checkbox"/> Yes <input type="checkbox"/> No
10)	Spreading material	<input type="checkbox"/> Yes <input type="checkbox"/> No
11)	Parking and shut down procedures a) Equipment line-up i) Straight line ii) Allow easy access for maintenance and servicing b) Turn off all accessories c) Lower bucket to the ground d) Place and position wheel chocks (rubber tire type excavator) e) Perform a general walk around looking for maintenance items	<input type="checkbox"/> Yes <input type="checkbox"/> No

Any items checked 'No' require additional training of operator and the skill evaluation to be repeated until the operator successfully achieves a satisfactory status in all skill identified.

Americas

Water Truck Operator Skill Evaluation

S3AM-309-FM11

Date _____ Employee Name _____ Evaluator _____

<u>Description:</u>		
Drives articulated, pull type, single and two axle type water trucks. Waters roads, fills, and cut areas to suppress dust.		
STEPS	KEYPOINTS	SATISFACTORY
1)	Demonstrated abilities a) Pre-shift inspection check list (<i>S3AM-309-FM2 Heavy Machinery Pre-Operation Checklist</i> or equivalent or DOT daily inspection if applicable) i) Check equipment for loose bolts and leaks; check oil, air, hydraulic fluid and water ii) Make sure area around the equipment is clear of people and other equipment iii) Check for fire extinguisher iv) Make sure that the following equipment is operational a) Brakes b) Lights c) Back-up alarms d) Hand rails & ladders e) Seat belts f) Tires g) Glass, wipers h) Gauges, including temperature, oil, air and fuel i) Wheel chocks v) Notify supervision of any equipment that is not operational vi) The operator can park a piece of equipment that is unsafe to operate if it poses a danger or hazard to employees or property b) Maintain three points of contact while entering and exiting the equipment	<input type="checkbox"/> Yes <input type="checkbox"/> No
2)	Identification of equipment controls	<input type="checkbox"/> Yes <input type="checkbox"/> No
3)	Loading Techniques a) Minimizes spillage b) Uses chocks or turns into berm	<input type="checkbox"/> Yes <input type="checkbox"/> No
4)	Shifting and Hauling	<input type="checkbox"/> Yes <input type="checkbox"/> No
5)	Properly applies water to ramps/corners	<input type="checkbox"/> Yes <input type="checkbox"/> No
6)	Backing with the use of mirrors	<input type="checkbox"/> Yes <input type="checkbox"/> No
11)	Parking and shut down procedures a) Equipment line-up i) Straight line ii) Allow easy access for maintenance and servicing b) Turn off all accessories c) Use park break d) Place and position wheel chocks e) Perform a general walk around looking for maintenance items	<input type="checkbox"/> Yes <input type="checkbox"/> No

Any items checked 'No' require additional training of operator and the skill evaluation to be repeated until the operator successfully achieves a satisfactory status in all skill identified.

Americas

Heavy Equipment Maintenance Inventory

S3AM-309-FM12

EQUIPMENT (MAKE, MODEL, SERIAL #)	EQUIPMENT OWNER	EQUIPMENT STATUS (ON HIRE, ACTIVE, DECOMMISSIONED)	FREQUENCY OF SERVICE	SERVICE TYPE	MANUFACTURER'S STANDARDS	INDUSTRY STANDARDS	LEGISLATED REQUIREMENTS	LOCATION OF EQUIPMENT

Americas

Heavy Equipment Inspection Report

S3AM-309-FM13

[illegible]

Working Alone

S3AM-314-PR1

1.0 Purpose and Scope

- 1.1 This procedure establishes the requirements for communication and accountability between personnel at a work site to reduce the potential for incidents occurring to one employee without help readily available and to facilitate the rapid mustering of assistance to employees in the event of an emergency.
- 1.2 This procedure applies to all AECOM America-based employees and operations.

2.0 Terms and Definitions

- 2.1 **Buddy System** – A system of organizing employees at a work site in such a manner that each employee is accompanied by or in communication with at least one other employee or is escorted by a client or contractor representative during work site activities.
- 2.2 **Controlled Work Areas** – One or more designated work areas on a field project site where hazardous activities and/or strictly defined operations take place. Such controlled work areas include, but are not limited to, remediation or construction sites; a restricted radius where a critical lift operation will take place could be declared a controlled work area. On a HAZWOPER site, the controlled work area is divided into the exclusion zone, the contaminated reduction zone, and the support zone.
- 2.3 **Working Alone** – Performing work with no line of sight or direct voice communication with another person who is aware of your assignment and capable of initiating emergency response.

3.0 References

- 3.1 S3AM-005-PR1 Driving
- 3.2 S3AM-209-PR1 Risk Assessment & Management

4.0 Procedure

- 4.1 Roles and Responsibilities
 - 4.1.1 **Manager or Supervisor**
 - Establish if employee is permitted to work alone, through evaluation of employee's experience, training and any personal limitations (e.g. life-threatening allergic reactions).
 - Provide the resources, communication devices, emergency response plans, and check-in procedures as listed in the Task Hazard Assessment (THA) or SH&E plan, etc. necessary so that employees are not working alone or have a buddy system in place.
 - Act as point of contact if employees miss their check-in.
 - 4.1.2 **Employees**
 - Complete training as required to prepare for working alone.
 - Confirm emergency contacts are provided to the Manager or supervisor in case of an emergency.
 - Establish a buddy system and check in procedure in accordance with the THA or SH&E Plan provided by the Manager and Supervisor.
 - 4.1.3 **SH&E Managers**
 - Review and approve relevant planning documents entailing employees working alone and on remote travel.

4.2 General

- 4.2.1 All projects/programs shall conduct a review of all tasks performed by AECOM to establish specific work alone procedural requirements as defined here. They shall have at minimum a THA and SH&E Plan that has been reviewed by the SH&E Manager.
- 4.2.2 Employees are discouraged from working alone on any site due to the risk of delayed assistance in the event of an incident. If they will be out of contact with other employees, they shall establish a buddy system or check-in procedure with another employee or responsible person.
- 4.2.3 Employees working alone or in small crews in remote isolation shall have an effective means of communication including cell/radio/satellite phone as well as established check-in times.
- 4.2.4 When traveling alone, staff shall take appropriate precautions, including notifying someone of their travel plans as well as carrying a communication device and safety equipment, as appropriate. See *S3AM-005-TP1 Journey Management Plan*.

4.3 No employee shall work by themselves or without a buddy system established if they are conducting a hazardous job task.

4.3.1 The following tasks are considered hazardous:

- Working at heights.
- Working in a confined space.
- Working in a trench.
- Lock out/tag out tasks.
- Work on energized equipment.
- Working with electricity.
- Working with hazardous substances or materials.
- Working with material under pressure.
- Working where there is a possible threat of violence, including civil unrest.
- Working in avalanche areas.
- Working on water or ice.
- Working in remote or wilderness isolation.
- Working in a controlled area.
- Extreme heat or cold stress environments.
- Working with power tools/equipment.
- Working with/operating heavy equipment or machinery.
- Working in isolation from first aid services or immediate/emergency assistance.
- Working around mobile equipment.
- Highway and road work.

4.3.2 The following tasks (identified as hazardous) may permit working alone provided it can be demonstrated there is no substantial increased risk associated with working alone:

- Working with power tools/equipment (e.g. power drill versus chainsaw).
- Working with material under pressure (e.g. small air compressor versus compressed gasses).

4.4 Office Work

- 4.4.1 The supervisor shall have in place and shall communicate as part of location specific orientation, its procedures for the safety and security of an employee working alone in the office. Contact numbers to be used in case of emergency are posted at all common gathering areas or major exits.
- 4.4.2 Employees working in the office after regular working hours or in situations where they are working alone shall keep the entrance to the office locked.
- 4.4.3 If the building is monitored by a security service, employees working in the office after regular working hours or working alone shall notify the security guard of their presence and anticipated hours. If the building does not have a security service, the employee working alone shall notify their supervisor or a family member or friend if agreed to by their supervisor.
- 4.4.4 During all working hours, employees shall stay alert to unauthorized entries into the building and to other suspicious activities and shall report them to security or their supervisor immediately.
- 4.5 Field Work
 - 4.5.1 Prior to work commencing, a THA shall be prepared for all assignments on which employees are to work alone (in accordance with *S3AM-209-PR1 Risk Assessment & Management*). The THA shall consider travel time, weather, available communications, and the impact of working alone when establishing risk ratings of the hazards associated with the task and work environment.
 - 4.5.2 The THA should also consider whether the employee assigned to work alone has sufficient training and qualifications in the tasks to be performed to allow the employee to work safely alone. The employee's personal medical conditions may be considered if the employee has voluntarily made the medical condition known to the Manager or Supervisor.
 - 4.5.3 The THA should identify the controls required for the safety of employees as applicable to the job task and location. Some controls associated with working alone or in remote isolation include a buddy system, standardized check-in times, what to do if a check-in is missed (e.g. worker in proximity attends site, utilizing secondary communication method, etc.), specialized communication devices, and enhanced emergency supply kits.
 - 4.5.4 The THA is completed in addition to the SH&E plan which details the work activities and the procedures to manage the hazards and in accordance with *S3AM-209-PR1 Risk Assessment & Management*.
- 4.6 Buddy System
 - 4.6.1 When conducting non-hazardous work, employees shall work with a buddy (another responsible individual) or follow check –in procedures listed in the THA or SH&E Plan.
 - 4.6.2 When conducting hazardous work, employees shall work with a buddy (another responsible individual) at all times.
 - 4.6.3 Once assigned as buddies, personnel shall remain in contact.
 - 4.6.4 When electronic communication devices are used, prior to starting work, a protocol shall be established and agreed to by each buddy to confirm that periodic effective and faultless communications are maintained
 - 4.6.5 When unanticipated conditions develop that do not permit line of sight and direct voice contact, and alternate communication was not established in the THA, Stop Work and notify the Supervisor. If permission from the Supervisor is obtained to continue the work, voice contact shall be achieved using reliable electronic communication devices such as, but not limited to, hand-held radio or cell phone. The THA shall be updated to reflect this change.
 - 4.6.6 If crews will separate once they reach their work site, they shall then be considered to be "working alone". The buddy system or check-in procedures shall be established, as determined by the work being hazardous or non-hazardous and as identified in the THA.

- 4.6.7 Client or contractor personnel may be substituted for an AECOM employee's buddy only if they are designated by the client or contractor and the AECOM manager or supervisor, and are properly trained to the tasks and the site's emergency response procedures.
- 4.6.8 A missed communication event shall initiate the applicable missed check-in actions established in the THA (e.g. worker in proximity attends site, utilizing secondary communication method, etc.) and may trigger emergency response procedures. The results of each communication event shall be documented in the program or project files.
- 4.7 Check-In Procedures
 - 4.7.1 All field crews shall establish check-in procedures as part of the THA or SH&E Plan prior to leaving the office. These procedures shall be reviewed daily as part of the Task Hazard Assessment review or more frequently if there is a change in work arrangements that could adversely affect a worker's well-being or a report that the system is not working effectively. These procedures shall be confirmed with the assigned Check-In Person daily.
 - 4.7.2 The timing and frequency of those check-in procedures schedule shall be established prior to the initiation of field operations and shall vary depending on the task and location of the work.
 - 4.7.3 If communication is lost between buddies or a check-in time is missed, it shall be assumed that an emergency situation exists, and the site's emergency response procedures shall be implemented. Site work shall cease until the emergency is resolved and the Supervisor directs personnel to restart work.
 - 4.7.4 If crews will separate once they reach their field site, they will then be considered to be "working alone" and will establish a buddy system with the other members of the crew.
 - 4.7.5 Employees working alone or in small crews in remote isolation will have an effective means of communication system including cell/radio/satellite phone as well as established check-in times.
 - 4.7.6 The Check-In Procedure will be reviewed daily as part of the THA review or more frequently if there is a change in work arrangements that could adversely affect a worker's well-being or a report that the system is not working effectively.
- 4.8 Emergency Response Procedures
 - 4.8.1 All field employees and the Check-In Person shall be provided with the location specific Emergency Response Plan (may be included in the THA or SH&E plan, or exist as a separate document).
 - 4.8.2 The Check-In Person shall have access to a route map or understands their anticipated route of travel.
 - 4.8.3 The established contact person shall follow the procedures below, with specifics established in the SWP Plan or THA, if a field employee has missed a check-in:
 - First, they shall attempt to make contact with the field employee directly.
 - If that fails to provide a response, they shall contact other persons who may have been on site, including client supervisors, or other locations where the field employee might be (e.g., hotel, home, office).
 - If the field employee still cannot be located, the emergency contact person notifies the manager or supervisor responsible for the employee.
 - Depending on the location and situation, they shall then dispatch another employee, another supervisor, or an appropriate emergency response agency (e.g., police) to travel to the last known location of the field employee.
 - If the dispatched responder arrives at the site but cannot locate the field employee, the appropriate public emergency contacts (e.g., police, search and rescue) shall be made and the employee's personal contacts shall be notified by Human Resources.

- If the dispatched responder finds the crew in an emergency situation (medical, environmental, structural, etc.), the appropriate steps shall be taken to isolate the hazard, administer first aid, and contact emergency support services.

4.9 Training

- 4.9.1 All employees shall receive an initial orientation that includes the hazards and controls associated with working alone.
- 4.9.2 If working in wilderness, all field employees will be able to orienteer using a map and compass—if not, the basic skills of orienteering will be provided by an experienced employee before work commences. Refer to the *S3AM-314-ATT1 Wilderness Isolation* instruction for more specifics.
- 4.9.3 Employees working alone should be trained in First Aid. Consideration should be given to Wilderness First Aid training based on the anticipated work environment.
- 4.9.4 Employees regularly working in remote, isolated wilderness locations will either participate in a wilderness survival course from a qualified provider (one or two day) or will obtain management approval based on their level of experience/competence in wilderness situations.

5.0 Records

- 5.1 None

6.0 Attachments

- 6.1 [S3AM-314-ATT1 Wilderness Isolation](#)

Wilderness Isolation

S3AM-314-ATT1

1.0 Planning

- 1.1 Working in wilderness isolation presents many more potential hazards and should only be conducted by teams with documented experience, safety plans, and equipment appropriate for the tasks and conditions of the work.
- 1.2 A safety plan and Task Hazard Analysis will be reviewed by the SH&E Manager.

2.0 Safety Equipment

- 2.1 All field employees should regularly carry the following on their person:
 - GPS Unit.
 - Compass.
 - Lighter, matches, or a "flint" of fire steel.
 - A knife or folding saw.
 - Map.
 - First aid kit.
 - Communication device appropriate to the type of coverage anticipated in the area.
- 2.2 When hiking long distances, it is recommended that a "mini survival kit" that includes the following items be carried in addition to the items listed above:
 - Fire starter (tinder). Cotton balls with lip balm work well, or paper egg cartons with cotton balls and paraffin wax; if buying commercial fire starter, test it after several months.
 - A whistle.
 - Heavy tinfoil (to melt snow, to cook on, or to boil water in).
 - Water and/or portable water purification device (e.g. steri-pens®).
 - Some high-energy food.
 - Cordage or rope (about 50 feet).
 - Bear spray and/or bear bangers.
- 2.3 When using an ATV or helicopter for isolated work, it is recommended that a survival bag or backpack that can be left at a known muster point be put together. This bag should include the following items:
 - Additional fire starter (tinder).
 - Matches, fire steel.
 - A multi-tool (like a Swiss Army knife).
 - A folding saw.
 - 3-8'x6" tarps plus one 12 X 16" tarp or larger (or a tent).
 - 100 " of utility cord or parachute cord.
 - A small pot.
 - A small stove (a small folding military stoves with trioxethelyne tablets will work well).
 - Closed cell foam pads or several square feet of double-wall bubble insulation (the silver sided bubble wrap used in construction) to use as a sleeping pad or for hypothermia treatment.
 - Emergency Food.
 - Water.
 - Sleeping bag with a mylar® bivouac (bivy) sack to be used as a vapor barrier inside.

3.0 Drinking Water

- 3.1 No surface water can be considered safe for human consumption without treatment. Even the cleanest looking spring water could be polluted. Untreated water may be contaminated with bacteria, viruses, or protozoa.
- 3.2 On short trips, carry treated water or obtain water from another safe source.
- 3.3 When field projects take you into remote isolation where there is the potential for not having access to clean drinking water, be sure to take the appropriate tools with you: a water filter, tin foil or a pot for boiling water, or tablets or chemicals for treating the water prior to consumption.
- 3.4 Generally, the chances of finding safe drinking water in the mountains increase as you gain altitude. Intense sunlight at high altitudes kills undesirable bacteria and viruses but harmful cysts are unaffected.
- 3.5 Runoff water from streams below glaciers is often cloudy with silt and should be filtered.
- 3.6 Well water and moving rivers are the best locations to obtain water. Avoid stagnant water, shoreline water, and water close to human habitations and campsites.
- 3.7 During the winter, it is best to use an open water source or to obtain water through a hole in the ice. Check the safety of the ice first. Melting ice and snow consumes fuel and takes extra time. Eating snow or ice directly can lead to chilling and hypothermia and could also cause stomach cramps and headaches. Beware of colored snow, which indicates the presence of algae that could cause diarrhea if ingested. Even in winter, all water should be purified.
- 3.8 Water Treatment
- 3.8.1 Each method of water treatment has its advantages and disadvantages. Use only boiled or treated (filtered and disinfected) water for drinking, brushing teeth, or washing fruits and vegetables that will be eaten raw. Heat is the oldest, safest and most effective method of purifying water. However when boiling is not practical because of time and lack of a heat source, water should be treated by filtration and disinfection. This method may not be as effective as boiling the water.
- 3.8.2 Use two water containers: one for treating water and the other for carrying purified water. After disinfection, shake the container vigorously. Wait five minutes. Shake it again with the lid loose so that some water leaks out to cleanse the mouth of the container. Then pour the water into a clean container for drinking water.
- 3.8.3 Boiling. Bring the water to a boil for at least one minute (adding one more minute for each 300 m (1000 ft.) above sea level. If the water is cloudy, filter it before boiling.
- 3.8.4 Filtration. Water filters for use in the wilderness are available. Avoid filters that allow particles larger than 0.5 microns to pass. Filters with a pore size of 0.1 to 0.3 micron can remove protozoa and some bacteria but may not remove viruses. Filtration alone is insufficient to purify water; hence, it should be combined with disinfection to kill viruses and bacteria.
- 3.8.5 Disinfection. Disinfect with chlorine or iodine compounds, following the manufacturers instructions. Disinfection alone may not kill some protozoa..

Table 1: Summary of Water Purification Methods				
	Boiling	Chlorine	Iodine	Filters
Bacteria	E	E	E	M
Viruses	E	E	E	N
Protozoa	E	M	M	M
Chemicals	M	N	N	N

E = effective M = may be effective (see text) N = not effective

- 3.8.6 Additional portable water purification devices are available, using methods such as ozone disinfection, ultraviolet purification, or solar water disinfection.
- 3.8.7 Water treatment methods should be evaluated for suitability to the work environment, the potential water hazards, and limitation of the device.
- 3.8.8 Some water-borne diseases are difficult to diagnose. If you are not feeling well and have recently drunk water from a source in the wild, inform your doctor that you may have consumed untreated water.

1.0 Purpose and Scope

- 1.1 This procedure applies to all AECOM Americas based employees and operations where the potential for hand injuries is present.
- 1.2 This procedure is intended to protect employees from activities that may expose them to hand injury. This procedure provides information on recognizing those conditions that require personal protective equipment (PPE) or specific work practices to reduce the risk of hand injury.
- 1.3 All personnel shall have gloves in their immediate possession 100% of the time when in a shop or on a work site. Appropriate gloves shall be worn when employees work with or near any materials or equipment that present the potential for hand injury due to sharp edges, corrosives, flammable and irritating materials, extreme temperatures, splinters, etc.

2.0 Terms and Definitions

- 2.1 None

3.0 References

- 3.1 S3AM-003-PR1 SH&E Training
- 3.2 S3AM-208-PR1 – Personal Protective Equipment
- 3.3 S3AM-209-PR1 – Risk Assessment & Management
- 3.4 S3AM-325-PR1 – Lockout Tagout

4.0 Procedure

- 4.1 Roles and Responsibilities

4.1.1 Manager / Supervisor

- Implementation of this standard for the applicable facility, site, or project location.
- Confirm employees are familiar with this procedure and have appropriate training.
- Confirm the appropriate hand protection is available on site as necessary.

4.1.2 Employees

- Recognize hazards to hands.
- Comply with this procedure as well as client or work location requirements.

4.1.3 SH&E Manager

- Advise supervisors and site personnel on matters relating to hand safety.
- Work with the manager / supervisor to confirm that sufficient PPE and equipment are available.
- Maintain contact with manager / supervisor to regularly evaluate site conditions and new information that might require modifications to this procedure.
- Conduct training or briefings, when necessary, and to explain the content of this procedure and site hazards to employees.
- Assist in investigation of incidents that resulted or could have resulted in an injury.

4.2 Hazard Assessment

4.2.1 Perform hazard assessments for those work activities likely to require Personal Protective Equipment (PPE).

- Use the Task Hazard Assessment (THA) to perform the hazard assessment (in accordance with *S3AM-209-PR1 Risk Assessment & Management*). The THA will accompany AECOM personnel at jobsites for use in the event of a job or task change, or
- Use the *Gloves Needs Assessment – S3AM-317-FM1* or equivalent to perform the assessment.
- Re-evaluate completed hazard assessments when the job or task changes.

4.2.2 The hierarchy of controls should be considered during the THA process to minimize or eliminate the need for hand protection PPE or material handling tools. Examples of controls are chemical substitution, machine guarding, and use of different tools.

4.2.3 Select PPE that will protect employees if hazards cannot be eliminated.

- Review Safety Data Sheets for project or task-specific chemicals to determine appropriate PPE. If needed, consult with a SH&E Manager for assistance.
- Review glove manufacturer recommendations for both physical and chemical protection.
- Obtain gloves of the correct size for the employees.
- When both chemical and physical protection is of concern, wear the chemical protection gloves (e.g., nitrile) inside the physical protection gloves (e.g., leather, Kevlar®).
- Nitrile gloves or equivalent chemical resistant shall always be used for protection from hazardous fluids or non-corrosive chemicals.
- Do not wear metal or metal-reinforced gloves when working with electrical equipment or on electrical services. Proper leather and/or rubber gloves designed and tested for this purpose shall be used.
- Refer to *S3AM-208-PR1 – Personal Protective Equipment* for additional information.

4.2.4 Follow glove requirements in the applicable SH&E plan.

4.3 Guidelines for Working With and Around Equipment (Hand Tools, Portable Powered Equipment)

4.3.1 General

- As applicable, employees shall be trained in the use of all tools. Refer to *S3AM-003-PR1 SH&E Training*.
- Keep hand and power tools in good repair and use them only for the task for which they were designed.
- Inspect tools before use and remove damaged or defective tools from service.
- Operate tools in accordance with manufacturer's instructions.
- Do not remove or bypass a guarding device for any reason.
- Keep surfaces and handles clean and free of excess oil to prevent slipping.
- Do not carry sharp tools in pockets.
- Clean tools and return to the toolbox or storage area upon completion of a job.
- Confirm that the wrench is in full contact (fully seated, "flat", not tilted) with the nut or bolt before applying pressure.

- Place the body in the proper position for optimal balance and bracing to prevent falls if the tool slips.
- Make sure hands and fingers have sufficient clearance in the event the tool slips.
- Whenever possible, pull on a wrench and avoid pushing.
- When working with tools overhead, place tools in a holding receptacle when not in use.
- Do not throw tools from place to place or from person to person, or drop tools from heights.
- Inspect all tools prior to start-up or use to identify any defects.
- Powered hand tools shall not be capable of being locked in the ON position.
- Require that all power-fastening devices be equipped with a safety interlock capable of activation only when in contact with the work surface.
- Do not allow loose clothing, long hair, loose jewelry, rings, and chains to be worn while working with power tools or rotating equipment.
- Do not increase the leverage by adding sleeved additions (e.g. a pipe or snipe) to increase tool handle length.
- Make provisions to prevent machines from restarting through proper lockout/tagout (refer to *S3AM-325-PR1 – Lockout Tagout*).

4.3.2 Cutting Tools

- Always use the specific tool designed for the task. Tubing cutters, snips, self-retracting knives, concealed blade cutters, and related tools are task specific and minimize the risk of hand injury. For more information about cutting tools, see *S3AM-317-ATT1 Safe Alternative Tools*.
- Fixed open-blade knives (FOBK) are prohibited from use during the course of AECOM work.
 - Examples of fixed open-blade knives include pocket knives, multi-tools, hunting knives, and standard utility knives.
 - Any exception to this requirement shall require approval of the Manager / Supervisor and SH&E Manager.
- When utilizing cutting tools, personnel will observe the following precautions to the fullest extent possible:
 - Use the correct tool and correct size tool for the job.
 - Cut in a direction away from yourself and not toward other workers in the area.
 - Maintain the noncutting hand and arm toward the body and out of the direction of the cutting tool if it were to slip out of the material being cut.
 - Ensure that the tool is sharp and clean; dirty and dull tools typically cause poor cuts and more hazard than a sharp, clean cutting tool.
 - Store these tools correctly with covers in place or blades retracted, as provided by the manufacturer.
 - On tasks where cutting may be very frequent or last all day (e.g., liner samples), consider Kevlar® gloves in the PPE evaluation for the project.
 - Do not remove guards on paper cutters.
 - In office locations, paper cutters must always be kept in a locked position when not in use.

4.3.3 Moving/Rotating Equipment

- General Requirements for Rotating Equipment (feed augers, chippers, conveyors, etc.)
 - Never place hands, fingers, or extremities near hoppers and operational areas of machinery.

- When the equipment is rotating, stay clear of the rotating components and only operate equipment with proper machine guarding in place.
- Never clean a jammed piece of equipment unless the transmission is in neutral and the power source or the engine is off, locked out, and the moving parts of the equipment have stopped rotating. Refer to *S3AM-325-PR1 – Lockout Tagout*.

4.3.4 Other Physical Hazards

- Activities such as drum handling, fencing, work near razor wire, manhole cover removal, and demolition also pose hazards to hands. Use tools instead of hands for high hazard tasks whenever possible.
- Plan work to avoid pinch points for hands when moving drums, moving manhole covers into position, and handling other heavy objects.
- Work handling scrap metal, glass or other sharp edges requires proper hand PPE (Kevlar® or leather gloves).
- Activities involving hoisting, lifting and landing of a load shall be done “hands-free” when possible. Refer to *S3AM-317-ATT2 – Safe Hands-Free Lifting Guidelines*.

4.4 Ergonomics – Hand and Wrist Care

- 4.4.1 Keep your wrist in neutral. Avoid using your wrist in a bent (flexed), extended, or twisted position for long periods of time. Instead try to maintain a neutral (straight) wrist position. Ergonomic tools may be needed for long-term work.
- 4.4.2 Watch your grip. Gripping, grasping, or lifting with the thumb and index finger can put stress on your wrist. When practical, use the whole hand and all the fingers to grasp an object.
- 4.4.3 Minimize repetition. Even simple, light tasks may eventually cause injury. If possible, avoid repetitive movements or holding an object in the same way for extended periods of time.
- 4.4.4 Reduce speed and force. Reducing the speed with which you do a forceful, repetitive movement gives your wrist time to recover from the effort. Using power tools helps reduce the force.
- 4.4.5 Rest your hands. Periodically give your hands a break by letting them rest briefly. Or you may be able to alternate easy and hard tasks, switch hands, or rotate work activities.
- 4.4.6 Consider low vibration or anti- vibration hand power tools when possible.

4.5 Cleaning Hands

- 4.5.1 Avoid contamination of hands by proper use of gloves when contact with physical, chemical, or biological hazards is possible.
- 4.5.2 Use soap and water for normal hand cleaning. Do not use solvents for cleaning as they remove essential oils in the skin and may cause dermatitis. Do not use pressure washers for hand cleaning.
- 4.5.3 If the hands contact a corrosive (e.g., nitric acid), wash the area with water for fifteen minutes and then seek medical attention.
- 4.5.4 Use antibiotic ointment and skin protection on minor breaks/scratches of the skin.
- 4.5.5 In some cases barrier creams may be used to provide limited protection for hands exposed to greases and oils.

4.6 Safe Hands Observation Tool

- 4.6.1 The *Safe Hand Task Review Card S3AM-317-FM2* may be used to supplement and reinforce safe work practices and the requirements of this procedure.
- 4.6.2 The observer’s responsibilities include:

- Two-way conversation with the employees being observed.
- Completing the card and mark the applicable fields on the back of the card.
- Submitting the completed cards to the supervisor.

4.6.3 The supervisor's responsibilities include:

- Reviewing the completed cards.
- Identifying best work practices and any improvements.
- Communicating any changes back the employee(s).

5.0 Records

The following documentation will be maintained:

5.1 Hand tool training records, as applicable.

6.0 Attachments

- 6.1 [S3AM-317-FM1](#) [Glove Needs Assessment](#)
- 6.2 [S3AM-317-FM2](#) [Safe Hands Task Review Card](#)
- 6.3 [S3AM-317-ATT1](#) [Safe Alternative Tools](#)
- 6.4 [S3AM-317-ATT2](#) [Safe Hands-Free Lifting Guidelines](#)

Americas

Glove Needs Assessment

S3AM-317-FM1

Mgr. / Supervisor Name:

Work Area Name:

Task/Operation Being Evaluated:

Date:

1.0 Using the Protection and Performance Needs Assessment Table Below

- 1.1 Function and performance needs must be evaluated thoroughly. If employees have a strong need for dexterity, tactility, and/or grip this should be identified as a priority. Rank properties in the table below with 1 being the highest priority. Do not assign the same priority more than once. It is only necessary to rank the applicable properties. If all properties are ranked, the lowest priority would be ranked 12.

Protection and Performance Needs Assessment			
Category	Properties	Protection and Performance Needs	Priority (1=Top Priority)
Mechanical	Cut Resistance	Protection from sharp edges, blades, and other cutting hazards	
	Puncture Resistance	Protection from sharp objects like nails, pins, needles, wire	
	Abrasion Resistance	Durability and resistance to abrasive objects or materials	
	Shielding	Protection from impact, ricochet, small projectiles.	
Chemical	Degradation & Absorption Resistance	Durability and resistance to breaking down and/or permeating the glove from exposure to chemicals. Refer to the chemical's Safety Data Sheet for the appropriate glove choice.	
Thermal	Heat Resistance	Thermal protection from hot objects or materials	
	Cold Resistance	Thermal protection from cold weather, objects, or materials	
Vibration	Anti-Vibration	Vibration reduction from operating certain tools and equipment	
Electrical	Insulation	If performing work on electrical equipment, this must be the top priority	
Function	Dexterity	Ability to manipulate objects and control hands in the desired manner	
	Tactility	Ability to sense objects by touch	
	Grip	Ability to exert pressure on an object when holding it	

- 1.2 Identify a glove that meets the top protection and performance priorities.

In most cases there are trade-offs between hazard protection and functional performance of a glove. These factors are equally important. The higher the severity of the hazard, the more important hazard protection is. The table below offers additional guidance on key considerations when selecting a glove for certain protection and performance properties.

Category	Properties	Key Considerations and Selection Criteria
Mechanical	Cut Resistance	Testing Standard: ASTM F1790 and ASTM F1970-05 There are 5 levels of cut resistance. 5 is the highest.
	Puncture Resistance	Testing Standard: EN 388:2003 This testing measures the force required to pierce the sample with a standard sized point.
	Abrasion Resistance	Testing Standard: ASTM D3389-05 and ASTM D3884-09 Abrasion resistance testing measures how well the glove material resists loss of material from rubbing on rough surfaces.
	Shielding	Some gloves offer thick padding or hard guards around the back of the hand or knuckles. These can offer good protection against impact.
Chemical	Degradation & Absorption Resistance	Identify products / chemicals that present potential exposures. Refer to the chemical's Safety Data Sheet and glove manufacturer's specifications for the appropriate glove choice.
Thermal	Heat Resistance	Testing Standard: ASTM F1060-08 This testing measures the insulation provided by the glove when contacting a hot surface. Higher temperatures reported indicate a glove with greater insulation.
	Cold Resistance	Testing Standard: EN 511:1994 (for ambient temperature) Testing Standard: ISO 5085:1989-1 (for cold surfaces) Choosing the right glove depends on whether protection is needed from cold weather or cold surfaces.
Vibration	Anti-Vibration	Testing Standard: ANSI S2.73-2002 (R2007) This testing method measures the vibration transmission of the glove.
Electrical	Insulation	Testing Standard: ASTM D120-09 Glove protection depends on the maximum voltage of energized components.
		50 – 480V Class 00 with Leather Protectors
		480 – 600V Class 0 with Leather Protectors
		600V and above Class 0 or higher (depending on maximum voltage) with Leather Protectors
Function	Dexterity	Testing Method: EN 420:2003 Ability to manipulate objects and control hands in the desired manner. This testing method assesses the wearer's ability to pick up small diameter pins lying on a flat surface with their thumb and forefinger. If high dexterity is needed, and the hazards are relatively low to the forefinger and thumb, consider a glove that is tip less for those two digits.
	Tactility	Ability to sense objects by touch. There is no standard test. However, a common field test is to determine if the wearer can feel a pulse while wearing the glove. This is affected by the thickness of the glove, presence of liners, glove surface characteristics, and properties of the coating material.
	Grip	Testing Standard: NFPA 1971 (Grip) Ability to exert pressure on an object when holding it.



Safe Hands Task Review Card

Task Being Performed: _____

Date: _____

Person Performing Task Review: _____

Pre-Job: Did Employees identify/discuss?

- ☐ Placement of hands
- ☐ Potential hazards to the hands (sharp edges, chemicals, etc.)
- ☐ Actions to eliminate exposure to hands
- ☐ Type of gloves or other PPE to protect hands

Safe Hands Task Review Card (S3AM-317-FM2)
Revision 0 March 1, 2016

Go To Back of Card



Safe Hands Task Review Card

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Date: _____

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Revision 0 March 1, 2016

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Safe Hands Task Review Card (S3AM-317-FM2)
Revision 0 March 1, 2016

Go To Back of Card

Task: _____

Are employees hands placed near hazard areas?

- ☐ Sharp Edges
- ☐ Crush Hazards
- ☐ Pinch Points
- ☐ Chemicals

Could other tools or controls be used to prevent hand from being in the hazard zone?

- ☐ Block Materials
- ☐ Cover Sharp Edges
- ☐ Are tools used to keep hands clear of pinch/crush hazards

Are the gloves being used appropriate for the task?

- ☐ Do they offer the right type of protection from the identified hazards?
- ☐ Do they have enough dexterity to complete the task while worn?

Is the off-hand placed away from the hazard zone?

- ☐ Yes
- ☐ No

Are there any other actions that could have been taken to keep hands safe?

Task: _____

Are employees hands placed near hazard areas?

- ☐ Sharp Edges
- ☐ Crush Hazards
- ☐ Pinch Points
- ☐ Chemicals

Could other tools or controls be used to prevent hand from being in the hazard zone?

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- ☐ No

Are there any other actions that could have been taken to keep hands safe?

Task: _____

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- ☐ Yes
- ☐ No

Are there any other actions that could have been taken to keep hands safe?

Task: _____

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Are the gloves being used appropriate for the task?

- ☐ Do they offer the right type of protection from the identified hazards?
- ☐ Do they have enough dexterity to complete the task while worn?

Is the off-hand placed away from the hazard zone?

- ☐ Yes
- ☐ No

Are there any other actions that could have been taken to keep hands safe?

1.0 Types of Safety Knives or Alternative Cutting Tools

1.1 Self-retracting utility knives (brands – OLFA, Martor, Allway Tools)



1.2 Guarded utility knives (brands – The Safety Knife Co., Martor)



1.3 Shears, snips, scissors (brands – Ridgid, Craftsman, Wolfcraft)



1.4 Concealed blade cutters (brands – The Safety Knife Co., Martor)



1.5 Pipe cutters (brands – Ridgid, Empire)



1.6 Specialty cutter (brand – Geoprobe)



1.0 What is Safe Hands Free Lifting?

The Task Hazard Assessment (THA) shall identify the measures taken to prevent injuries to hands, including methods to perform hands-free lifting as well as address proper glove selection. The most hazardous parts of a lifting operation are hoisting and landing of the load. Therefore at these critical stages, personnel must be as far away from the load as possible in case the load shifts or drops. To ensure this happens, it is essential to adopt a “hands-free” lifting guideline that is rigidly followed.

Once a load is properly rigged and connected to a mechanical lifting device, personnel should not handle or touch a load or rigging with any part of their body as the load is being lifted or before the load is properly set down, and all potential energy is released.

However, there will always be certain jobs which will require “hands-on” for final positioning. These should be treated as exceptions to the norm and fully addressed in the risk assessment process with special attention given to the risk of injury to fingers, hands, toes and feet.

2.0 Objective of Safe Hands Free Lifting

To eliminate the risk of injury to personnel from pinch points, caught between zones, entanglement hazards and a reduced field of vision.

3.0 What are the benefits of Safe Hands Free Lifting?

- Significantly reduces crush, entanglement and hand injuries.
- Clears you of the potential injury zone for dropped objects.
- Clears you of the potential swing area.
- Personnel can see more of the load zone.
- Better posture when pushing and pulling objects.
- Less strain on the lower back and neck area.
- Creates a strong safety culture for all project personnel.

4.0 Can every load be guided with Safe Hands Free Lifting?

- 4.1 MOSTLY, but there *may* be times when due to restricted work space, working from elevated work platforms, awkward angles and body posture, that hands will need to be used.
- 4.2 HOWEVER, every load must be assessed in real time as part of the Safe Work Planning process. Remember to document and communicate the process to be used with all involved employees.

5.0 How is Safe Hands Free Lifting Achieved?

5.1 The Correct Mindset

Changing the way we have done things for years always results in an element of “pushback” from people set in their ways. We have to persevere with fresh ideas or we will never change things for the better. It is a natural reaction to hold the rigging in place until the tension is taken up to make sure the load is properly slung and balanced. Nevertheless, how often have you heard of people getting hands, fingers and body pinched, trapped or crushed by the rigging?

5.2 Tag Lines

Tag lines must be attached to a load prior to lifting and provided at the appropriate length to allow employees to stay clear of the drop zone and any pinch/crush points the load may create.

Whether or not to use tag lines has always been a debatable point, but the consensus of opinion is that although their use can introduce additional hazards, their use generally increases the safety of the lift. Having said that, the advantages and disadvantages will be considered and their use determined during the risk assessment and documented.

5.3 Push / Pull Sticks

Push / Pull sticks are simply wooden or fiber glass poles with a boat hook at one end and a rubber or leather pad at the other. Ideally, these should be about 2 meters / 6 feet long. Their primary use is to retrieve tag lines hanging vertically down from the load so that personnel do not have to get too close to the suspended load. Their secondary use is to push and maneuver loads into the correct orientation / position for landing or guiding them into tight spaces while remaining hands-free / hands-off.

Achieving "hands-free" lifting is not difficult; it is an awareness of the hazards and planning the work and working the plan. If you do come up against jobs that appear to require "hands-on", think long and hard about how you can change that and if you think it needs special tools or equipment to achieve "hands-free".

6.0 What has to happen if you put your hands on the load?

- Safe Work Planning.
- Use proper gloves.
- Agree on the communication method within the lift group.
- Never touch the load with your arm higher than your shoulder level.
- Use hooks to pull tag lines away from the drop zone.
- Keep out of the drop zone.
- Look ahead for the pinch points and crush zones.

7.0 Mandatory Safe Hand Practices

- All personnel must have GLOVES in possession 100% of the time.
- Appropriate GLOVES shall be worn when employees work with or near any materials or equipment that present the potential for hand injury due to sharp edges, corrosives, flammable and irritating materials, extreme temperatures, splinters, etc.
- All Hoisted Loads should only be touched with a HANDS FREE TOOL.
- DO NOT place any part of your body under a suspended load.

8.0 Guidelines for Safe Hands-Free Lifting are in addition to any requirements of S3AM-317-PR1 Hand Safety

8.1 Safe Hands Free Lifting Tools



- Rubber dipped or vinyl coated tag lines prevent curling of rope.
- Eliminates trip and entanglement hazards.

- Example of aluminum boat hook modified for Safe Hands Free Lifting.
- One end rubberized for controlled pushing.
- Hook ideal for pulling tag lines to you and not walking into the drop zone.



- Other tool options for Safe Hands Free Lifting



8.2 Photo Examples



Drilling, Boring & Direct Push Probing

S3AM-321-PR1

1.0 Purpose and Scope

- 1.1 This document provides procedures designed to help prevent injuries to personnel working on the project and pedestrians, property damage, and adverse environmental impact as a result of potential hazards associated with drilling, boring and direct-push probing. These hazards include, but are not limited to, encountering underground utilities, subsurface installations, rotating equipment and potential overhead hazards.
- 1.2 This procedure provides the minimum requirements to be followed when drilling, boring, and probing work are performed.
- 1.3 This procedure applies to all Americas-based employees and operations.
- 1.4 The Manager is responsible for meeting all the requirements in this procedure.
- 1.5 AECOM's clients may have specific procedures which shall be followed to identify and map utility and subsurface structures on their properties or facilities. Provided the client's procedures meet or exceed those of AECOM, approval shall be obtained from the Manager and the SH&E Manager to follow the client's procedures.

2.0 Terms and Definitions

- 2.1 **Underground Utilities** – All utility systems located beneath grade level, including, but not limited to, gas, electrical, water, compressed air, sewage, signaling, and communications, etc.
- 2.2 **Ground Disturbance (GD)** – Any indentation, interruption, intrusion, excavation, construction, or other activity in the earth's surface as a result of work that results in the penetration of the ground.
- 2.3 **Intrusive Activities** – Examples: Excavation of soil borings, installations of monitoring wells, installation of soil gas sampling probes, excavation of test pits / trenches or other man-made cuts, cavity, trench, or depression in an earth surface formed by earth removal.
- 2.4 **Subsurface Installations** – Examples: Subterranean tunnels, underground parking garages, and other structures beneath the surface.

3.0 References

- 3.1 S3AM-003-PR1 SH&E Training
- 3.2 S3AM-118-PR1 Hearing Conservation
- 3.3 S3AM-208-PR1 Personal Protection Equipment
- 3.4 S3AM-209-PR1 Risk Assessment & Management
- 3.5 S3AM-213-PR1 Subcontractor Management
- 3.6 S3AM-305-PR1 Hand & Power Tools
- 3.7 S3AM-306-PR1 Highway and Road Work
- 3.8 S3AM-322-PR1 Overhead Lines
- 3.9 S3AM-322-FM1 Overhead Electrical Lines Acknowledgement
- 3.10 S3AM-325-PR1 Lockout Tagout
- 3.11 S3AM-326-PR1 Machine Guarding
- 3.12 S3AM-331-PR1 Underground Utilities

3.13 S3AM-331-FM1 Underground Utilities & Subsurface Installation Clearance Checklist

4.0 Procedure

4.1 Roles and Responsibilities

4.1.1 Manager

- Confirm the development of the project SH&E Plan and compliance with this procedure.
- Confirm the appropriate equipment and materials are available to conduct the drilling, boring or direct-push operations.
- Confirm compliance with *S3AM-331-PR1 Underground Utilities*.
- Review the *S3AM-331-FM1 Underground Utilities & Subsurface Installation Clearance Checklist* prior to authorizing work to proceed.
- Confirm that employees conducting drilling, boring or direct-push probing possess any required training, registrations or certifications.
- Confirm all employees involved and affected by the task review the SH&E Plan, *S3AM-331-FM1 Underground Utilities & Subsurface Installation Clearance Checklist* and Task Hazard Assessment (THA) prior to work commencing.
- Confirm an equipment maintenance inventory is maintained, schedules adhered to and appropriate inspections of equipment are conducted.
- Provide authorization (with the concurrence of the Site Supervisor and SH&E Manager) for work to resume if interrupted due to unexpected conditions or events.

4.1.2 Safety, Health & Environment (SH&E) Manager

- Assist AECOM management as needed by providing guidance and clarification as to issues that may arise.
- Review the project SH&E Plan to confirm compliance with jurisdictional regulations. Provide technical guidance as needed when a variance is pursued related to this procedure. Confirm variance process meets requirements identified in *S2-001-SM1 Global SH&E Management System Manual*.

4.1.3 Employees

- Maintain training as appropriate to the work to be completed (e.g., ground disturbance, lockout tagout, equipment operation, etc.). Refer to *S3AM-003-PR1 SH&E Training*.
- Review the SH&E Plan, *S3AM-331-FM1 Underground Utilities & Subsurface Installation Clearance Checklist* and Task Hazard Assessment (THA) prior to work commencing.
- As appropriate to the anticipated or encountered hazards and as addressed in the applicable planning documentation, utilize appropriate personal protective equipment (PPE) and applicable training, practices and operating procedures.
- Immediately notify the Manager of any unanticipated conditions or events. If assigned equipment, perform appropriate inspections and confirmations of maintenance and / or repairs.

4.2 Training

- 4.2.1 All on-site employees involved with drilling, boring, and direct-push probing shall be trained, at a minimum, in these procedures and in the procedures of *S3AM-331-PR1 Underground Utilities*.
- 4.2.2 All operators and assistants shall have the appropriate safety training based on the SH&E Training Matrix and any additional training assessments developed at the business group, and be versed in the equipment to be utilized.
- Refer to *S3AM-003-PR1 SH&E Training*.

- This training may include, but is not limited to, Excavation / Trenching (Ground Disturbance), HAZWOPER, Petroleum Safety Training (or Construction Safety Training), and H2S Alive as appropriate.
 - Only qualified personnel shall operate and inspect equipment.
- 4.2.3 All on-site Employees involved with drilling, boring, and direct-push probing activities shall be provided with on-site orientation of the drill rig and its operation.
- 4.2.4 All Employees involved with drilling, boring and direct-push probing activities at a client site shall receive the applicable client-required training.
- 4.3 Planning
- 4.3.1 SH&E Plan – At a minimum, a SH&E plan that includes a pre-job hazard assessment shall be prepared and communicated to all involved personnel prior to any drilling, boring, and direct-push probing activities. Refer to *S3AM-209-PR1 Risk Assessment & Management*.
- Assessment shall include both overhead and subsurface utilities and installations. Refer to *S3AM-322-PR1 Overhead Lines* and *S3AM-331-PR1 Underground Utilities*.
 - The SH&E Plan will address any required environmental monitoring including gas monitoring, dust, noise, metals, radiation or other monitoring as may be appropriate for site conditions.
 - All SH&E Plan requirements will be followed by the project team.
 - The location specific emergency response plan shall be in place, contain procedures applicable to the potential emergencies presented by the operations, and be reviewed with all personnel potentially affected.
- 4.3.2 A Task Hazard Assessment (THA) shall be completed before every assigned task at the work location. The focus of the analysis shall be on the specific assigned task and the evaluation of risks and assignment of control measures based on actual work conditions.
- 4.3.3 *S3AM-321- ATT2 Pre-Drilling, Boring & Direct-Push Probing Flow Chart* summarizes the key Pre-Drilling, Boring, and Direct-push probing requirements addressed in this procedure.
- 4.3.4 Procedures and documentation as detailed in *S3AM-322-PR1 Overhead Lines* and *S3AM-331-PR1 Underground Utilities* shall be completed prior to any intrusive subsurface work.
- The locations of subsurface and overhead utilities and subsurface installations will be investigated, documented, mapped on a site plan and evidenced with appropriate surface markings.
 - A site walk shall be conducted by the project team / site Manager and any other appropriate personnel, with the objectives of reviewing all planned intrusive activity locations, the locations of subsurface and overhead utilities and the potential for subsurface installations, to determine the appropriate utility clearance activities, and to observe other physical hazards.
 - All proposed subsurface activities will be reviewed in comparison to subsurface and overhead utilities and subsurface installations and adjustments made as necessary.
 - Appropriate clearance activities shall confirm location(s) of identified underground utilities and subsurface structures. Review the applicable completed *S3AM-331-FM1 Underground Utilities & Subsurface Installation Clearance Checklist*.
 - Site Walks should be repeated as necessary following the clearance of subsurface utilities and installations to confirm hazards are clearly identified.
- 4.3.5 Confirm drilling location(s) and / or bore entry and bore exit points are adequately identified on the worksite to enable appropriate equipment positioning.
- 4.4 Permits, Notifications and Access Agreements

- 4.4.1 Any required notifications shall be provided within the appropriate timeframe to the applicable organization (e.g. owner, agency, governing body, etc.).
- 4.4.2 All applicable permits (e.g. client, government, working near rail road, etc.) will be identified, obtained, and adhered to.
- 4.4.3 Access agreements will be obtained and adhered to as necessary.
- 4.5 Pre-Qualifying and Re-Qualifying Drilling Subcontractors
 - 4.5.1 All drilling subcontractors will be properly pre-qualified in accordance with *S3AM-213-PR1 Subcontractor Management*.
 - 4.5.2 The qualifications of the drilling crew performing the work will be evaluated prior to each mobilization and each day by AECOM's on-site representative to assure that their safety performance, training, qualifications, equipment, processes, and approaches reflect AECOM standards for excellence.
 - 4.5.3 All drilling subcontractor equipment will be properly maintained and properly equipped, and the drilling subcontractor will verify their equipment is fully functional as a normal part of their daily and pre-work routine. Refer to *S3AM-321-FM1 Daily Drilling, Boring & Direct Push Equipment Inspection*.
- 4.6 General Health and Safety
 - 4.6.1 Personal Protective Equipment – Refer to the *S3AM-208-PR1 Personal Protection Equipment* for best practices. These requirements may be modified or expanded in the SH&E Plan. Clothing shall be close fitting and comfortable without loose ends, straps, draw strings, belts, or otherwise unfastened parts that might catch on some rotating or translating component of the rig.
 - Depending upon the hazards present, additional PPE may be required such as fire retardant clothing, specific hearing protection, respiratory protective equipment and chemical protective clothing.
 - If the location has potential for underground electrical utilities to be present, workers shall ensure footwear has additional protection of shock resistant soles required (white rectangle with omega symbol).
 - 4.6.2 Hearing Conservation – Hearing conservation program requirements may apply when working around operating equipment. Refer to *S3AM-118-PR1 Hearing Conservation*.
 - Each worker shall wear noise-reducing ear protectors around operating equipment or during elevated noise levels. Distance from the elevated noise level is the primary measure of control for non-essential drilling personnel.
- 4.7 Drilling, Boring and Direct Push Equipment Maintenance and Inspections
 - 4.7.1 All equipment will be inspected prior to the initiation of operations and daily during operations using the *S3AM-321-FM1 Daily Drilling, Boring & Direct-Push Equipment Inspection*. This inspection is the responsibility of the operator who will provide written documentation of the inspection prior to the start of drilling each day.
 - Equipment that is deemed defective will immediately be repaired by a qualified person, or, if repair is not practicable, tagged "Out of Service" and sent for repairs or discarded.
 - 4.7.2 Managers shall confirm an accurate inventory of the equipment within their operation requiring scheduled maintenance is developed. Using applicable regulations, industry standards, best practices, and manufacturer's recommendations, a maintenance schedule shall be developed with defined responsibility, required actions, and frequency. Refer to *S3AM-321-FM2 Drilling, Boring, & Direct-Push Equipment Maintenance Inventory*.
 - 4.7.3 The maintenance program for equipment shall:

- Adhere to applicable regulations, standards, and manufacturers' specifications;
- Provide for service by appropriately qualified maintenance personnel; and,
- Require maintenance schedules and records of maintenance.

4.7.4 Employees or operators who are assigned equipment are required to review maintenance schedules for that equipment and will confirm that required maintenance has occurred or see that it is undertaken.

4.8 General Requirements

4.8.1 Excluding geoprobe activities, set up any sample tables and general work areas for employees at a safe distance from the rig.

- The recommended safe distance is the height of the fully extended mast plus 5 feet (1.5 meters), and no less than 30 feet (9.1 meters) from the rig.
- An increase to this distance may be required due to noise exposure hazards. Refer to *S3AM-118-PR1Hearing Conservation*.

4.8.2 Operation of the drilling, boring or direct-push equipment shall be restricted to the designated operator except to activate the emergency shut-off as required.

- All rotary drilling equipment shall have an emergency shut off / kill switch. The location of the switch and operation should be reviewed with all involved Employees.

4.8.3 Sit-on direct push rigs are not permitted on AECOM worksites unless the rig has been modified (in accordance with manufacturer's requirements) to be operated by remote control or the rig has been manufactured with a rollover protection system and seat belt.

4.8.4 Consult jurisdictional regulations as use of J-hooks and cat-heads may be prohibited. Examples:

- 29 CFR 1926 requires derricks and cranes to use hooks with self-closing latches and permits the use of J-hooks only for a task unrelated to this procedure (setting trusses).
- British Columbia and Saskatchewan prohibit the use of friction cat-heads.

4.9 Identifying the Work Area

4.9.1 Ensure the work area is adequately identified:

- Including zone around the drilling, boring, or direct push equipment, as well as fluid equipment, entry point, exit point and any excavated areas.
- Utilize barricades, signage, pylons, snow fence, etc. as appropriate.
- Implement traffic control as necessary.
- Coordinate with concurrent operations to identify their associated hazards and controls, and communicate those associated with AECOM tasks.

4.9.2 When operating near public vehicular and pedestrian traffic, the on-site personnel shall take every precaution necessary to see that the work zone is properly established, identified, and isolated from both moving traffic and passer-by pedestrians (refer to *S3AM-306-PR1 Highway and Road Work*).

4.9.3 All traffic control devices shall be installed, placed, and maintained in accordance with a Traffic Control Plan, client specifications, and / or the Manual of Uniform Traffic Control Devices and Manual of Uniform Traffic Control Devices for Canada in Canada. Traffic control devices shall consist of and not be limited to

- Directional and informational signage;
- High visibility barricades, cones, or barrels;
- Lighting; and
- Other equipment and devices as required.

4.10 Clearing Work Areas

- 4.10.1 In addition to any minimum requirements the drilling subcontractor may have, prior to set up, adequate site clearing and leveling shall be performed to accommodate the rig and supplies and provide a safe working area.
- 4.10.2 Clearing the site includes clearing the intended drilling area obstacles and of underground utilities in accordance with *S3AM-331-PR1 Underground Utilities*.
- 4.10.3 Drilling or probing shall not commence when tree limbs, unstable ground, or site obstructions cause unsafe tool handling conditions.
 - The cleared / levelled area should be large enough to accommodate the rig and supplies.
 - If the rig is positioned on a steep grade and levelling of the ground is impossible or impractical, the wheel of the transport vehicle shall be blocked and other means employed of preventing the rig from moving or toppling over.
- 4.11 Drilling Activities
 - 4.11.1 Federal / State / Provincial / Territorial regulations that govern drill rig operations and exposed moving parts shall be adhered to.
 - 4.11.2 All applicable client on-site safety procedures shall be understood and adhered to.
 - 4.11.3 Minimum approach distances (MAD) from subsurface and overhead utilities and subsurface installations will be established including 5 feet (1.5 meters) from any subsurface utility, 7 feet (2.1 meters) from the pad surrounding any underground storage tanks, and 10 feet (3 meters) from any overhead energized electrical line (or further depending on line voltage). These approach distances are a minimum; government regulations and utility requirements may dictate a greater set back distance and should be confirmed.
 - 4.11.4 Verify that equipment / energy is isolated when lockout is required:
 - Refer to operator's manual and *S3AM-325-PR1 Lockout Tagout*.
 - Ensure stop switch is activated.
 - Driller is out of the seat.
 - Test controls to ensure they do not engage.
 - 4.11.5 In addition to any identified minimum requirements (as applicable, client, drilling subcontractor), the following safety measures shall be taken during drilling, boring or probing operations on site:
 - The operator and helper shall be present during all active rig operations.
 - Site personnel shall remain within visual contact of the rig operator.
 - Hard hats, approved safety boots, safety glasses, and hearing protection shall be worn in the work zone (minimum, the radius around the rig equal to the height of the drill rig mast) of a rig.
 - Gas monitoring shall be conducted as appropriate.
 - Hands, feet and other body parts shall be kept away from moving parts, (e.g. hoisted, rotating, pushing, etc.) including augers, drill rods and reamers.
 - When observing drilling, stand upwind of the drill rig to prevent potential exposure to vapors that may be emitted from the borehole.
 - The emergency shut-off switch on the rig shall be identified to site personnel and tested on a daily basis by the operator.
 - Unauthorized personnel shall be kept outside of the established work zone.
 - Rig crew and other worksite personnel shall not use a cell phone while operating the drill rig or other equipment or within the rig work zone.
 - Do not drive the rig from hole to hole with the mast (derrick) in the raised position.
 - Before raising the mast (derrick) look up to check for overhead obstructions. Refer to *S3AM-322-PR1 Overhead Lines*.

- Before raising the mast (derrick), all rig personnel (with the exception of the operator) and visitors should be cleared from the areas immediately to the rear and the sides of the mast. All rig personnel and visitors should be informed that the mast is being raised prior to raising it.
- Before the mast (derrick) of a drill rig is raised and drilling is commenced, the drill rig shall be first levelled and stabilized with levelling jacks and / or solid cribbing.
 - The drill rig shall be releveled if it settles after initial set up.
 - Lower the mast (derrick) only when the levelling jacks are down, and do not raise the levelling jack pads until the mast (derrick) is lowered completely.
- After the rig has been positioned to begin drilling, all brakes and / or locks shall be set before drilling begins.
- The operator of a rig shall only operate a drill rig from the position of the controls. The rig shall not be in operation if the operator of the rig leaves the area of the controls.
- Throwing or dropping tools shall not be permitted. All tools shall be carefully passed by hand between personnel or a hoist line should be used.
- If it is necessary to operate the rig within an enclosed area, make certain that exhaust fumes are conducted out of the area.
 - Exhaust fumes can be toxic and some cannot be detected by smell.
 - Air monitoring and, as necessary, noise monitoring shall be conducted.
- Clean mud and grease from boots before mounting a rig platform and use hand holds and railings. Watch for slippery ground when dismounting from the platform.
- During freezing weather, do not touch any metal parts of the rig with exposed flesh. Freezing of moist skin to metal can occur almost instantaneously.
- All unattended bore holes shall be adequately covered or otherwise protected to prevent rig personnel, site visitors, or animals from stepping or falling into the hole. All open bore holes shall be covered, protected, or backfilled adequately and according to Federal / State / Provincial / Territorial or local regulations on completion of the drilling project.
- When using a ladder on a rig, face the ladder and grasp either the side rails or the rungs with both hands while ascending and descending. Always use adequate fall protection and a full body harness when climbing above 6 feet (1.8 meters) of the ground. Do not attempt to use one or both hands to carry a tool while on a ladder. Use a hoist line and a tool "bucket" or a safety hook to raise or lower hand tools.

4.12 Drilling Fluid

- 4.12.1 Ensure drilling fluid is appropriate to the soil type and conditions to be encountered to enable smooth drilling.
- 4.12.2 Drilling fluid used in the boring process shall be contained at the entry and, as applicable, exit locations until recycled or removed from the site.
- 4.12.3 Confirm drilling fluid does not enter roadways, streams, municipal storm or sanitary sewer lines, and / or any other drainage system or body of water.
- 4.12.4 Monitor drilling equipment and fluid equipment for any leakage or spills. Confirm appropriate containment is in place and adequate spill response supplies are available.
- 4.12.5 It is important to monitor fluid flow and pressure gauges when drilling with any tooling, but it is essential when drilling with a mud motor (pump placed in the drill string to provide additional power to the bit while drilling).

4.13 Unanticipated Concrete / Debris or Void

- 4.13.1 The presence of subsurface installations and utilities requires special care when obstructions / refusal and voids are encountered and when unexpected absence of soil recovery occurs during

drilling operations. Other indicators of subsurface installations and utilities are the presence of warning tape, pea gravel, sand, non-indigenous material, bentonite, red concrete (indicative of electrical duct banks) and any departure from native soil or backfill.

- 4.13.2 If unanticipated concrete / debris is encountered and / or if a void is encountered, drilling will be immediately discontinued and the Manager notified. Drilling may only proceed with Manager or SH&E Manager approval.

4.14 Use of Manual Slide Hammer

- 4.14.1 The following health and safety procedures should be followed when using a manual slide hammer to install shallow injection points, drive point piezometers, and drill tools:

- Only use a manual slide hammer that either attaches directly to the point / piezometer being driven or that incorporates a cap on the point / piezometer / drill tool that prevents the slide hammer from slipping off the point / piezometer / drill tool.
- Always grasp the manual slide hammer (handles if equipped with handles) with both hands while driving the point / piezometer / drill tool.
- Never allow hands or feet to get between the manual slide hammer and the drive plate or anvil.

4.15 Use of Augers

- 4.15.1 The following general health and safety procedures should be followed when supervising borings with continuous flight hollow-stem augers:

- Never place hands or fingers under the bottom of an auger section when it is being hoisted over the top of the auger section in the ground or other hard surfaces such as the drill rig platform.
- Never allow feet to get under the auger section that is being hoisted.
- When augers are rotating, stay clear of the rotating auger and other rotating components of the drill rig. Never reach behind or around a rotating auger for any reason.
- Use a long-handled shovel to move auger cuttings away from a rotating auger. Never use hands or feet to move cuttings away from a rotating auger.
- Do not attempt to remove earth from rotating augers. Augers should be cleaned only when the drill rig is in neutral and the augers are stopped from rotating.
- Loud noises may occur while driving split spoons. At minimum hearing protection shall be worn when driving split spoons.
- When pulling / lifting augers, a clevis pin or other closed device shall be used. Use of J-hooks is prohibited.

4.16 Attaching and Breaking Rods

- 4.16.1 Do not use manual tools (e.g., pipe wrenches) in combination with rotation of the drill stem. Manual tools are not designed for the load, and may break.

- The use of such tools creates a significant impact hazard for those in the work area, because they rotate with the drill stem. Manual tool use in combination with a rotating drill stem to attach or break rods is therefore prohibited.
- Manual tools may be used if the drill stem is isolated / positively disengaged.
- Mechanical means of rod separation that are permitted include:
 - Opposing hydraulic controls.
 - Rod locking devices or machine's power vice.
 - Hydraulic breakout tools.
 - Hydraulic foot clamps.

- 4.16.2 Rod box changes present severe crushing hazards. Operators shall ensure all crew members are clear of the machine and hoisting equipment while they are changing rod boxes.

4.17 Rotary, Sonic and Core Drilling

- 4.17.1 In addition to the health and safety procedures identified above, the following general health and safety procedures should be followed when supervising borings with rotary, sonic and core drilling:
- Drill rods should not be braked during lowering into the hole with drill rod chuck jaws. Drill rods should not be held or lowered into the hole with pipe wrenches.
 - If a string of drill rods are accidentally or inadvertently released into the hole, do not attempt to grab the falling rods with your hands or a wrench.
 - When drill rods are hoisted from the hole, they should be cleaned for safe handling with a rubber or other suitable rod wiper. Do not use hands to clean drilling fluids from drill rods.
 - When drill rods are rotating, stay clear of the rotating components of the drill rig. Never reach behind or around a rotating drill rod for any reason.
 - Use a long-handled shovel to move cuttings away from the top of the borehole. Never use hands or feet to move cuttings away from the borehole.
 - If work shall progress over a portable drilling fluid (mud) pit, do not attempt to stand on narrow sides or cross members. The mud pit should be equipped with rough-surfaced, fitted cover panels of adequate strength to hold drill rig personnel.
 - Keep away from area where drill rods are being moved or raised to the rig. Do not stand in the area where a drill rod will fall or slide if it should be dropped.
 - Loud noises may occur during drilling. Hearing protection shall be worn.

4.18 Direct-push

- 4.18.1 The following general health and safety procedures should be followed when supervising drilling borings with direct-push drilling:
- Loud noise may occur during direct-push drilling. Appropriate hearing protection shall be worn.
 - When drill rods are hoisted from the hole, they should be cleaned for safe handling with a suitable rod wiper. Do not use hands to clean drilling fluids from drill rods.
 - If work shall progress over a portable drilling fluid (mud) pit, do not attempt to stand on narrow sides or cross members. The mud pit should be equipped with rough-surfaced, fitted cover panels of adequate strength to hold drill rig personnel.
 - Drill rods should not be lifted and leaned unsecured against the mast. Either provide some method of securing the upper ends of the drill rod sections for safe vertical storage or lay the rods down.

4.19 Horizontal Directional Drilling

- 4.19.1 During surface to surface operations a 16.4' (5 meters) safe zone shall be established and identified at both the entry and exit locations; no personnel are permitted to be within this zone unless the drill is locked out and the operator is out of the seat.
- 4.19.2 Machine shall be locked out before entering an excavation, changing tools, adding or removing drill stem or doing any other work on tools or the drill stem at the exit end of the bore.
- 4.19.3 A tracking head shall be installed on the drill stem:
- 4.19.4 Assemble drill head using components appropriate to the soil conditions to be encountered (e.g. nozzle, bit, beacon housing, etc.).
- 4.19.5 Ensure all personnel are clear of the bore entry point (outside of identified work zone).

- 4.19.6 At all times two way communication will be maintained at entrance and exit points using two way radios or equally effective communication means. If at any time communication is lost, all work will be stopped until communication is re-established
- 4.19.7 Locate drill head with tracking device at least every half-length of pipe. Adjust direction as necessary to follow the intended bore path.
- 4.19.8 Any drilling fluid returning to the surface shall be cleaned up promptly.
- 4.19.9 Drill pipe should exit the bore at an angle of 5 to 10° from the ground surface.
- 4.19.10 Turn off fluid flow as soon as drill head emerges.
- 4.19.11 Lockout machine and remove drill head using appropriate breakout tools.
- 4.19.12 Select and attach a reamer that allows the return of drilling fluids and cuttings, to reduce frictional pullback forces, and to allow for bend radius of the pipe. Reamer shall be:
 - The smaller of 1.5 times the outside diameter (O.D.) or 12 inches (300mm) larger than the diameter of the product pipe.
 - A diameter less than 1.5 times the diameter of the product may be necessary in collapsing soil formations.
 - Reamed diameter may need to be increased by up to 25% if substantial swelling of the soil is expected to occur.
- 4.19.13 All personnel shall clear the trench or the designated surface zone (16.4 feet [5 meters]) once the reamer is attached. Operator shall only reverse lockout and commence pullback when communication is received from personnel on exit hole side and operator has confirmed the message.
- 4.19.14 Personnel on exit hole side shall ensure reamer is pulled the entire way back to the exit hole.
 - If rotation is started when drill rod and reamer are away from the exit hole, very fast sideways movement of the rod and reamer can occur.
 - Larger reamers and longer lengths of exposed drill rod increase the speed and distance of this movement.
- 4.19.15 If working with trailing drill stem, swivels shall be verified as lubricated and rotating freely by hand prior to use:
 - A freely moving swivel prevents trailing drill stem or product from rotating / whipping.
 - If the swivel does not move freely by hand it shall be removed from service and repaired or replaced.
 - Only use swivels with limited articulation to prevent whipping or cranking action between the reamer and trailing drill pipe or product.
- 4.19.16 It is important to clean and lubricate the tool and drill stem joint threads before each use.
- 4.19.17 Any individual drill pipes that are bent or damaged shall be immediately taken out of service.
- 4.19.18 Occasionally change the order of the lead drill pipe (i.e. move the lead pipe to the end of the stem, or other pipe rotation procedures) to extend drill stem life.
- 4.19.19 Operator should avoid stalling the pipe rotation to avoid stress damage from shock loading.
- 4.20 Drilling at Potential MEC / UXO Sites
 - 4.20.1 If the project site is suspected of containing munitions and explosives of concern (MEC) or unexploded ordnance (UXO), the UXO team will conduct a reconnaissance and MEC / UXO avoidance to provide clear access routes to each site before drilling crews enter the area. The following procedures will be implemented:

- Drilling operations on an MEC / UXO site will not be conducted until a complete plan for the site is prepared and approved by the AECOM UXO Safety Officer. MEC / UXO avoidance shall be conducted during drilling operations on known or suspect MEC / UXO sites.
- The UXO team will identify and distinctly mark the boundaries of a clear approach path for the drilling crews, vehicles, and equipment to enter the site. This path will be, at a minimum, twice the width of the widest vehicle. No personnel will be allowed outside any marked boundary.
- If MEC / UXO is encountered on the ground surface, the UXO team will clearly mark the area where it is found, report it to the proper authorities, and divert the approach path around it.
- The UXO team will conduct an access survey using the appropriate geophysical instrument over the approach path for avoidance of MEC / UXO that may be in the subsurface. If a magnetic anomaly is encountered, it will be assumed to be MEC / UXO, and the approach path will be diverted around the anomaly. UXO personnel only will operate the appropriate geophysical instrument and identify MEC / UXO.
- An incremental geophysical survey of the drill-hole location(s) will be initially accomplished by the UXO team using a hand auger to install a pilot hole. If MEC / UXO is encountered or an anomaly cannot be positively identified as inert material, Hazardous, Toxic, and Radioactive Waste (HTRW) sampling personnel will select a new drill-hole location.
- Once the surface of a drilling site has been cleared and a pilot hole established as described above, the drilling contractor will be notified that the site is available for subsurface drilling.

4.21 Movement and Transport of Drilling, Boring or Direct-Push Equipment

- 4.21.1 Personnel transporting equipment shall be properly licensed and shall operate the vehicle according to Federal / State / Provincial / Territorial, and local regulations. Refer to *S3AM-005-PR1 Driving* and *S3AM-320-PR1 Commercial Motor Vehicles*.
- 4.21.2 Confirm the traveling height (overhead clearance), width, length and weight of the equipment with the carrier. Identify highway and bridge load, width and overhead limits, to confirm these limits are not exceeded and with adequate margin.
- 4.21.3 Allow for overhang of any drilling, boring or direct-push equipment when cornering or approaching other vehicles or structures.
- 4.21.4 Be aware that the canopies of service stations and motels are often too low for equipment loaded on a trailer to clear
- 4.21.5 Watch for low hanging electrical lines, particularly at the entrances to drilling sites or restaurants, motels, other commercial sites.
- 4.21.6 Never travel on a street, road, or highway with any part of the drilling, boring or direct-push equipment in a raised or partially raised position.
- 4.21.7 Remove all ignition keys if rig is left unattended unless client requirements specify that the keys remain in the ignition switch at all times.
- 4.21.8 Before moving a rig on location, the operator shall do the following:
 - To the extent practical, walk the planned route of travel and inspect it for depressions, gullies, ruts, and other obstacles.
 - Check the brakes of the truck / carrier, especially if the terrain along the route of travel is rough or sloped.
 - Discharge all passengers before moving on rough or steep terrain.
- 4.21.9 Engage the front axle (on 4x4, 6x6, etc., vehicles) before traversing rough or steep terrain
- 4.21.10 Driving drill rigs along the sides of hills or embankments should be avoided; however, if side-hill travel becomes necessary, the operator shall conservatively evaluate the ability of the rig to remain upright while on the hill or embankment. The possibility shall be considered that the presence of

drilling tools on the rig may reduce the ability of the rig to remain upright (raises the center of mass of the rig).

- 4.21.11 Logs, ditches, road curbs, and other long and horizontal obstacles should be approached and driven over squarely, not at an angle.
- 4.21.12 When close lateral or overhead clearance is encountered, or when backing up, the driver of the rig shall be guided by another person on the ground.
- 4.21.13 Loads on the drill rig and truck shall be properly stored while the truck is moving, and the mast shall be in the fully lowered position.
- 4.22 Loading and Unloading
 - 4.22.1 Consult applicable manufacturer's recommendations for loading and unloading of the equipment.
 - 4.22.2 Use ramps of adequate design that are solid and substantial enough to bear the weight of the rig with carrier, including tools.
 - 4.22.3 Load and unload on level ground.
 - 4.22.4 Use the assistance of someone on the ground as a guide.
 - 4.22.5 Check the brakes on the rig carrier before approaching loading ramps.
 - 4.22.6 Distribute the weight of the rig, carrier, and tools on the trailer so that the center of weight is approximately on the centerline of the trailer and so that some of the trailer load is transferred to the height of the pulling vehicle. Refer to the trailer manufacturer's weight distribution recommendations.
 - 4.22.7 The rig and tools should be secured to the hauling vehicle with ties, chains, and / or load binders of adequate capacity.

5.0 Records

- 5.1 All employee training files shall be maintained in accordance with *S3AM-003PR1 SH&E Training*.
- 5.2 Completed inspections and maintenance inventories shall be maintained the site or project files.

6.0 Attachments

- 6.1 [S3AM-321-ATT1 Core Drilling Machine](#)
- 6.2 [S3AM-321-ATT2 Pre-Drilling, Boring, & Direct-Push Probing Flow Chart](#)
- 6.3 [S3AM-321-FM1 Daily Drilling, Boring & Direct-Push Equipment Inspection](#)
- 6.4 [S3AM-321-FM2 Drilling, Boring & Direct-Push Equipment Maintenance Inventory](#)

Americas

Core Drilling Machine

S3AM-321-ATT1

1.0 Objective / Overview

- 1.1 Core drilling machines are used on all types of jobs. They can be electrical or gas powered and come with a stand or can be hand held. Caution should be used when operating such a machine. It may look harmless and easy to run, but drilling machines have many hazards.
- 1.2 Prior to coring activities the location should be checked for buried utilities in accordance with S3AM-331-PR1 *Underground Utilities*.

2.0 Safe Operating Guidelines

- 2.1 Clean the flanges before mounting the blade.
- 2.2 Make sure the blade is correct for the material being cut and that the arrow on the blade corresponds with the direction of rotation of the machine spindle.
- 2.3 Use built-in vacuum or bolt-down anchors depending on the type of surface to be cored. Do not bypass anchoring system.
- 2.4 Properly manage power cable for electric units to prevent slips, trips or falls by the operator or those nearby.
- 2.5 Avoid tilting the blade when cutting.
- 2.6 Use only the machines that have an approved safety guard.
- 2.7 Remove the diamond blade from the machine during transit to prevent accidental damage.
- 2.8 Inspect the blades frequently to detect cracks or undercutting of the steel center.
- 2.9 Do not let excessive heat be generated at the cutting edge of the blade.
- 2.10 Use adequate water supply to both sides of the blade.
- 2.11 Follow the manufacturers recommended pulley sizes and operating speeds for specific blade diameters.
- 2.12 Make sure to tighten drive belts to ensure full available power.
- 2.13 Don't force the blade on the blade shaft or mount blade on an undersized spindle.

3.0 Potential Hazards

- 3.1 Utilities
- 3.2 Electricity
- 3.3 Flying debris
- 3.4 Noise exposure
- 3.5 Inadequate housekeeping
- 3.6 Fumes or dust
- 3.7 Pinch points
- 3.8 Binding/biting – torque control

**4.0 Training Requirements**

- 4.1 Review of applicable SOPs (e.g., S3AM-305-PR1 *Hand & Power Tools*; S3AM-302-PR1 *Electrical Safety*).

- 4.2 Demonstrated knowledge on the use of a coring machine.
- 4.3 Review and follow manufacturers' operating guidelines.

5.0 Personal Protective Equipment (Level D PPE)

- 5.1 Hard hat
- 5.2 Safety Vest
- 5.3 Leather gloves
- 5.4 Face shield
- 5.5 Steel-toed/composite-toed boots
- 5.6 Hearing protection
- 5.7 Respirator or dust mask (as applicable to the respiratory hazards)

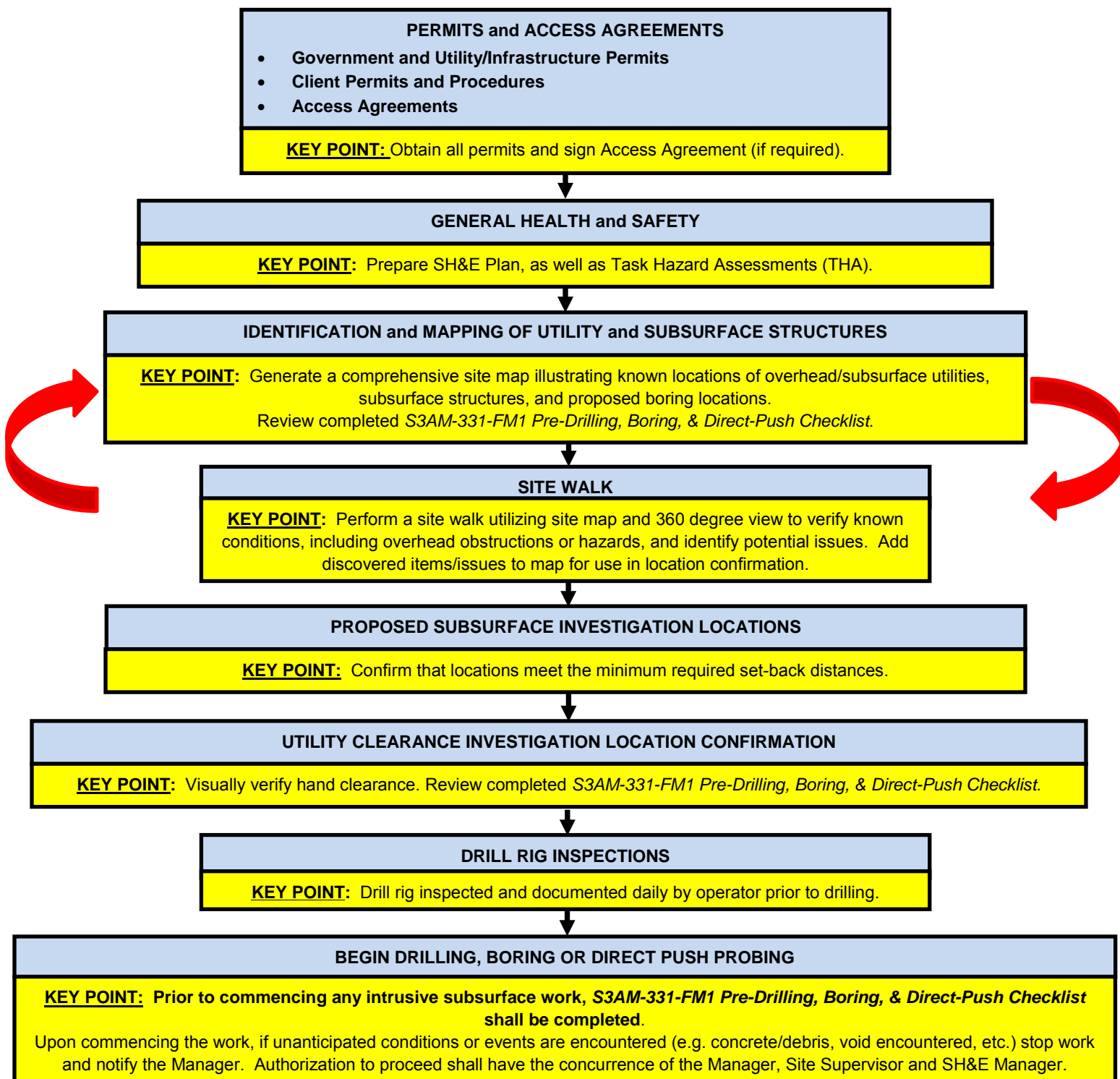
6.0 Other Safety Tips

- 6.1 Keep fingers and hands away from the cutting edge.
- 6.2 Hold handle firmly when operating.
- 6.3 A subsurface utility clearance shall be performed prior to initiating drilling operations.
- 6.4 Stand firmly and apply body weight at anchored side of guarded platform.

Pre-Drilling, Boring & Direct Push Probing Flow Chart

S3AM-321-ATT2

Before Any Drilling, Boring and Direct Push Probing Activities



Americas

Daily Drilling, Boring & Direct-Push Equipment Inspection

S3AM-321-FM1

Site / Project Name _____ Rig Inspector (Name/Company) _____

RIG INFORMATION:

Rig Type	Rotary/Auger Drilling Rig <input type="checkbox"/>	Direct Push Type (DPT) <input type="checkbox"/>
Owner	_____	VIN# _____
Year/Make	_____	Mileage _____
Model	_____	Drill Hrs _____

INSTRUCTIONS: Each shift shall inspect all applicable items. If an unsatisfactory condition (fail) is observed, suspend operation of the equipment and report the condition to the site supervisor immediately.

Emergency Equipment / Devices / Switches	
Kill switches are located and accessible to workers on both sides of the rotating stem. NOTE: Location and number of switches depend on the rig manufacturer; please refer to owner's manual (DPT typically has one switch on control panel).	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Kill switches installed by the manufacturer, alarms and other devices (e.g. positive air shut-off valve) tested and in operable condition. All workers familiar with location and operation of devices. NEVER BYPASS, DISABLE, OR REMOVE KILL DEVICES.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
First aid kit adequate and on equipment / readily available.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Absorbent materials on equipment / readily available (spill response).	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
A fire extinguisher of appropriate size is located on drill rig and readily available/accessible for drilling crew (recommended 20 lb).	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Protective Guards	
Drive shafts, belts, chain drives, and universal joints are guarded to prevent accidental insertion of hands, fingers, or tools.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Cables	
Cables on drill rig free of kinks, frayed wires, birdcages, flat spots, grease, and worn or missing sections.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Cables are terminated at the working end with a proper eye splice; either swaged, coupled, or using cable clamps.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Cable clamps are installed with the saddle on the live or load side. Clamps are not alternated and are of the correct size and number for the cable size.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Wire ropes are not allowed to bend around sharp edges without cushion material.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Pulleys and Cable Winches	
Pulleys are not bent, cracked, or broken.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Pulleys operate smoothly and freely, without resistance.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Motor is mounted in correct location and tightly secured to drill rig.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Winch capable of being placed in the free spool (unwind smoothly) and locked position correctly, demonstrating that the cable is suitable for lifting during drilling operations.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Safety Latches	
Hooks installed on hoist cables are the safety type with a functional latch to prevent accidental separation.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Safety latches are functional and completely span the entire throat of the hook and have positive action to close the throat except when manually displaced for connecting or disconnecting a load.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Flights / Augers / Reamers	
Flights / Augers / Reamers are not bent, cracked, or broken. NOTE: Flights / Augers / Reamers failing inspection must be removed from jobsite.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A

Flights are blunt to prevent the risks of cuts.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Auger keys are not bent, cracked/fractured, excessively worn, or otherwise damaged.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Auger bolt holes and threads are not damaged.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Inspect flights/augers for metal burns. NOTE: Burrs must be filed to flat surface.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Augers / Reamers lying flat on the ground (avoid stacking).	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Augers / Reamers over 50lbs (22.7kg) moved mechanically. (Avoid manual lifting).	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Drill String	
Appropriate break out tool(s) available.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Rod box and power vice operating smoothly and freely.	
Drill string are not bent and do not have any cracks/fractures.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Drill string connections (e.g. pins, threads, couplers) are of the proper type, are not bent, have no cracks/fractures, and are not excessively worn.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Swivel connectors (for trailing horizontal drill stem) lubricated and freely rotating.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Mast	
Mast is free of bends, cracks, or broken sections.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
All mounting hardware (pins, bolts, etc) in place.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
No moving of drill rig or maintenance/repairs while mast is in vertical position.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Hammering Device	
Hammer free of cracks, fatigue, or other signs of excessive wear.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Hammer connections are secure.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Leveling Devices	
Outriggers move in/out and up/down smoothly and freely while using controls on drill rig, with no hydraulics leaks.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Outriggers are extended prior to and whenever the mast is raised off its cradle. Outriggers must maintain pressure to continuously support and stabilize the drill rig (even while unattended).	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Outriggers are properly supported on the ground surface to prevent setting into the soil (use of outrigger support pads).	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Controls	
Controls are intact, properly labeled, have freedom of movement, and have no loose wiring or connections.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Controls are not blocked or locked into an operating position.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Installed lights, signals, gauges, and alarms operate properly.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Lifting Devices	
Slings, chokers, and lifting devices (straps, not chains) inspected before using and are in proper working order. NOTE: Damaged units are labeled and removed from jobsite.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Shackles/Clevises are in proper working order with pins/screws in place that is to be used while lifting.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Cables and lifting devices are not operated erratically or with a jerking action to overcome resistance.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Hydraulic System	
Hydraulic lines are secure, in good condition with no signs of excessive wear, and not leaking. NOTE: Check while pressurized.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Hydraulic lines are not in a bent or pinched position causing additional fluid restrictions/pressures.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Hydraulic oil reservoir has appropriate amount of oil and not leaking.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Documentation available to confirm that pressure relief valve was checked during shop maintenance activity and noted on maintenance log.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Pump Lines (water, grout, etc)	
Suction/Discharge hoses, pipes, valves, and fittings are secured and not leaking.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
High pressure hoses have a safety chain, cable, or strap at each end to prevent whipping in the event of a failure.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A

Ladders	
Drill rig has a permanently attached or proper portable ladder to be used for access to drilling platform.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Ladders and platforms not to be used for tool storage- keep ladders and operator platforms clear during drilling.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Tires / Tracks	
Tires / Tracks on rig are not excessively worn and free of any debris or foreign material.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
General	
General condition – exterior (no structural damage, no loose bolts, platform tidy, etc.)	
General condition – interior (cab clean, tidy)	
Drill rig meets regulations for transport on state/federal highways (inspection sticker, license plate, etc.).	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Rig is of appropriate size to meet job requirements.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Maintenance log available for previous 3 months to confirm proper maintenance/inspection.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Exhaust	
Exhaust system is free from defect and routes engine exhaust away from drill rig workers.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Fuels	
Fuel stored in an approved and properly labeled container.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Fuel transfer lines free from signs of excessive wear and not leaking.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Refueling and transferring of fuel is performed in an approved area with sufficient containment to prevent spillage.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Exclusion/Work Zones	
The exclusion/work zone is centered over the borehole (and if applicable, bore exit point) and the radius equal to or greater than the height of the mast (measured from ground level).	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
The exclusion/work zone is clear of tripping hazards.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
The exclusion/work zone communicated to concurrent/adjacent operations to prevent overlap of work zones or line of fire.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Subsurface Utilities / Installations and Overhead Obstructions	
Subsurface utilities / installations have been confirmed as identified and cleared through site observation and review of the completed <i>S3AM-331-FM1 Underground Utilities & Subsurface Installation Clearance Checklist</i> .	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Except where electrical distribution and transmission lines have been de-energized and visibly grounded, drill rigs will be operated proximate to under, by, or near power lines in accordance with the Minimum Approach Distance (MAD).	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Rig Repairs	
Repairs, when possible, are conducted offsite to reduce the risk of any onsite incidents.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Specialized PPE	
When working at elevated heights, workers are to wear a fall restraining device attached in a manner to restrict falls to less than six feet (1.83 meters).	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
When working in wet/slippery conditions, all workers have a lug-type sole or similar slip resistant sole, on their safety footwear to prevent slipping.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A

Comments:

Signature of Inspector: _____

Date: _____

Drilling, Boring & Direct-Push Equipment Maintenance Inventory

Drilling, Boring & Direct-Push Equipment Maintenance Inventory (S3AM-321-FM2)
Revision 1 December 15, 2016

1 of 1

Overhead Lines

S3AM-322-PR1

1.0 Purpose and Scope

- 1.1 Provides the safe work requirements to be observed where overhead utilities or other lines are present at a work location, including, but not limited to electric power lines, electrical apparatus, or any energized (exposed or insulated) parts, communication wires, or any other overhead wire or cable.
- 1.2 This procedure applies to all AECOM Americas-based employees and operations.

2.0 Terms and Definitions

- 2.1 **Arc Flash Hazard** – A dangerous condition associated with the possible release of energy caused by and electric arc. Arc flash is the light and heat produced from an electric arc supplied with sufficient electrical energy to cause substantial damage, harm, fire, or injury.
- 2.2 **Electrical Hazard** – A dangerous condition such that contact or equipment failure can result in electric shock, arc flash burn, thermal burn, or blast.
- 2.3 **Minimum Approach Distance (MAD)** – The MAD is the closest distance any employee or any part of the operating equipment is permitted to approach an energized or a grounded object.
- 2.4 **Qualified Person (Electrical Transmission and Distribution)** – A person trained and knowledgeable in the construction and operation of electrical transmission and distribution equipment or a specific work method, and has been trained to recognize and avoid electrical hazards that might be present with respect to that equipment or work method.
- 2.5 **Types of Overhead Lines:**
 - Overhead electric power lines
 - Structural cable supports
 - Guy wires
 - Cable television / communication lines

3.0 References

- 3.1 S3AM-004 PR1 Incident Reporting, Notifications & Investigation
- 3.2 S3AM-010-PR1 Emergency Response Planning
- 3.3 S3AM-209-PR1 Risk Assessment & Management
- 3.4 S3AM-302-PR1 Electrical Safety
- 3.5 S3AM-303-PR1 Excavation

4.0 Procedure

- 4.1 Roles & Responsibilities
 - 4.1.1 **Manager**
 - Identify conditions where overhead electric power lines may be present and outline what is required in the SH&E Plan and Task Hazard Assessments. Refer to the *S3AM-209-PR1 Risk Assessment & Management*.
 - Confirm electrical and communication lines are identified on all site and project drawings.

- Coordinate and communicate with overhead electrical line owner or operator to identify and implement appropriate control measures.
 - Provide adequate advance notification to the Overhead Electrical Line Owner / Operator to allow for insulation or isolation and grounding of the line(s) if required.
 - Confirm the Overhead Electrical Line Owner / Operator(s) are fully informed as to when the operations are to begin, end and when any location changes are planned if applicable.
- Confirm Employees are trained as required for the scope of work and associated hazards.
- Coordinate and communicate with subcontractors or employees working around overhead electric power lines.
- Confirm the *S3AM-322-FM1 Overhead Electric power lines Acknowledgement* is completed by concurrent operations working around overhead electric power lines on the worksite.

4.1.2 **Safety Health & Environment (SH&E) Manager**

- Assist and support the Manager in planning and responding to concerns regarding the exposure to overhead electric power lines.

4.1.3 **Employees**

- Maintain current training required for the scope of work and associated hazards.
- Inform the Manager of location conditions that may expose risks to overhead electric power lines.
- Comply with established minimum approach distances.

4.2 Training

4.2.1 The Manager shall confirm all Employees are oriented to the SH&E Plan and Task Hazard Assessment (THA) process, in accordance with *S3AM-209-PR1 Risk Assessment & Management*.

4.2.2 Confirm training requirements were met prior to work starting.

- The AECOM Manager or supervisor and employees shall perform a walk-thru of the work site and / or review of the work area / travel route to identify the overhead electric power lines. AECOM personnel may be accompanied by other applicable personnel (e.g. client representatives, contractors operating concurrently, etc.).
- Employee orientation shall include the Location Specific Emergency Response Plan.
- Proof of training and orientation shall be documented and retained in the project files.

4.2.3 Managers shall confirm that each Employee has received training required for the scope of work and associated hazards in accordance with *S3AM-003-PR1 SH&E Training*.

4.2.4 Additional training requirements may include, but are not limited to:

- The limitations of an insulating link / device, proximity alarm, and range control (and similar) device, if used.
- Grounding and bonding procedures.

4.3 General Requirements

4.3.1 The location or project specific SH&E Plan shall identify all overhead line hazards and provide suitable methods of elimination or control. All involved or affected workers shall review the SH&E Plan to confirm proper communication of the overhead line hazards and awareness of the control measures associated with their work.

4.3.2 Assess applicable factors such as, but not limited to:

- Scope of work (e.g. hoisting materials, excavation, grubbing, etc.).
 - Transportation route.
 - Hoisting, excavating, or other equipment to be operated.
 - Height, placement, and reach of equipment.
 - Equipment or material loading / unloading.
 - Location(s) of electric power lines, communication lines, guy wires, etc.
 - Worker training and experience.
 - Soil or ground condition and environmental conditions.
 - Interruptions to electrical services.
 - Hazard to public.
 - Use of ladders.
 - Pipe and other conducting materials.
 - Notification of electric utility owner.
 - Changing conditions.
 - Communication of all hazards to all workers including contractors, sub-contractors, and concurrent operations.
- 4.3.3 Task Hazards Assessments (THAs) shall be completed to record the hazards and control measures specific to the task, including those related to overhead line hazards, prior to undertaking assigned tasks. THAs shall be reviewed and signed by all workers involved in the specific task.
- 4.3.4 Should adverse weather conditions cause the work associated with overhead lines to be unsafe, the activities shall be discontinued.
- 4.3.5 Managers or designated employees shall formally notify all concurrent operations, or any others who may not have had reason to review and sign the related SH&E Plan or THAs, of work that is to be done in the vicinity of the overhead line at distances less than 50 feet (15.25 meters) and obtain the operator's assistance in protecting workers involved.
- Formal notification may be accomplished through a review of the SH&E Plan or THAs by the concurrent operator and associated personnel, as evidenced by signing the respective document's acknowledgement.
 - Alternately, the concurrent operations may acknowledge having reviewed AECOM's procedures with a separate acknowledgment form. *S3AM-322-FM1 Overhead Electric power lines Acknowledgement Form* or equivalent may be used.
- 4.3.6 Overhead lines are presumed to be energized unless the Overhead Electrical Line Owner / Operator confirms that the overhead line has been, and continues to be de-energized and visibly grounded at the worksite.
- 4.3.7 Overhead lines are presumed to be uninsulated unless the Overhead Electrical Line Owner / Operator or a registered Professional Engineer who is a Qualified Person with respect to electrical power transmission and distribution confirms that a line is insulated.
- 4.3.8 Confirm accurate measurement of load heights, maximum equipment radius and height or reach of any other equipment that could potentially encroach on the safe limit of approach for the overhead electrical line or guy wires.
- The height of all applicable overhead electric power lines that pose contact or encroachment potential shall be determined prior to work commencing.

- The height of electric power lines may only be determined by the client, utility company professional, or by using an approved electronic measuring device.
 - Awareness shall be maintained for any elements that could affect clearance (e.g. snow pack, ice or snow weighing down lines, excessive heat causing sag, etc.).
 - Caution shall be exercised when working or travelling near overhead lines having long spans, since they tend to be more prone to lateral swing in response to the wind and can present a contact hazard.
 - All low hanging communication lines in close proximity to energized lines shall be clearly identified as *Encroaching on Energized Lines*.
- 4.3.9 Managers shall contact the overhead owner/operator (i.e. local utility company) if work is to be done or before equipment is operated within 50 feet (15.25 meters) of an energized overhead line, to determine the voltage of the overhead line and establish the appropriate MAD.
- 4.3.10 Until the voltage of the overhead electrical line is known and the MAD established, an exclusion zone shall be created at ground level beneath and 50 feet (15 meters) perpendicular to the overhead electric power lines on each side.
- The exclusion zone shall be demarcated with visual indicators (e.g., signage, flagging, paint, cones). No equipment shall enter the exclusion zone without approval from AECOM management.
 - Unqualified employees shall maintain a safe clearance distance in accordance with the established MAD when working in an elevated position near energized overhead lines. For additional information associated with Qualified Employees refer to S3AM-302-PR1 *Electrical Safety*.
- 4.3.11 Managers shall contact the Overhead Electrical Line Owner / Operator (e.g. local utility company) if work is to be done or before equipment is operated within 50 feet (15.25 meters) of an energized overhead line, to determine the voltage of the overhead line and establish the appropriate MAD.
- All inquiries regarding electric utilities shall be made in writing and a written confirmation of the outage / isolation shall be received by the appropriate AECOM Manager prior to the start of the task that may impact the utility.
- 4.3.12 The Minimum Approach Distance (MAD) as it relates to Voltage varies from jurisdiction to jurisdiction. The MAD or the regulatory minimum distance requirements, whichever is more stringent, shall be maintained. The below chart shows the Phase-to-Phase voltage rating voltages in kilovolts and the MADs applicable to all AECOM operations:

Minimum Approach Distances (MAD)

Voltage Range (Kilovolts) (Phase-to-Phase)	Minimum Approach Distance (MAD) in Feet (Meters)
Personnel shall allow for equipment movement and electrical line swaying when establishing a M.A.D.	
0 – 50 KV	10 (3)
Over 50 – 200 KV	15 (5)
Over 200 – 350 KV	20 (6)
Over 350 – 500 KV	25 (8)
Over 500 – 750 KV	35 (11)
Over 750 – 1,000 KV	45 (14)
Note: This requirement shall apply except where client, local, or governmental regulations are more stringent.	

Source: American National Standards Institute, Publication B30.5.

- 4.3.13 An appropriate distance shall be kept between equipment, its occupants, their tools and energized overhead lines, electrical apparatus, or any energized parts.
- 4.3.14 These minimum approach distances do not apply to a load, equipment, or building that is transported under energized overhead power lines if the total height, including equipment transporting it, is less than 13.5 feet (4.15 meters).
 - If the travelling equipment, including load, is over 4.15m (13.62ft) a transportation permit shall be acquired from the appropriate jurisdiction to travel on any public road or highway.
 - Consult local jurisdiction as some US states may use heights of up to 4.45m (14.6ft).
 - Notification of appropriate utility companies may be required in conjunction with the transportation permit. Jurisdictional requirements shall be verified prior to transport.
 - Route shall be checked for clearance of overhead electrical and communication lines prior to transport.
 - A designated signaler will be utilized when the height of the equipment, buildings, tractor / trailers or any other transport equipment travelling under an overhead electrical line is greater than 4.15m (13.62ft).
- 4.3.15 Employees shall not place earth or other material under or beside an overhead line if doing so reduces the safe clearance to less than 50 feet (15.25 meters). To maintain a safe distance of 50 feet (15.25 meters):
 - Install warning devices and signs (hang a sign from and mark all guy wires to warn traffic of low clearance; provide warning signage for all overhead services).
 - Install telescopic, nonconductive posts and flagging across right-of-way at the minimum allowable clearance as allowed by regulations for the line voltage.
 - Position signs or other devices to determine the "Danger Zone".
 - Inform all job site personnel of the danger zone and the safe distances required.
 - Beware of atmospheric conditions, such as temperature, humidity, and wind that may dictate more stringent safety procedures.
- 4.3.16 If employees are to climb or perform work on poles or towers, the structures shall be confirmed as capable of withstanding the weight and activity without failure.
- 4.3.17 If holes are dug for poles or foundations for structures, appropriate measures shall be taken to prevent inadvertent entry by personnel or equipment. Refer to *S3AM-303-PR1 Excavation*.
- 4.3.18 Operation of heavy equipment and cranes in areas with overhead lines represents a significant arc flash and electrical hazard to all personnel on the job site.
 - Accidental contact with an energized overhead line or arcing between a high power line and grounded equipment, can cause harm to nearby equipment operators or ground personnel and damage to power transmission systems and / or operating equipment.
 - Equipment will be repositioned and blocked so that no part, including cables, can come within the established minimum clearances.
- 4.3.19 Gravel trucks, cranes, boom trucks, etc. shall retract, stow and lower boxes, outriggers, booms, etc. to the travel position prior to entering municipal and client owned roads (e.g. leaving plant sites, work over rig sites, battery sites, and storage yards) and any time travel may put the equipment within the MAD of an electrical line.

- 4.3.20 When a signal person is required, the individual shall wear reflective striping (coveralls or vest) and carry an air horn or other appropriate means of emergency communication.
- 4.3.21 The signal person shall be aware of the potential electrical line hazards, be verified as competent by their supervisor and not have any other duties while acting as the signal person.
- 4.3.22 The signal person shall remain outside the MAD and in a position that allows for monitoring of equipment or loads to prevent encroachment on the MAD.
- 4.3.23 Signs, pylons, high visibility tape and / or signalers shall not be removed until the last piece of AECOM equipment has traveled under the overhead electrical line.
- 4.4 Minimum Approach Distance (MAD) Reduction
 - 4.4.1 Where any work task will not allow the MAD to be maintained, an alternate means of protection shall be implemented by the Manager and approved by the SH&E Manager. In order of preference, acceptable procedures are:
 - De-energize the overhead line(s) / lockout by local utility authorities; or
 - Implement alternative procedures as identified by the Overhead Electrical Line Owner / Operator or a registered professional engineer.
 - 4.4.2 De-energize Overhead Lines
 - Elimination of electrical power provides the most acceptable means of ensuring safety of personnel. While temporary site overhead lines are often under the control of the site manager (and can be de-energized locally), electrical distribution and transmission lines can be de-energized only by the Overhead Electrical Line Owner / Operator. De-energizing of an overhead line often requires advance coordination with the Overhead Electrical Line Owner / Operator. At least one week advance notice should be provided.
 - Managers shall confirm with the utility Overhead Electrical Line Owner / Operator that the overhead line has been de-energized and visibly grounded at the job site.
 - 4.4.3 Alternative Procedures
 - Managers may implement alternative procedures to prevent arc flash and electrical contact. These procedures shall be identified by the Overhead Electrical Line Owner / Operator or a registered Professional Engineer who is a Qualified Person with respect to electrical power transmission and distribution.
 - A planning meeting with the Manager, SH&E Manager and the Overhead Electrical Line Owner / Operator (or registered Professional Engineer) shall be held to determine the most effective alternative procedures.
 - Alternative procedures shall meet all client, local and governmental regulatory requirements.
 - The work will be conducted by qualified and competent individuals, following the alternative written safe work procedures. All others are restricted from entering the MAD.
 - Insulating Barriers shall be rated for the voltage line being guarded. These barriers may not be part of or attached to the equipment. The MAD shall only be reduced within the designed working dimensions of the insulating barrier. This determination shall be made by a Qualified Person in accordance with local or governmental requirements for work practices near energized equipment.
 - Consult *S3AM-302-PR1 Electrical Safety* procedures to properly ground equipment and for limitations of grounding.
 - Dedicated Line Spotters shall be trained to enable them to effectively perform their task, including training on the applicable local and governmental regulations.

- No work that encroaches on an energized power line will be completed outside of daylight hours.

4.5 Additional Safety Measures.

- 4.5.1 When equipment shall repeatedly travel beneath electric power lines, a route shall be plainly marked and “rider poles” of non-conductive material shall be erected on each side to confirm equipment structures are lowered into a safe position.
- 20" X 28" (50.8cm X 71.12cm) Danger Overhead Power Lines signs, which are highly visible, shall be erected at a height of 1.8 meters (6ft) on each side of the electrical line. A combination of pylons and high visibility tape shall be placed underneath the electrical line.
 - These signs shall be in plain view of equipment traveling in either direction, but no closer than the MAD.
 - If physical guards (i.e. goal posts, rider poles) are used, the guards shall be of non-conductive material and consist of a pole on each side of the approach connected by a rope.
 - The poles will be placed at the MAD from and on each side of the electrical line. The ropes will be set at a height, which will maintain the MAD from the electrical line.

4.5.2 Watch for uneven ground that may cause vehicles and equipment to weave, bob, or bounce.

4.5.3 The following additional safety measures shall be implemented as needed when working around energized power lines:

- Provide equipment with proximity warning devices. These provide an audible alarm if any part of the equipment gets too close to a line.
- Install ground safety stops. These prevent vehicles from accidentally entering hazardous areas.
- Equip cranes with a boom-cage guard. This prevents the boom from becoming energized if an electrical line is contacted.
- Utilize insulated links and polypropylene tag lines. These prevent the transmission of electricity to loads or tag line handlers if an electrical line is contacted.

NOTE: These additional safeguards are intended as supplemental protection. Use of these measures is not permissible as a substitute for maintaining the safe working distance or implementation of the procedures outlined in this document.

4.6 Emergency Planning

4.6.1 Managers shall complete a location specific emergency response plan as part of their location or project specific SH&E Plan for all operations during which equipment is operated within 50 feet (15.25 meters) of an energized overhead electrical line or conductor. Refer to *S3AM-010-PR1 Emergency Response Planning*. This plan shall identify the following information:

- The importance to the operator's safety of remaining inside the cab except where there is an imminent danger of fire, explosion, or other emergency that necessitates leaving the cab.
- The safest means of evacuating from equipment that may be energized.
- The potentially energized zone around the equipment.
- The need for crew in the area to avoid approaching or touching the equipment and the load.
- The means to de-energize the electrical line or live conductor.
- The contact information for the utility Overhead Electrical Line Owner / Operator and emergency services.

- 4.6.2 In the event of an incident, the Employee shall report it in accordance with *S3AM-004 PR1 Incident Reporting, Notifications & Investigation*.
- 4.6.3 All damaged utilities shall be repaired by a qualified and / or licensed professional.

5.0 Records

- 5.1 Retain the Overhead Electric power lines Acknowledgement forms and any document related to requests of and confirmation from the Overhead Electrical Line Owner / Operator in the project files. Documentation of employee training completed shall be retained in accordance with *S3AM-003-PR1 SH&E Training*.

6.0 Attachments

- 6.1 [S3AM-322-FM1 Overhead Electric Power Lines Acknowledgement Form](#)

Americas

Overhead Electrical Lines Acknowledgment

S3AM-322-FM1

Company Information		
Name of Employer or Contracting Operation:		
Address:		
City:	Province:	Postal Code:
Telephone:	Fax:	
Project / Location Name:		
AECOM Contact Name:		
Acknowledgement		
<p>I acknowledge that I have received a copy of <i>S3AM-322-PR1 Overhead Lines</i> and any other AECOM documentation related to the overhead electrical lines.</p> <p>List any additional documentation received:</p> <p>I understand that this worksite may have Overhead Electrical Hazards, and I have discussed the received documentation with all of our company staff who will be on this site.</p>		
Name & Title (Print)	Signature	Date

Underground Utilities

S3AM-331-PR1

1.0 Purpose and Scope

- 1.1 Provides procedures designed to help prevent injuries to personnel working on the location and pedestrians, property damage, and adverse environmental impact as a result of potential hazards associated with encountering underground utilities, subsurface installations, and potential overhead hazards.
- 1.2 Provides the minimum requirements to be followed for underground work (e.g., excavations, drilling, boring, and probing work) to ensure that underground installations, and subsurface structures, are identified properly before work commences.
- 1.3 This procedure applies to all Americas-based employees and operations.
- 1.4 The Manager is responsible for meeting all the requirements in this procedure.
- 1.5 AECOM's clients may have specific procedures which shall be followed to identify and map utility and subsurface structures on their properties or facilities. Provided the client's procedures meet or exceed those of AECOM, approval shall be obtained from the Manager and the SH&E Manager to follow the client's procedures.

2.0 Terms and Definitions

- 2.1 **Underground Utilities** – All utility systems located beneath grade level, including, but not limited to, gas, electrical, water, compressed air, sewage, signaling and communications, etc.
- 2.2 **Clearance** – includes the following:
 - The positive locating of underground utilities or subsurface installations in or near the work area.
 - A signed statement by an appropriate representative attesting to the location of underground utilities and/or the positive de-energizing (including lockout) and testing of electrical utilities.
- 2.3 **Ground Disturbance (GD)** – Any indentation, interruption, intrusion, excavation, construction, or other activity in the earth's surface as a result of work that results in the penetration of the ground.
- 2.4 **Hand Clearance Zone** – The area on either side of the locate marks of a utility that shall be maintained in order to expose the utility through the use of non-destructive ground disturbance techniques acceptable to the owner of the buried utility. Visual exposure is required before mechanical excavation equipment may be used.
- 2.5 **Intrusive Activities** – Examples: Excavation of soil borings, installations of monitoring wells, installation of soil gas sampling probes, excavation of test pits/trenches or other man-made cuts, cavity, trench or depression in an earth surface formed by earth removal.
- 2.6 **Non-Destructive Ground Disturbance Technique** – A safe and acceptable excavation method that is used to visually expose an underground utility without causing damage. Non-destructive ground disturbance techniques may include, but are not limited to:
 - Hand digging.
 - Use of non-conductive tools.
 - Hydro-vacuum.
- 2.7 **Subsurface Installation** – Examples: Subterranean tunnels, underground parking garages and other structures beneath the surface.
- 2.8 **Utility Strikes** – Unplanned contact with utilities resulting in damage to the utility or its protective coating.

3.0 References

- 3.1 S3AM-003-PR1 SH&E Training
- 3.2 S3AM-303-PR1 Excavation
- 3.3 S3AM-321-PR1 Drilling, Boring & Direct-Push Probing

4.0 Procedure

4.1 Roles and Responsibilities

4.1.1 Manager

- Administer this procedure and the development of the SH&E Plan.
- Confirm the appropriate equipment and materials are available to conduct the underground utility and/or subsurface installation clearance.
- Confirm all employees involved and affected by the task review the SH&E Plan and Task Hazard Assessment (THA) prior to work commencing
- Authorize work to proceed using the *S3AM-331-FM2 Underground Utility & Subsurface Installation Clearance Checklist*.
- Confirm that employees conducting underground utilities and subsurface clearance processes possess all required training, registrations or certifications.
- Provide authorization (with the concurrence of the Site Supervisor and SH&E Manager) for work to resume if interrupted due to unexpected conditions or events.

4.1.2 Safety, Health & Environment (SH&E) Manager

- Assist AECOM management as needed by providing guidance and clarification as to issues that may arise.
- Review the SH&E Plan to confirm compliance with jurisdictional regulations. Provide technical guidance as needed when a variance is pursued related to this procedure.

4.1.3 Employees

- Maintain training as appropriate to the work to be completed (e.g. ground disturbance, lockout tagout, equipment operation, etc.). Refer to *S3AM-003-PR1 SH&E Training*.
- Review the SH&E Plan and Task Hazard Assessment (THA) prior to work commencing.
- As appropriate to the anticipated or encountered hazards and as addressed in the applicable planning documentation, utilize appropriate personal protective equipment (PPE) and applicable training, practices and operating procedures.
- Immediately notify the Manager of any unanticipated conditions or events. If assigned equipment, perform appropriate inspections and confirmations of maintenance and/or repairs.

4.2 Training

4.2.1 All on-site employees involved with the underground utility and subsurface identification and associated clearance process shall be trained, at a minimum, in these procedures.

4.2.2 Employees shall complete all required training associated with their tasks in accordance with the SH&E Training Matrix and any training assessments developed at the business group.

- Refer to *S3AM-003-PR1 SH&E Training*.
- This training may include, but is not limited to, Excavation / Trenching (Ground Disturbance), HAZWOPER, Petroleum Safety Training (or Construction Safety Training), and H2S Alive as appropriate.

4.2.3 As applicable, employees shall receive client-required training.

4.3 Planning

4.3.1 Health and Safety Plan – At a minimum, a SH&E Plan and task hazard assessments (THAs) shall be prepared prior to any underground utilities and subsurface installations clearance activities.

- The SH&E Plan will address any required environmental monitoring including gas monitoring, dust, noise, metals, radiation or other monitoring as may be appropriate for site conditions.
- Employees shall comply with all SH&E Plan requirements.
- The location specific emergency response plan shall be in place, contain procedures applicable to the potential emergencies presented by the operations, and be reviewed with all personnel potentially affected.

4.3.2 *S3AM-331-ATT2 Underground Utilities & Subsurface Installation Clearance Flow Chart* provides a summary of the key requirements addressed in this procedure.

4.3.3 Underground utilities and subsurface installations shall be investigated as being present, including the following, but not limited to:

- Steam, gas and electric.
- Sewer and water.
- Subterranean tunnels.
- Fibre optics (note: routine geophysical surveys will not identify fibre optic cables).
- Traffic control cables.

4.3.4 Location of underground utilities and subsurface installations will be confirmed by cross-referencing available information:

- Maps, as-built drawings and issued for construction (IFC) drawings.
- Plot plans, permits, crossing/encroachment agreements.
- One-Call information, locator and provided surveys.
- Private utility information, locator and provided surveys (e.g. ground penetrating radar (GPR), electromagnetic, etc.).
- Owner supplied documentation.
- Site walks.

4.3.5 As applicable, emergency shut-off locations of utilities shall be verified before work activities commence.

4.3.6 Jurisdictional, land owner, client and utility owner requirements shall be consulted to determine the minimum search zone dimensions and appropriate clearance distances.

4.3.7 As necessary and if possible, adjust locations of excavations or intrusive subsurface work away from subsurface utilities and installations

4.3.8 Prior to any excavation or intrusive subsurface work, the *S3AM-331-FM1 Underground Utility & Subsurface Installation Clearance Checklist* shall be completed. The form shall be reviewed and signed by the Manager.

- If the answer to any question in Part 1 of the checklist is “No” or “N/A”, no ground disturbance may take place without review by the Manager, in consultation with SH&E Manager, of the circumstances related to the particular item. The Manager shall initial beside each “No” or “N/A” item to indicate review and authorization.

4.4 Permits, Notifications and Access Agreements

- 4.4.1 Any required notifications shall be provided within the appropriate timeframe to the applicable organization (e.g. owner, utility company, agency, governing body, etc.).
- 4.4.2 All applicable permits (e.g. client, government, working near rail road, etc.) will be identified, obtained, and adhered to.
- 4.4.3 All access agreements will be obtained and adhered to.
- 4.5 Locating Underground Utilities and Subsurface Installations
 - 4.5.1 Utilize the appropriate call/click-before-you-dig provider. Refer to *S3AM-331-ATT1 One-Call System*.
 - 4.5.2 Federal/State/Provincial/Territorial and other “One Call” providers shall be contacted at least two working days and no more than ten working days prior to commencing the ground disturbance. Jurisdictional requirements shall be consulted to verify the appropriate advance notice. (e.g. 24 hours, two full working days, three to ten business days, etc.).
 - 4.5.3 If the location of proposed excavation or intrusive subsurface work cannot be clearly and adequately identified, the route and/or area of the proposed ground disturbance shall be identified using white flags, paint or stakes prior to the arrival of the locator. Consult jurisdictional requirements as white-lining may be a mandatory requirement on all ground disturbances.
 - 4.5.4 One Call providers shall appropriately identify and mark the subsurface utilities or installations, or otherwise provide written notification they do not have any facilities near the proposed subsurface/intrusive locations.
 - 4.5.5 Confirm all circuits were on during subsurface checks if the checks were for identifying energized lines (e.g. circuits on timers or light sensing switches).
 - 4.5.6 Areas that have a high density of sub-surface facilities may require a secondary locate by another independent locator to verify locations identified by the first locator.
- 4.6 Private Utility Locating
 - 4.6.1 One Call services may not be available in various non-urban locations. Private utility locating companies shall be utilized to identify and located any underground utilities or subsurface installations.
 - 4.6.2 Be aware urban areas (e.g. city or town) may have subsurface installations (e.g. underground garages) and utilities (e.g. public water, sewer, and gas pipelines) that are not covered by one-call systems.
 - These subsurface installations and utilities require additional investigation and diligence beyond the one-call system.
 - Additional investigation and diligence beyond the one-call system is also recommended for non-urban areas.
 - 4.6.3 In urban areas, private utility locating companies shall be called to identify and locate, through geophysical surveys and other means, the presence of private utilities installed by the property owner (e.g. irrigation systems) and to verify the presence of public utilities on the properties.
 - Hand clearing is required in urban areas.
 - 4.6.4 Hand clearing is also recommended for non-urban areas and may be required by the given jurisdiction.
 - 4.6.5 Warning tape, pea gravel, sand, non-indigenous material, bentonite, red concrete (indicative of electrical duct banks) and any departure from native soil or backfill may be evidence of the presence of subsurface installations and utilities.
- 4.7 Surface Markings

- 4.7.1 Once the underground installation has been identified, proper surface markings shall be made in accordance with the guidelines from the One-Call System (refer to S3AM-331-ATT1), guidance contained in this procedure or as contract-specified.
- 4.7.2 Color-coded surface marks (paints or similar coatings) shall be used to indicate the type, location, and route of buried installations. Additionally, to increase visibility, color-coded vertical markers (temporary stakes or flags) shall supplement surface marks.
- 4.7.3 All marks and markers shall indicate the name, initials, or logo of the company that owns or operates the installation and the width of the installation if it is greater than 2 inches.
- 4.7.4 If the surface over the buried installation is to be removed, supplemental offset marking shall be used. Offset markings shall be on a uniform alignment and shall clearly indicate that the actual installation is a specific distance away.
- 4.7.5 Locate marks shall be re-verified as per jurisdictional requirements or no later than 14 days after the previous locate was completed, whichever interval is shorter. These locate time intervals shall be maintained for the duration of the ground disturbance.
- If the work is interrupted during the determined lifespan or work does not commence during the applicable lifespan, a new locate shall be performed.
 - Jurisdictional provisions may allow for an extension to the lifespan of the locate marks, however certain conditions may need to be met. (e.g. activities uninterrupted)
 - If locate marks are moved or destroyed the location of the buried facilities shall be re-established.
- 4.8 Uniform Color Coding
- 4.8.1 The colors and corresponding installation type are as follows unless otherwise contract-specified:

AMERICAN PUBLIC WORKS ASSOCIATION – APWA
Color Coding for Marking of Buried Facilities

White	Proposed Ground Disturbance Area
Pink	Temporary Survey Markings
Red	Electric Power Lines, Cables, Conduit and Lighting Cables
Yellow	Gas, Oil, Steam, Petroleum Lines or Gaseous Materials
Orange	Conduit, Cable, Communication, Alarm or Signal Lines
Blue	Potable Water
Green	Sewer, Storm Sewer and Drain Lines
Purple	Reclaimed Water, Irrigation and Slurry Lines (non-potable)

Canadian Association of Geophysical Contractors



4.9 Identification and Mapping of Utility and Subsurface Structures

- 4.9.1 The locations of subsurface utilities and subsurface installations shall be investigated, documented, and shown on a site plan (a scaled site plan shall be used when feasible). Refer to *S3AM-331-FM1 Underground Utilities & Subsurface Installation Clearance Checklist*.
- 4.9.2 Documentation of utility and subsurface installation identification (calling one call, responses from utilities) along with the scaled site plan shall be available on the worksite at all times of intrusive activities.

4.10 Site Walk

- 4.10.1 A site walk shall be conducted by the AECOM Manager and any other appropriate personnel with the objectives of reviewing all planned intrusive activity locations, the locations of subsurface and overhead utilities, overhead obstructions, and the potential for subsurface installations, to determine the appropriate utility clearance activities, and to observe other physical hazards.
- Walk the area at least 50 feet (15.2 meters) from perimeter of the site to observe physical hazards.
 - Walk the area of at least 50 feet (15.2 meters) radius from each proposed subsurface intrusion location.
 - If possible, particularly at urban and industrial sites, the client/property owner or an individual knowledgeable about the site and site utilities will attend the site walk.
 - Add discovered items/issues to map for use in location confirmation.
- 4.10.2 The Site Walk further supplements the Identification and Mapping of Utility and Subsurface Structures procedure. Site Walks should be repeated as necessary following the Identification and Mapping of Utility and Subsurface Structures as visual verification of the hazards. Examples include:
- Proposed location(s) does not lie on a line connecting two similar manhole covers (e.g. sanitary sewer or storm drain).
 - Proposed subsurface location(s) has not subsided, been excavated and patched, nor gives the appearance it may be covering a former trench (e.g. linear cracks, sagging curbs, linear re-pavements, etc.).
 - Proposed subsurface location(s) does not lie on a line with any water, gas, electrical meters, utility cleanouts, or other utility boxes in the surrounding areas.

4.11 Proposed Subsurface Investigation Locations

- 4.11.1 All proposed subsurface locations will be reviewed in comparison to subsurface and overhead utilities and subsurface installations and adjustments made as necessary.
- 4.11.2 Minimum set back distances from subsurface and overhead utilities and subsurface installations will be established including 5 feet (1.5 meters) from any subsurface utility, 7 feet (2.1 meters) from the pad surrounding any underground storage tanks, and 10 feet (3 meters) from any overhead energized electrical line (or further depending on line voltage). These set back distances are a minimum; government regulations and utility requirements may dictate a greater set back distance.

4.12 Utility Clearance Investigation Location Confirmation

- 4.12.1 As applicable, all client on-site safety procedures shall be understood and adhered to.
- 4.12.2 Hand exposure or non-destructive ground disturbance techniques to expose an underground utility or subsurface installation are necessary to accurately determine size, location and alignment prior to mechanical excavation or intrusive subsurface work in the vicinity of that utility or installation.
- 4.12.3 Non-destructive ground disturbance techniques shall be acceptable to the owner of the buried utility (i.e. hydro-vacuum temperature or pressure).
- 4.12.4 Hydro-vacuum or air-knife require proper grounding equipment at sites where the subsurface may contain flammable gases, liquids, or vapors
- 4.12.5 Jurisdictional, land owner, client and utility owner requirements shall be consulted to determine the distance of the hand exposure zone, and what requirements, when met, may allow mechanical excavation within these zones.
- 4.12.6 At a minimum, all underground utilities and subsurface installations within a 5 feet (1.5 meter) radius of the work site shall be identified and physically located (seen) before use of mechanical excavation equipment is permitted. Jurisdictional, client, land owner and utility owner requirements shall be consulted as the required hand exposure radius may be larger.
- 4.12.7 In urban areas, proposed subsurface locations will be hand cleared to 5 feet (1.5 meters) (soil borings and wells) or 12 inches (30 centimeters) (soil gas sampling probes) using non-mechanical methods.
 - In non-urban areas, hand clearing should be conducted if possible and shall be conducted as required by the given jurisdiction.
 - Hand clearance should be extended if locations of deep utilities and structures are not known.
 - Hand exposure or non-destructive ground disturbance techniques should extend a minimum of 24 inches (60 centimeters) below the intended ground disturbance depth to minimize the hazard of mechanical equipment contact with any utility or installation.
- 4.12.8 Mechanical equipment and attachment dimensions shall be considered when establishing the zone in which all underground utilities and subsurface installations are physically located (seen) prior to the use of that equipment. The radius may require expanding to maintain safe distances when using large equipment.

4.13 Utility Strikes

- 4.13.1 Utility strikes shall be reported in accordance with *S3AM-004-PR1 Incident Reporting, Notifications & Investigation*.
- 4.13.2 All damaged utilities shall be repaired by a qualified and/or licensed professional.

5.0 Records

- 5.1 Retain completed *S3AM-331-FM1 Underground Utility & Subsurface Installation Clearance Checklist* and documents related the clearance process (e.g. Utility Owner communication, etc.) in the site or project files.

- 5.2 Documentation of employee training completed shall be retained in accordance with S3AM-003-PR1 SH&E Training.

6.0 Attachments

- 6.1 [S3AM-331-ATT1](#) [One-Call System](#)
- 6.2 [S3AM-331-ATT2](#) [Underground Utilities & Subsurface Installation Flow Chart](#)
- 6.3 [S3AM-331-FM1](#) [Underground Utility & Subsurface Installation Clearance Checklist](#)

Americas

One-Call System

S3AM-331-ATT1

1.0 What Is It?

- 1.1 One-call systems are established across the Americas to provide one telephone number for excavating contractors and the general public to call for notification of their intent to use equipment for excavating, tunneling, demolition, or any other similar work. This one-call system provides the participating members an opportunity to identify and locate their underground facilities.
- 1.2 As described on their web site (<http://www.call811.com>), Common Ground Alliance (CGA) was “created specifically to work with all industry stakeholders in an effort to prevent damage to underground utility infrastructure and ensure public safety and environmental protection.” CGA also serves as an organization to continuously update best practices amongst the growing underground industry. The CGA web site provides current one-call information for all states and provinces.

2.0 Why Is It Needed?

- 2.1 Damage to underground facilities increased considerably following the building boom of the 1950s, 1960s, and early 1970s when the trend was to go underground with utilities. Thousands of miles of underground facilities are vulnerable to excavating machines such as backhoes, and the resulting damage can interrupt utility service and threaten life, health, and property.

3.0 How to Get It

- 3.1 In the United States 811 is the Federally-mandated national “Call Before Your Dig” number that connects directly to the local one-call center. Each state has different rules and regulations governing digging, some stricter than others. The CGA web site provides current contact information to find state-specific information as well as links to submit an online digging request where available. Canadian one-call numbers vary by jurisdiction. One-call services are not available in Canada’s Atlantic provinces (New Brunswick, Newfoundland, Nova Scotia) or in the three Northern Territories (Nunavut, Northwest Territories, Yukon).

4.0 Disclaimer

- 4.1 The purpose of this directory is to illustrate the extent of one-call service available. Some jurisdictions have a list of “Tier 1” subscriber utilities notified by 811, and a “Tier 2” list that the excavator/contractor is responsible for contacting directly. Users shall verify information is current including the extent and limit of service from local sources.

Province/State		One-Call Agency	Number
Canada		www.clickbeforeyoudig.com	
Alberta	Alberta One Call	www.albertaonecall.com	1.800.242.3447
British Columbia	BC One Call	www.bconeall.bc.ca	1.800.474.6886
Manitoba	Click Before You Dig	www.clickbeforeyoudigmb.com	Various – see website
Ontario	Ontario One Call	www.on1call.com	1.800.400.2255
Québec	Info Excavation	www.info-ex.com	1.800.663.9228
Saskatchewan	Sask 1 st Call	www.sask1stcall.com	1.866.828.4888

United States		www.call811.com	811
Alabama	Alabama 811		1.800.292.8525
Alaska	Alaska Digline, Inc.		1.800.478.3121
Arizona	Arizona 811		1.800.782.5348
Arkansas	Arkansas One Call		1.800.482.8998
California	(North & Central) USA North 811		1.800.227.2600
	(South) Dig Alert		1.800.227.2600
Colorado	Colorado 811		1.800.922.1987
Connecticut	Call Before You Dig		1.800.922.4455
Delaware	Miss Utility of Delmarva		1.800.282.8555
District of Columbia	District One Call		1.202.265.7177
Florida	Sunshine 811		1.800.432.4770
Georgia	Georgia 811		1.800.282.7411
Hawaii	Hawaii One Call		1.866.423.7287
Idaho	Dig Line, Inc.		1.800.342.1585
	(Bonner/Boundary) Pass Word		1.800.626.4950
	(Kootenai County) Pass Word		1.800.428.4950
	(Shoshone-Benewah) Pass Word		1.800.398.3285
Illinois	(Chicago) Digger -Chicago Utility Alert Network		312.744.7000
	(Outside of Chicago) JULIE		1.800.892.0123
Indiana	Indiana 811		1.800.382.5544
Iowa	Iowa One Call		1.800.292.8989
Kansas	Kansas 811		1.800.344.7233
Kentucky	Kentucky 811		1.800.752.6007
Louisiana	LA One Call		1.800.272.3020
Maine	Dig Safe		1.888.344.7233
Maryland	(West of Chesapeake Bay) Miss Utility of Maryland		1.800.257.7777
	(East of Chesapeake Bay) Miss Utility of Delmarva		1.800.282.8555
Massachusetts	Dig Safe System, Inc.		1.888.344.7233
Michigan	Miss Dig		1.800.482.7171
Minnesota	Gopher State One Call		1.800.252.1166
Mississippi	Mississippi 811		1.800.227.6477

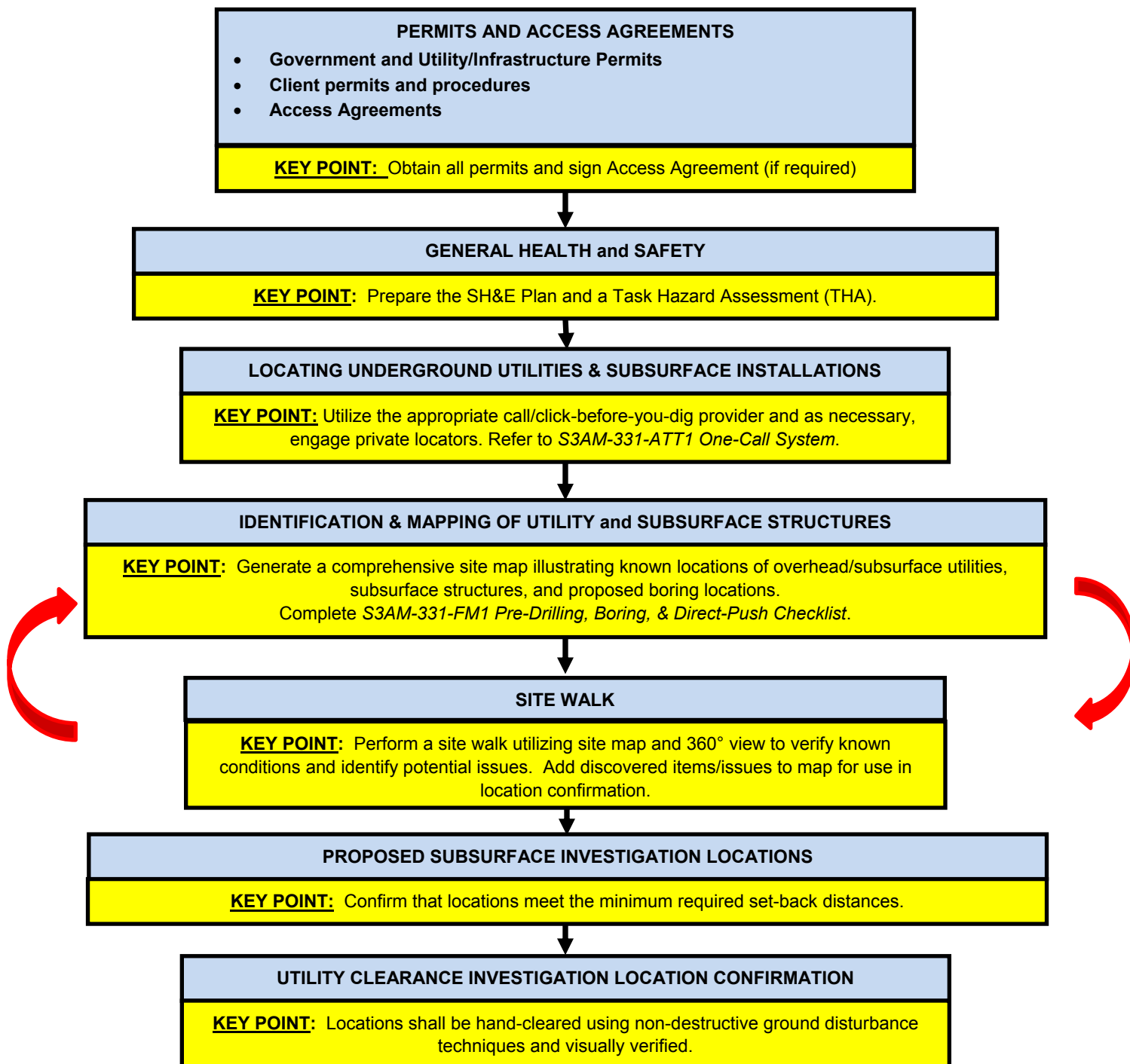
Missouri	Missouri One Call System	1.800.344.7483
Montana	Montana 811	1.800.424.5555
	(Flathead and Lincoln Counties) Montana One Call Center	1.800.551.8344
Nebraska	Nebraska 811	1.800.331.5666
Nevada	USA North 811	1.800.227.2600
New Hampshire	Dig Safe System, Inc.	1.888.344.7233
New Jersey	New Jersey One Call	1.800.272.1000
New Mexico	New Mexico 811	1.800.321.2537
New York	(North of 5 Boroughs) Dig Safely New York	1.800.962.7962
	(5 Boroughs and Long Island) New York 811, Inc.	1.800.272.4480
North Carolina	North Carolina 811	1.800.632.4949
North Dakota	North Dakota One Call	1.800.795.0555
Ohio	Ohio Utilities Protection Service	1.800.362.2764
Oklahoma	Call Okie	1.800.522.6543
Oregon	Oregon Utilities Notification Center	1.800.332.2344
Pennsylvania	Pennsylvania One Call System, Inc.	1.800.242.1776
Puerto Rico	Puerto Rico Public Service Commission 811	
Rhode Island	Dig Safe System, Inc.	1.888.344.7233
South Carolina	South Carolina 811	1.888.721.7877
South Dakota	South Dakota One Call	1.800.781.7474
Tennessee	Tennessee 811	1.800.351.1111
Texas	Texas 811	1.800.545.6005
	Lone Star 811	1.800.669.8344
Utah	Blue Stakes of Utah	1.800.662.4111
Vermont	Dig Safe System, Inc.	1.888.344.7233
Virginia	Virginia 811	1.800.552.7001
Washington	Utility Notification Center	1.800.424.5555
West Virginia	WV 811	1.800.245.4848
Wisconsin	Diggers Hotline	1.800.242.8511
Wyoming	One-Call Of Wyoming	1.800.849.2476

Americas

Underground Utilities & Subsurface Installation Clearance Flow Chart

S3AM-331-PR1

Before Any Underground Utilities and Subsurface Installation Clearance



Americas

Underground Utilities & Subsurface Installation Clearance Checklist

S3AM-331-FM1

Location:	Project #:	Date & Time:
Manager:	Contractor (if applicable):	Weather:
Client:	Inspector:	
Notes:		

Part 1

Part 1 and Part 2 shall be completed prior to any intrusive subsurface work. DO NOT DISTURB GROUND if a "No" or "N/A" answer to any of the Part 1 questions has not been initialed as authorized by the AECOM Manager.

Any variance from these procedures requires approval of the Vice President of the applicable business group.

	Yes	No	N/A
I. Permits and Access Agreements			
1. Have all appropriate permits and agreements been identified and obtained (e.g. client, drilling, encroachment, working near railroads, etc.)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Have all client requirements been identified and obtained?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. If working off-site is (are) site access agreement(s) executed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
II. General Health and Safety			
1. Has a Health and Safety Plan (HASP) been prepared for AECOM employees?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Do on-site personnel have required-level PPE?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Do on-site personnel have required-level of training?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Is appropriate monitoring equipment as specified in HASP/THAs available at each clearance location?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Has the field screening equipment been calibrated as required by the HASP?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Are calibration gases available at the site?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
III. Identification and Mapping of Utility and Subsurface Structures			
1. Is a Site Plan showing proposed subsurface locations and utility locations attached to this check list?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Have above/below ground utilities & subsurface installations been investigated (Part 2 of this form)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Have all Federal/State/Provincial/Territorial and other "One Call" providers marked their facilities or otherwise notified they do not have any facilities near the proposed subsurface/intrusive locations?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Have Federal/State/Provincial/Territorial or other "One Call" providers identified what utilities and underground structures are <u>not</u> included in their provider system (e.g. underground structures)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. As noted in the exception at the bottom of Section VI of this checklist, has a utility locating contractor performed geophysical and/or other surveys of the proposed subsurface/intrusive locations?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Visual verification that each of the proposed locations does not lie on a line connecting two similar manhole covers (e.g. sanitary sewer or storm drain)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Visual verification that the ground in the vicinity of each of the proposed subsurface locations has not subsided, been excavated and patched, give the appearance it may be covering a former trench (e.g. linear cracks, sagging curbs, linear re-pavements, etc.) and does not lie on a line with any water, gas, electrical meters, utility cleanouts, or other utility boxes in the surrounding areas?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Part 1 and Part 2 shall be completed prior to any intrusive subsurface work. DO NOT DISTURB GROUND if a "No" or "N/A" answer to any of the Part 1 questions has not been initialed as authorized by the AECOM Manager.

Any variance from these procedures requires approval of the Vice President of the applicable business group.

	Yes	No	N/A
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IV. Site Walk

1. Has a site walk been performed that includes the following:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
a. Reviewing all planned intrusive locations?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Adjusting locations away from subsurface utilities and installations?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Determining the appropriate utility clearance activities for each location?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Determining the presence and location of overhead utilities and obstructions?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Walk around perimeter of the site to observe physical hazards?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Includes 50 feet (15.2 meters) from perimeter of the site to observe physical hazards and 50 feet (15.2 meters) radius from each proposed subsurface location?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

V. Proposed Subsurface Investigation Locations*

1. Are all of the proposed subsurface locations at least 5 feet (1.5 meters) from any identified subsurface utility?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Are all of the proposed subsurface locations at least 7 feet (2.1 meters) from the pad surrounding any underground storage tanks (USTs) shown on the Site Plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Are all of the proposed subsurface locations at least 5 feet (1.5 meters) from any subsurface utilities shown on the Public Right-of-Way street improvements?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

* These set back distances are a minimum; government regulations and utility requirements may dictate a greater set back distance.

VI. Utility Clearance Investigation Location Confirmation*

1. Have subsurface locations been hand cleared as follows? Hand clearance should be extended if locations of deep utilities and structures are not known. In non-urban areas hand clearing should be conducted if possible and according to local requirements.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
a. For soil borings/monitoring wells; excavated to a minimum of 5 feet (1.5 meters) below ground surface using non-mechanical methods?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. For soil gas sampling; excavated to 2 foot (0.6 meter) below grade or below the bottom of a concrete floor prior to the installation of soil gas sample probe points?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

* Exceptions to requirements of the utility clearance process, as permitted by the applicable jurisdiction, include the following:

- Sites where extensive utility mapping (e.g. geophysical survey) has been completed and/or where extensive activities have already been performed.
- Locations where facility layout is well documented and understood.
- Sites or portions of large sites where utilities are known not to exist currently or to not have ever existed throughout the life of the facility, property or site.

Comments:

Documentation supplied by one-call or private utility and installation locators, including email or written field confirmation / maps of mark-out requests and status shall accompany this form. If this form is supporting multiple ground disturbance activities, a copy of this completed form should be provided to each activity.

Part 2

Public Utility Locate (OneCall)			Prior Locate Ticket #	
Date Called:		Called By:		Valid Until:
Ticket Number:		Area Requested To Be Cleared:		
Private Utility Locate			Prior Locate Ticket #	
Company Performing Locate:			Date Completed:	
Area(s) Requested To Be Cleared (including distance around marked locations):				
Method(s) Used (e.g., GPR, EM):				
Confirm Area(s) Cleared:				
OneCall Utilities			Field Observation	
Utility	Notified by	Comments	Marked (mains & services)	
Electric (Red)	<input type="checkbox"/> OneCall <input type="checkbox"/> Other		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above	
Gas/Petroleum Pipeline (Yellow)	<input type="checkbox"/> OneCall <input type="checkbox"/> Other		<input type="checkbox"/> Yes <input type="checkbox"/> No	
Sewer/Drainage (Green)	<input type="checkbox"/> OneCall <input type="checkbox"/> Other		<input type="checkbox"/> Yes <input type="checkbox"/> No	
Water (Blue)	<input type="checkbox"/> OneCall <input type="checkbox"/> Other		<input type="checkbox"/> Yes <input type="checkbox"/> No	
Communications (Orange)	<input type="checkbox"/> OneCall <input type="checkbox"/> Other		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above	
Other	<input type="checkbox"/> OneCall <input type="checkbox"/> Other		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above	
Were all circuits on during subsurface checks if the checks were for identifying energized lines (e.g., circuits on timers or light sensing switches)?			<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Utilities Not Identified By OneCall (Includes both Public and Private along with Regional and Site Utilities)			Field Observation	
Utility (Colors may vary)	Owner / Contact / Phone #	Notified	Marked	
Communications: (Orange) TV, computer, phone, cell towers, site communication, cameras, security, etc.		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above	
Electricity: (Red) Mains / Supplies / Interior / Exterior (signs, fuel pumps, low voltage security perimeters, gates, property light posts, equipment, substations, etc.)		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above	
Gas: (Yellow) Mains / Supplies / Equipment / Pipelines (Natural, Process, Oil, Crude, Refined (Gas, Diesel, Jet), etc.)		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above	
Steam: (Yellow)		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above	
Structures: Possible horizontally installed facilities, vaults, basements, tunnels, sub-grade structures, foundations, overhead obstructions, etc.		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above	
UST Systems (Tanks / piping / electric)		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Sewer: (Green) Sanitary, storm, combined, septic, drainage (parking, buildings, fields), irrigation		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Water: (Blue) Process, Plant, potable, well, cooling, return/makeup, fire, sprinkler, landscape irrigation, reclaim (Purple) other		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above	
Other: Abandoned lines, invisible dog fences, shopping cart perimeter monitoring, traffic lights		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above	

Manager:

Print

Sign

Date

Attachment C

Safety Data Sheets (SDSs)



SAFETY DATA SHEET

Creation Date 10-Dec-2009

Revision Date 12-Jul-2016

Revision Number 3

1. Identification

Product Name Tetrachloroethylene

Cat No. : AC445690000; ACR445690010; AC445690025; AC445691000

Synonyms Perchloroethylene

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

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

Entity / Business Name
Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

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

2. Hazard(s) identification

Classification

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

Skin Corrosion/irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Skin Sensitization	Category 1
Carcinogenicity	Category 1B
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Central nervous system (CNS).	
Specific target organ toxicity - (repeated exposure)	Category 2
Target Organs - Kidney, Liver, Blood.	

Label Elements

Signal Word
Danger

Hazard Statements
Causes skin irritation
Causes serious eye irritation
May cause an allergic skin reaction
May cause drowsiness or dizziness
May cause cancer
May cause damage to organs through prolonged or repeated exposure

**Precautionary Statements****Prevention**

Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wash face, hands and any exposed skin thoroughly after handling
Contaminated work clothing should not be allowed out of the workplace
Do not breathe dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Wear protective gloves/protective clothing/eye protection/face protection

Response

IF exposed or concerned: Get medical attention/advice

Inhalation

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing

Skin

IF ON SKIN: Wash with plenty of soap and water
Take off contaminated clothing and wash before reuse
If skin irritation or rash occurs: Get medical advice/attention

Eyes

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention

Storage

Store locked up
Store in a well-ventilated place. Keep container tightly closed

Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

Toxic to aquatic life with long lasting effects

WARNING! This product contains a chemical known in the State of California to cause cancer.

3. Composition / information on ingredients

Component	CAS-No	Weight %
Tetrachloroethylene	127-18-4	>95

4. First-aid measures

General Advice

If symptoms persist, call a physician.

Eye Contact

Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
Obtain medical attention.

Skin Contact

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

Inhalation

Move to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms occur.

Ingestion

Clean mouth with water and drink afterwards plenty of water.

Most important symptoms/effects	None reasonably foreseeable. May cause allergic skin reaction. Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting: Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
Unsuitable Extinguishing Media	No information available
Flash Point	No information available
Method -	No information available
Autoignition Temperature	No information available
Explosion Limits	
Upper	No data available
Lower	No data available
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical

Thermal decomposition can lead to release of irritating gases and vapors. Containers may explode when heated.

Hazardous Combustion Products

Chlorine Hydrogen chloride gas Phosgene

Protective Equipment and Precautions for Firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health
2

Flammability
0

Instability
0

Physical hazards
N/A

6. Accidental release measures

Personal Precautions	Use personal protective equipment. Ensure adequate ventilation.
Environmental Precautions	Do not flush into surface water or sanitary sewer system.

Methods for Containment and Clean Up Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.

7. Handling and storage

Handling Wear personal protective equipment. Do not get in eyes, on skin, or on clothing. Ensure adequate ventilation. Avoid ingestion and inhalation.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place. Protect from sunlight.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH
Tetrachloroethylene	TWA: 25 ppm STEL: 100 ppm	(Vacated) TWA: 25 ppm (Vacated) TWA: 170 mg/m ³ Ceiling: 200 ppm TWA: 100 ppm	IDLH: 150 ppm

Component	Quebec	Mexico OEL (TWA)	Ontario TWA EV
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Tetrachloroethylene	TWA: 25 ppm TWA: 170 mg/m ³ STEL: 100 ppm STEL: 685 mg/m ³	TWA: 100 ppm TWA: 670 mg/m ³ TWA: 200 ppm TWA: 1250 mg/m ³ STEL: 200 ppm STEL: 1340 mg/m ³	TWA: 25 ppm STEL: 100 ppm
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Legend

ACGIH - American Conference of Governmental Industrial Hygienists

OSHA - Occupational Safety and Health Administration

NIOSH IDLH: The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health

Engineering Measures

Use only under a chemical fume hood. Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment**Eye/face Protection**

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

Skin and body protection

Long sleeved clothing.

Respiratory Protection

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

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	Characteristic, sweet
Odor Threshold	No information available
pH	No information available
Melting Point/Range	-22 °C / -7.6 °F
Boiling Point/Range	120 - 122 °C / 248 - 251.6 °F @ 760 mmHg
Flash Point	No information available
Evaporation Rate	6.0 (Ether = 1.0)
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	18 mbar @ 20 °C
Vapor Density	No information available
Density	1.619
Specific Gravity	1.625
Solubility	0.15 g/L water (20°C)
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	> 150°C
Viscosity	0.89 mPa s at 20 °C
Molecular Formula	C ₂ Cl ₄
Molecular Weight	165.83

10. Stability and reactivity

Reactive Hazard

None known, based on information available

Stability	Stable under normal conditions.
Conditions to Avoid	Incompatible products. Excess heat. Exposure to moist air or water.
Incompatible Materials	Strong acids, Strong oxidizing agents, Strong bases, Metals, Zinc, Amines, Aluminium
Hazardous Decomposition Products	Chlorine, Hydrogen chloride gas, Phosgene
Hazardous Polymerization	Hazardous polymerization does not occur.
Hazardous Reactions	None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Tetrachloroethylene	LD50 = 2629 mg/kg (Rat)	LD50 > 10000 mg/kg (Rat)	LC50 = 27.8 mg/L (Rat) 4 h

Toxicologically Synergistic Products No information available

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

Irritation Irritating to eyes and skin

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Tetrachloroethylene	127-18-4	Group 2A	Reasonably Anticipated	A3	X	A3

IARC: (International Agency for Research on Cancer)

NTP: (National Toxicity Program)

ACGIH: (American Conference of Governmental Industrial Hygienists)

Mexico - Occupational Exposure Limits - Carcinogens

IARC: (International Agency for Research on Cancer)

Group 1 - Carcinogenic to Humans

Group 2A - Probably Carcinogenic to Humans

Group 2B - Possibly Carcinogenic to Humans

NTP: (National Toxicity Program)

Known - Known Carcinogen

Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen

A1 - Known Human Carcinogen

A2 - Suspected Human Carcinogen

A3 - Animal Carcinogen

ACGIH: (American Conference of Governmental Industrial Hygienists)

Mexico - Occupational Exposure Limits - Carcinogens

A1 - Confirmed Human Carcinogen

A2 - Suspected Human Carcinogen

A3 - Confirmed Animal Carcinogen

A4 - Not Classifiable as a Human Carcinogen

A5 - Not Suspected as a Human Carcinogen

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Central nervous system (CNS)

STOT - repeated exposure Kidney Liver Blood

Aspiration hazard No information available

Symptoms / effects, both acute and delayed Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting. Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing

Endocrine Disruptor Information

Component	EU - Endocrine Disruptors Candidate List	EU - Endocrine Disruptors - Evaluated Substances	Japan - Endocrine Disruptor Information
Tetrachloroethylene	Group II Chemical	Not applicable	Not applicable

Other Adverse Effects Tumorigenic effects have been reported in experimental animals.

12. Ecological information

Ecotoxicity

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. The product contains following substances which are hazardous for the environment.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Tetrachloroethylene	EC50: > 500 mg/L, 96h (Pseudokirchneriella subcapitata)	LC50: 4.73 - 5.27 mg/L, 96h flow-through (Oncorhynchus mykiss) LC50: 11.0 - 15.0 mg/L, 96h static (Lepomis macrochirus) LC50: 8.6 - 13.5 mg/L, 96h static (Pimephales promelas) LC50: 12.4 - 14.4 mg/L, 96h flow-through (Pimephales promelas)	EC50 = 100 mg/L 24 h EC50 = 112 mg/L 24 h EC50 = 120.0 mg/L 30 min	EC50: 6.1 - 9.0 mg/L, 48h Static (Daphnia magna)

Persistence and Degradability Insoluble in water Persistence is unlikely based on information available.
Bioaccumulation/ Accumulation No information available.

Mobility . Is not likely mobile in the environment due its low water solubility. Will likely be mobile in the environment due to its volatility.

Component	log Pow
Tetrachloroethylene	2.88

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

Component	RCRA - U Series Wastes	RCRA - P Series Wastes
Tetrachloroethylene - 127-18-4	U210	-

14. Transport information

DOT

UN-No UN1897
 Proper Shipping Name TETRACHLOROETHYLENE
 Hazard Class 6.1
 Packing Group III

TDG

UN-No UN1897
 Proper Shipping Name TETRACHLOROETHYLENE
 Hazard Class 6.1
 Packing Group III

IATA

UN-No UN1897
 Proper Shipping Name TETRACHLOROETHYLENE
 Hazard Class 6.1
 Packing Group III

IMDG/IMO

UN-No UN1897
 Proper Shipping Name TETRACHLOROETHYLENE
 Hazard Class 6.1
 Subsidiary Hazard Class P
 Packing Group III

15. Regulatory information

All of the components in the product are on the following Inventory lists: X = listed

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Tetrachloroethylene	X	X	-	204-825-9	-		X	X	X	X	X

Legend:

X - Listed

E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.

F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.

N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.

P - Indicates a commenced PMN substance

R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.

S - Indicates a substance that is identified in a proposed or final Significant New Use Rule

T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.

XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B)).

Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.

Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Tetrachloroethylene	127-18-4	>95	0.1

SARA 311/312 Hazard Categories

Acute Health Hazard Yes
 Chronic Health Hazard Yes
 Fire Hazard No
 Sudden Release of Pressure Hazard No
 Reactive Hazard No

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Tetrachloroethylene	-	-	X	X

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Tetrachloroethylene	X		-

OSHA Occupational Safety and Health Administration

Not applicable

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Tetrachloroethylene	100 lb 1 lb	-

California Proposition 65 This product contains the following proposition 65 chemicals

Component	CAS-No	California Prop. 65	Prop 65 NSRL	Category
Tetrachloroethylene	127-18-4	Carcinogen	14 µg/day	Carcinogen

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Tetrachloroethylene	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ): Y
DOT Marine Pollutant Y
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security

This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class D1B Toxic materials
D2A Very toxic materials

**16. Other information**

Prepared By Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 10-Dec-2009
Revision Date 12-Jul-2016
Print Date 12-Jul-2016
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other

materials or in any process, unless specified in the text

End of SDS



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Phone: 905-337-7411 | Fax: 905-337-1686
megaloid.ca

Safety Data Sheet

1. PRODUCT IDENTIFICATION

Name	Trichloroethylene
Synonyms	1,1,2-trichloroethylene, acetylene trichloride, TCE & trade names
CAS#	79-01-6
Europe EC#	201-167-4
Product Uses	cleaning solvent for vapour degreasing

EMERGENCY INFORMATION

Canada Call CANUTEC (collect) (613) 996-6666
U.S.A. Call CHEMTREC (800) 424-9300

2. HAZARDS

GHS Class (Category)	skin irritant (2)	eye irritant (2)	STOT (3)	carcinogen (1B)	aquatic chronic (2)
Signal Words	WARNING	WARNING	WARNING	DANGER	no Signal Word
Hazard Statements	causes skin irritation (H315)	causes serious eye irritation (H319)	may cause drowsiness or dizziness (H336)	may cause cancer (H350)	toxic to aquatic life with long-lasting effects (H411)

GHS Precautionary Statements for Labelling

P261 P271	Avoid breathing vapour. Use only in a well ventilated area
P262 P264	Do not get in eyes, on skin or on clothing. Wash thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P280	Wear eye protection, protective gloves and clothing of butyl or "Viton".
P273 P391	Avoid release to the environment. Collect spillage.

Canada – WHMIS
Key:

D 1B, D 2A, D 2B
B 2 – Flash Point <38°C, B 3 – Flash Point >38°C & <93°C
D 1 – Immediately Toxic, D 2 – Chronic Toxicity
C – Oxidising Substance, E – Corrosive, F – Reactive Substance



3. COMPOSITION

	%	TWAEV / TLV ppm / mg/m ³	LD ₅₀ (mg/kg) ORAL	LD ₅₀ (mg/kg) SKIN	LC ₅₀ ppm INHALATION
1,1,2-trichloroethylene	100%	10 / 55	2400	29,280	7175

4. FIRST AID

SKIN:	Wash with soap & plenty of water. Remove contaminated clothing and do not reuse until thoroughly laundered.
EYES:	Wash eyes with plenty of water, holding eyelids open. Seek medical assistance promptly if irritation persists.
INHALATION:	Remove from contaminated area promptly. CAUTION: Rescuer must not endanger himself! If breathing stops, administer artificial respiration and seek medical aid promptly.
INGESTION:	Give plenty of water to dilute product. Do not induce vomiting (NOTE below). Keep victim quiet. If vomiting occurs, lower victim's head below hips to prevent inhalation of vomited material. Seek medical help promptly.

Inadvertent inhalation of vomited material may seriously damage the lungs. The danger of this is greater than the risk of poisoning through absorption of this relatively low-toxicity substance. The stomach should only be emptied under medical supervision, and after the installation of an airway to protect the lungs.

Please ensure that this SDS is given to, and explained to people using this product.



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5. FIRE FIGHTING & FLAMMABILITY

Flash Point	will not flash ¹
Autoignition Temperature	410°C / 770°F ¹
Flammable Limits	8% ó 50% ó <i>only burns in continuous contact with ignition source</i>
Combustion Products	hydrogen chloride & chlorine (<i>both corrosive</i>), plus phosgene (<i>highly toxic</i>)
Firefighting Precautions	as for substances sustaining fire; firefighters must wear SCBA
Static Discharge	will accumulate a static charge, but cannot be ignited by a spark

NOTE: Trichloroethylene may ignite in the presence of a welding torch – and then produce highly hazardous vapours.

6. ACCIDENTAL RELEASE MEASURES

Leak Precaution	dyke to control spillage; dyke must be able to contain the entire volume of a bulk storage tank
Handling Spill	ventilate contaminated area; recover free liquid with suitable pumps; absorb residue on an inert sorbent, sweep shovel & store in closed containers for recycling or disposal

7. HANDLING & STORAGE

Store in a cool environment, away from substances named in Part 10 (below).

Avoid breathing product vapour. Product should be used in equipment designed for the purpose (eg: vapour degreaser)

Use with adequate ventilation. If dealing with a spill, and ventilation is impossible or impractical, wear a suitable respirator (see Part 8). **Do not routinely wear a respirator for handling this product! Effective ventilation or engineering control of vapour is the ONLY acceptable way to protect people working with this product.**

When transferring product, if there is any danger of contact, wear appropriate protective clothing.

Never cut, drill, weld or grind on or near this container. Avoid contact with skin and wash work clothes frequently. An eye bath and safety shower must be available near the workplace.

NOTE: Although trichloroethylene is hard to ignite, fire can convert vapours into highly toxic, corrosive gases – Part 5, above.

8. EXPOSURE CONTROL & PERSONAL PROTECTION

Ontario TWAEV	10ppm / 55mg/m ³	Ontario STEV	25ppm / 135mg/m ³
ACGIH TLV	10ppm / 55mg/m ³	ACGIH STEL	25ppm / 135mg/m ³
OSHA PEL	50ppm / 270mg/m ³	OSHA STEL	200ppm / 1080mg/m ³
Ventilation	product should only be used in specially designed equipment (eg: vapour degreaser); mechanical ventilation should not be required so long as the equipment is working properly; using this product in open air and relying on mechanical ventilation is NOT ACCEPTABLE ; a respirator with organic vapour cartridge should be available for escape purposes, should vapour containment fail (<i>always store respirators in airtight containers [eg: “Tupperware”] to maintain cartridge “freshness”</i>)		
Hands	õVitonõ gloves ó <i>other types also protect, always confirm suitability with supplier</i>		
Eyes	safety glasses with side shields or chemical goggles – <i>always protect eyes!</i>		
Clothing	impermeable (hands, above) apron, boots, long sleeves, if splashing is anticipated		

Please ensure that this SDS is given to, and explained to people using this product.

9. PHYSICAL PROPERTIES

Odour & Appearance	clear, colourless, liquid with mild, sweet, <i>pleasant</i> ether odour
Odour Threshold	80ppm ó 100ppm ó <i>well above the TLV; hazardous below odour threshold!</i>
Vapour Pressure	60mmHg / 8kPa (20°C / 68°F); also 74.5mmHg / 9.9kPa (25°C / 77°F) ¹
Evaporation Rate (<i>Butyl Acetate</i> = 1)	4.5-4.9
Vapour Density (air = 1)	4.5
Boiling Point	87°C / 189°F
Freezing Point	-73°C / -99°F; also -85°C / -121°F ¹
Specific Gravity	1.46 (20/20°C)
Water Solubility	1.1 grams/litre (20°C / 68°F)
- in other solvents	most organic solvents
Log P _{O/W} (Octanol/H ₂ O partition)	2.53 ¹
Viscosity	0.58centipoise (20°C / 68°F) ¹
pH	none ó <i>does not yield hydrogen ions in solution</i>
Conversion Factor	1ppm = 5.36mg/m ³
Molecular Weight	131

10. REACTIVITY

Dangerously Reactive With	strong oxidising agents or reducing agents; reactive metals (eg: Na, K, Ca, Ba)
Also Reactive With	strong alkalis forming explosive dichloroacetylene gas; copper reacts with any dichloroethylene present to form explosive acetylides; reactive with epoxides; unstabilised trichloroethylene may corrode aluminium, copper, zinc in presence of moisture
Chemical Stability	stable; will not polymerize ó except under x-ray or other radiation source, or in the presence of aluminium chloride
Decomposes in Presence of	iron, copper, zinc or aluminium at 250-600°C cause decomposition to phosgene; reactive metals cause decomposition to dichloroacetylene
Decomposition Products	apart from Hazardous Combustion Products ó dichloroacetylene
Mechanical Impact	not sensitive

11. TOXICITY

Effects, Acute Exposure

Skin Contact	severely irritating if not removed promptly; chemical burns if contact is prolonged (>5 minutes)
Skin Absorption	slight ó no systemic toxic effects by this route
Eye Contact	liquid severely irritating, may damage eyes; vapour irritates some above 160ppm, others at 350ppm blurred vision & other disturbances have been reported following contact with eyes
Inhalation	headache, dizziness, drowsiness, intoxication may occur at above 350ppm; irritating above 1000ppm; high concentrations can lead to unconsciousness & death, numbness & muscle weakness also reported
Ingestion	burning sensation in mouth & throat; headache, dizziness, drowsiness, intoxication & vomiting, followed by muscle weakness, plus possible delayed heart, kidney & liver damage
LD ₅₀ (oral)	4920 & 5620mg/kg (rat), 2400mg/kg (mouse), >7330mg/kg (rabbit), >5865mg/kg (cat), 5680mg/kg (dog)
LD ₅₀ (skin)	29,280mg/kg (rabbit)
LC ₅₀ (inhalation)	7175, 7440, 8450, 40,920 & 48,730ppm (mouse), 7250 & 26,170ppm (rat)

Effects, Chronic Exposure

General	prolonged or repeated exposure may cause dermatitis; neurological damage (headache, sleeplessness, mood change), plus blurred or tunnel vision may be seen; loss of sensation in hands & feet may occur
Sensitising	not a sensitizer
Carcinogen/Tumorigen	probable carcinogen ó IARC ó Group 1, ACGIH ó A2; the NTP rates trichloroethylene a carcinogen
Reproductive Effect	no known effect on humans or animals
Mutagen	mutagen in a few animal tests, but not in others ¹ ; not known to be a mutagen or teratogen in humans
Synergistic With	alcohol ó prior exposure to trichloroethylene followed by alcohol consumption causes upper body flush ó called <i>ödegreasers flushö</i>

Please ensure that this SDS is given to, and explained to people using this product.

12. ECOLOGICAL INFORMATION

Bioaccumulation	trichloroethylene metabolised & excreted (½-life ~40hr) and will not bioaccumulate
Biodegradation	biodegrades in aerobic sewage treatment facilities, but only in the presence of other carbon sources; biodegradation is much slower under anaerobic conditions
Abiotic Degradation	reacts with atmospheric hydroxyl (OH) radicals; estimated ½-life in air 5-7 days
Mobility in soil, water	shown to have moderate mobility in soil and the water column
Marine Toxicity	
LC ₅₀ (96 hr) Fish	28 & 63mg/litre/96hr (Jordanella floridae), 41mg/litre/96hr (Pimephelas promelas), 16mg/litre Limada limada), 52 & 99mg/litre (Cyprinodon variegatus), 45mg/litre (Lepomis macrochirus)
LC ₅₀ (48hr) Shrimp	58mg/litre/ (Daphnia cucullata), 2.2, 8, 21 & 42-97mg/litre (Daphnia magna) & others
EC ₅₀ (Algae)	450mg/litre (Scenedesmus subspicatus), 175mg/litre (Selenastrum capricornutum), 95 & 150mg/litre (Skeletonema costatum)
EC ₅₀ (Bacteria)	235mg/litre (Bacillus subtilis), >400mg/litre (Chilomonas paramecium), 975mg/litre (Photobacterium phosphoreum) & others

13. DISPOSAL

Waste Disposal	do not flush to sewer , recycle solvent if possible, may be incinerated in approved facility with flue gas monitoring and scrubbing after mixing with a suitable flammable waste solvent
Containers	Drums should be reused. Recondition and pressure test by a licensed reconditioner prior to re-use. Pails must be vented and thoroughly dried prior to crushing and recycling. IBCs (intermediate bulk containers): polyethylene bottle must be pressure tested & recertified at 30 months. Replace at 60 months (5yrs). Steel containers must be inspected, pressure tested & recertified every 5 years. Never cut, drill, weld or grind on or near this container, even if empty

14. TRANSPORT CLASSIFICATION

Canada TDG	PIN	UN-1710
AND	Shipping Name	trichloroethylene
U.S.A. 49 CFR	Class	6.1
	Packing Group	III
Marine Pollutant		not a marine pollutant
ERAP Required		NO

**15. REGULATIONS**

Canada DSL	on inventory
U.S.A. TSCA	on inventory
Europe EINECS	on inventory

U.S.A. Regulations:

Immediately Dangerous to Life or Health: 1000 ppm; NIOSH considers trichloroethylene to be a potential occupational carcinogen.

Allowable Tolerances: Tolerances are established for residues of trichloroethylene resulting from its use as a solvent in the manufacture of foods as follows:

Food	Parts per million
Decaffeinated ground coffee	25
Decaffeinated soluble (instant) coffee extract	10
Spice oleoresins	30 parts per million (<i>provided that if residues of other chlorinated solvents are also present, the total of all residues of such solvents in spice oleoresins shall not exceed 30 parts per million</i>).

OSHA Standards: Permissible Exposure Limit: Table Z-2 8-hr Time Weighted Avg: 100 ppm. Permissible Exposure Limit: Table Z-2 Acceptable Ceiling Concentration: 200 ppm. Permissible Exposure Limit: Table Z-2 Acceptable maximum peak above the acceptable ceiling concentration for an 8-hour shift. Concentration: 300 ppm. Maximum Duration: 5 minutes in any 2 hours. Vacated 1989 OSHA PEL TWA 50 ppm (270 mg/cu m); STEL 200 ppm (1080 mg/cu m) is still enforced in some states.

NIOSH Recommendations: NIOSH considers trichloroethylene to be a potential occupational carcinogen. NIOSH usually recommends that occupational exposures to carcinogens be limited to the lowest feasible concentration. Recommended Exposure Limit: 60 Minute Ceiling Value: 2 ppm. /During the usage of trichloroethylene as an anesthetic agent/ Recommended Exposure Limit: 10 Hour Time-Weighted Average: 25 ppm. /During exposures to trichloroethylene other than as an anesthetic agent/

Please ensure that this SDS is given to, and explained to people using this product.

15. REGULATIONS, cont'd

Threshold Limit Values: 8 hr Time Weighted Avg (TWA): 10 ppm; 15min Short Term Exposure Limit (STEL) 25 ppm, A2: Suspected human carcinogen.

Atmospheric Standards: This action promulgates standards of performance for equipment leaks of Volatile Organic Compounds (VOC) in the Synthetic Organic Chemical Manufacturing Industry (SOCMI). The intended effect of these standards is to require all newly constructed, modified, and reconstructed SOCMI process units to use the best demonstrated system of continuous emission reduction for equipment leaks of VOC, considering costs, non air quality health and environmental impact and energy requirements. Trichloroethylene is produced, as an intermediate or a final product, by process units covered under this subpart. Listed as a hazardous air pollutant (HAP) generally known or suspected to cause serious health problems. The Clean Air Act, as amended in 1990, directs EPA to set standards requiring major sources to sharply reduce routine emissions of toxic pollutants. EPA is required to establish and phase in specific performance based standards for all air emission sources that emit one or more of the listed pollutants. Trichloroethylene is included on this list.

Federal Drinking Water Standards: Maximum contaminant level goals for organic contaminants: Trichloroethylene, MCLG: zero. Maximum contaminant levels (MCL) for organic contaminants apply to community and non-transient, non-community water systems: Trichloroethylene, MCL 0.005 mg/L. EPA 5 ug/l

State Drinking Water Standards: Florida 3 ug/l, New Jersey 1 ug/l

State Drinking Water Guidelines: Arizona 3.2 ug/l, Connecticut 5 ug/l, Maine 32 ug/l, Minnesota 5 ug/L

Clean Water Act Requirements: Toxic pollutant designated pursuant to section 307(a)(1) of the Federal Water Pollution Control Act and is subject to effluent limitations. Trichloroethylene is designated as a hazardous substance under section 311(b)(2)(A) of the Federal Water Pollution Control Act and further regulated by the Clean Water Act Amendments of 1977 and 1978. These regulations apply to discharges of this substance. This designation includes any isomers and hydrates, as well as any solutions and mixtures containing this substance.

CERCLA Reportable Quantities: Persons in charge of vessels or facilities are required to notify the National Response Center (NRC) immediately, when there is a release of this designated hazardous substance, in an amount equal to or greater than its reportable quantity of 100 lb or 45.4 kg. The toll free number of the NRC is (800) 424-8802. The rule for determining when notification is required is stated in 40 CFR 302.4 (section IV. D.3.b).

RCRA Requirements: As stipulated in 40 CFR 261.33, when trichloroethylene, as a commercial chemical product or manufacturing chemical intermediate or an off-specification commercial chemical product or a manufacturing chemical intermediate, becomes a waste, it must be managed according to Federal and/or State hazardous waste regulations. Also defined as a hazardous waste is any residue, contaminated soil, water, or other debris resulting from the cleanup of a spill, into water or on dry land, of this waste. Generators of small quantities of this waste may qualify for partial exclusion from hazardous waste regulations (40 CFR 261.5). A solid waste containing trichloroethylene may or may not become characterized as a hazardous waste when subjected to the Toxicity Characteristic Leaching Procedure listed in 40 CFR 261.24, and if so characterized, must be managed as a hazardous waste. When trichloroethylene is a spent solvent, it is classified as a hazardous waste from a nonspecific source, as stated in 40 CFR 261.31, and must be managed according to state and/or federal hazardous waste regulations.

FDA Requirements: Trichloroethylene is an indirect food additive for use as a component of adhesives. Tolerances are established for residues of trichloroethylene resulting from its use as a solvent in the manufacture of foods as follows:

Food	Parts per million
Decaffeinated ground coffee	25
Decaffeinated soluble (instant) coffee extract	10
Spice oleoresins	30 parts per million (<i>provided that if residues of other chlorinated solvents are also present, the total of all residues of such solvents in spice oleoresins shall not exceed 30 parts per million</i>).

16. OTHER INFORMATION

Prepared for Megaloid Laboratories by Peter Bursztyn, (705) 734-1577

Data from RTECS, HSDB (Haz. Substance Data Base), Cheminfo (CCOHS), IUCLID Datasheets (ESIS – European Chem. Substance Info. System), & others.

Preparation Date: May 2005 Revision Date: June 2008, June 2011, June 2014

European Chemicals Agency (ECHA) dossier for Trichloroethylene:

http://apps.echa.europa.eu/registered/data/dossiers/DISS-9c83a2d3-4a9f-1ff5-e044-00144f67d249/DISS-9c83a2d3-4a9f-1ff5-e044-00144f67d249_DISS-9c83a2d3-4a9f-1ff5-e044-00144f67d249.html

Please ensure that this SDS is given to, and explained to people using this product.



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SAFETY DATA SHEET

Airgas

Nonflammable Gas Mixture: 1,1-Dichloroethylene / Cis-1,2-Dichloroethylene / Methane / Nitrogen / Trans-1,2-Dichloroethylene / Trichloroethylene / Vinyl Chloride

Section 1. Identification

GHS product identifier	: Nonflammable Gas Mixture: 1,1-Dichloroethylene / Cis-1,2-Dichloroethylene / Methane / Nitrogen / Trans-1,2-Dichloroethylene / Trichloroethylene / Vinyl Chloride
Other means of identification	: Not available.
Product use	: Synthetic/Analytical chemistry.
SDS #	: 014225
Supplier's details	: Airgas USA, LLC and its affiliates 259 North Radnor-Chester Road Suite 100 Radnor, PA 19087-5283 1-610-687-5253
Emergency telephone number (with hours of operation)	: 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 : GASES UNDER PRESSURE - Compressed gas

GHS label elements

Hazard pictograms :



Signal word : Warning

Hazard statements : Contains gas under pressure; may explode if heated.
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.

Prevention : Use and store only outdoors or in a well ventilated place.

Response : Not applicable.

Storage : Protect from sunlight. 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.

Date of issue/Date of revision : 7/8/2015. **Date of previous issue** : No previous validation. **Version** : 1 1/11

Section 3. Composition/information on ingredients

Substance/mixture : Mixture
Other means of identification : Not available.

CAS number/other identifiers

CAS number : Not applicable.
Product code : 014225

Ingredient name	%	CAS number
Nitrogen	98 - 99	7727-37-9
methane	0.0001 - 0.9999	74-82-8
1,1-dichloroethylene	0.0001 - 0.0999	75-35-4
cis-dichloroethylene	0.0001 - 0.0999	156-59-2
trans-dichloroethylene	0.0001 - 0.0999	156-60-5
vinyl chloride	0.0001 - 0.0999	75-01-4
trichloroethylene	0.0001 - 0.0999	79-01-6

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. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. 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 : Contact with rapidly expanding gas may cause burns or frostbite.

Inhalation : Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.

Skin contact : Contact with rapidly expanding gas may cause burns or frostbite.

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.

Section 4. First aid measures

- 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** : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
- Specific treatments** : No specific treatment.
- 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. In a fire or if heated, a pressure increase will occur and the container may burst or explode.

Hazardous thermal decomposition products : Decomposition products may include the following materials: nitrogen oxides

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.

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** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. 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.

Section 6. Accidental release measures

- Large spill** : Immediately contact emergency personnel. Stop leak if without risk. 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. 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). 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

None.

- Appropriate engineering controls** : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.
- 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.
- 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.
- Color** : Not available.
- Melting/freezing point** : -210.01°C (-346°F) This is based on data for the following ingredient: nitrogen.
- Critical temperature** : Lowest known value: -146.95°C (-232.5°F) (nitrogen).
- Odor** : Not available.
- Odor threshold** : Not available.
- pH** : Not available.
- Flash point** : Not available.
- Burning time** : Not applicable.
- Burning rate** : Not applicable.
- Evaporation rate** : Not available.
- Flammability (solid, gas)** : Not available.
- Lower and upper explosive (flammable) limits** : Not available.
- Vapor pressure** : Not available.
- Vapor density** : Highest known value: 0.97 (Air = 1) (nitrogen).
- Gas Density (lb/ft³)** : Only known value: 0.072 (nitrogen).
- Relative density** : Not applicable.
- Solubility** : Not available.
- Solubility in water** : Not available.
- Partition coefficient: n-octanol/water** : Not available.
- Auto-ignition temperature** : Not available.
- Decomposition temperature** : Not available.
- SADT** : Not available.
- 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	: No specific data.
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

Not available.

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.

Information on the likely routes of exposure : Not available.

Potential acute health effects

Section 11. Toxicological information

Eye contact	: Contact with rapidly expanding gas may cause burns or frostbite.
Inhalation	: Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.
Skin contact	: Contact with rapidly expanding gas may cause burns or frostbite.
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

Not available.

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	UN1956	UN1956	UN1956	UN1956	UN1956
UN proper shipping name	COMPRESSED GAS, N.O.S. (nitrogen, methane)	COMPRESSED GAS, N.O.S. (nitrogen, methane)	COMPRESSED GAS, N.O.S. (nitrogen, methane)	COMPRESSED GAS, N.O.S. (nitrogen, methane)	COMPRESSED GAS, N.O.S. (nitrogen, methane)
Transport hazard class(es)	2.2 	2.2 	2.2 	2.2 	2.2 
Packing group	-	-	-	-	-
Environment	No.	No.	No.	No.	No.
Additional information	Reportable quantity 1001 lbs / 454.45 kg Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.	Explosive Limit and Limited Quantity Index 0.125 Passenger Carrying Road or Rail Index 75	-	-	-

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

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) PAIR: 1,1-dichloroethylene
TSCA 8(a) CDR Exempt/Partial exemption: Not determined
United States inventory (TSCA 8b): All components are listed or exempted.
Clean Water Act (CWA) 307: 1,1-dichloroethylene; cis-dichloroethylene; trans-dichloroethylene; vinyl chloride; trichloroethylene
Clean Water Act (CWA) 311: 1,1-dichloroethylene; trichloroethylene

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 : Sudden release of pressure

Composition/information on ingredients

No products were found.

State regulations

Massachusetts : The following components are listed: NITROGEN

New York : None of the components are listed.

New Jersey : The following components are listed: NITROGEN

Pennsylvania : The following components are listed: NITROGEN

California Prop. 65

WARNING: This product contains less than 0.1% of a chemical known to the State of California to cause cancer.

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
vinyl chloride trichloroethylene	Yes. Yes.	No. No.	Yes. 14 µg/day (ingestion) 50 µg/day (inhalation)	No. No.

Canada inventory : At least one component is not listed in DSL but all such components are listed in NDSL.

International regulations

Section 15. Regulatory information

International lists :

- Australia inventory (AICS)**: All components are listed or exempted.
- China inventory (IECSC)**: All components are listed or exempted.
- Japan inventory**: Not determined.
- Korea inventory**: All components are listed or exempted.
- Malaysia Inventory (EHS Register)**: Not determined.
- New Zealand Inventory of Chemicals (NZIoC)**: All components are listed or exempted.
- Philippines inventory (PICCS)**: Not determined.
- Taiwan inventory (CSNN)**: Not determined.

Chemical Weapons Convention List Schedule I Chemicals : Not listed

Chemical Weapons Convention List Schedule II Chemicals : Not listed

Chemical Weapons Convention List Schedule III Chemicals : Not listed

Canada

WHMIS (Canada) : Class A: Compressed gas.

- CEPA Toxic substances**: None of the components are listed.
- Canadian ARET**: None of the components are listed.
- Canadian NPRI**: None of the components are listed.
- Alberta Designated Substances**: None of the components are listed.
- Ontario Designated Substances**: None of the components are listed.
- Quebec Designated Substances**: None of the components are listed.

Section 16. Other information

Canada Label requirements : Class A: Compressed gas.

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

Health	1
Flammability	0
Physical hazards	3

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.

Section 16. Other information

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.

History

Date of printing : 7/8/2015.

Date of issue/Date of revision : 7/8/2015.

Date of previous issue : No previous validation.

Version : 1

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
ACGIH – American Conference of Governmental Industrial Hygienists
AIHA – American Industrial Hygiene Association
CAS – Chemical Abstract Services
CEPA – Canadian Environmental Protection Act
CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act (EPA)
CFR – United States Code of Federal Regulations
CPR – Controlled Products Regulations
DSL – Domestic Substances List
GWP – Global Warming Potential
IARC – International Agency for Research on Cancer
ICAO – International Civil Aviation Organisation
Inh – Inhalation
LC – Lethal concentration
LD – Lethal dosage
NDSL – Non-Domestic Substances List
NIOSH – National Institute for Occupational Safety and Health
TDG – Canadian Transportation of Dangerous Goods Act and Regulations
TLV – Threshold Limit Value
TSCA – Toxic Substances Control Act
WEEL – Workplace Environmental Exposure Level
WHMIS – Canadian Workplace Hazardous Material Information System

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

Vinyl Chloride (Chloroethylene)

Section 1. Identification

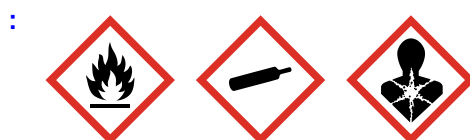
GHS product identifier	: Vinyl Chloride (Chloroethylene)
Chemical name	: vinyl chloride
Other means of identification	: chloroethylene; Ethene, chloro-; Vinyl chloride monomer; Chloroethene; Vinyl chloride, monomer; Ethene, chloro- (vinyl chloride); VCM; VC; Monochloroethylene; Monochloroethene
Product use	: Synthetic/Analytical chemistry.
Synonym	: chloroethylene; Ethene, chloro-; Vinyl chloride monomer; Chloroethene; Vinyl chloride, monomer; Ethene, chloro- (vinyl chloride); VCM; VC; Monochloroethylene; Monochloroethene
SDS #	: 001067
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 CARCINOGENICITY - Category 1 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (liver) - Category 2

GHS label elements

Hazard pictograms



Signal word

: Danger

Hazard statements

: Extremely flammable gas.
Contains gas under pressure; may explode if heated.
May cause frostbite.
May form explosive mixtures in Air.
May displace oxygen and cause rapid suffocation.
May cause cancer.
May cause damage to organs through prolonged or repeated exposure. (liver)

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

: Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective gloves. Wear eye or face protection. Wear protective clothing. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Do not breathe gas.

Section 2. Hazards identification

Response	: Get medical attention if you feel unwell. IF exposed or concerned: Get medical attention. Leaking gas fire: Do not extinguish, unless leak can be stopped safely. Eliminate all ignition sources if safe to do so.
Storage	: Store locked up. Protect from sunlight when ambient temperature exceeds 52°C/125°F. Store in a well-ventilated place.
Disposal	: Dispose of contents and container in accordance with all local, regional, national and international regulations.
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	: vinyl chloride
Other means of identification	: chloroethylene; Ethene, chloro-; Vinyl chloride monomer; Chloroethene; Vinyl chloride, monomer; Ethene, chloro- (vinyl chloride); VCM; VC; Monochloroethylene; Monochloroethene

CAS number/other identifiers

CAS number	: 75-01-4
Product code	: 001067

Ingredient name	%	CAS number
vinyl chloride	100	75-01-4

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.
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 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. Continue to rinse for at least 10 minutes. Get medical attention. 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.

Section 4. First aid measures

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.
Protection of first-aiders	: No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

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 halogenated compounds
---	---

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".

Section 6. Accidental release measures

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 exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not breathe 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). Store locked up. 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
vinyl chloride	ACGIH TLV (United States, 3/2016). TWA: 1 ppm 8 hours. OSHA PEL (United States, 2/2013). STEL: 5 ppm 15 minutes. TWA: 1 ppm 8 hours. OSHA PEL 1989 (United States, 3/1989). STEL: 5 ppm 15 minutes. TWA: 1 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.

Section 8. Exposure controls/personal protection

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

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. [COLORLESS GAS OR LIQUID (BELOW 7 F) WITH A PLEASANT ODOR AT HIGH CONCENTRATIONS. [NOTE: SHIPPED AS A LIQUEFIED COMPRESSED GAS.]]

Color : Colorless.

Molecular weight : 62.5 g/mole

Molecular formula : C₂H₃Cl

Boiling/condensation point : -13.4°C (7.9°F)

Melting/freezing point : -153.8°C (-244.8°F)

Critical temperature : 158.45°C (317.2°F)

Odor : Characteristic.

Odor threshold : Not available.

pH : Not available.

Flash point : Closed cup: -78°C (-108.4°F)
Open cup: -78°C (-108.4°F)

Burning time : Not applicable.

Burning rate : Not applicable.

Section 9. Physical and chemical properties

Evaporation rate	: Not available.
Flammability (solid, gas)	: Not available.
Lower and upper explosive (flammable) limits	: Lower: 3.8% Upper: 29.3%
Vapor pressure	: Not available.
Vapor density	: 2.2 (Air = 1)
Specific Volume (ft ³ /lb)	: 1.0989
Gas Density (lb/ft ³)	: 0.91 (20°C / 68 to °F)
Relative density	: Not applicable.
Solubility	: Not available.
Solubility in water	: 1.1 g/l
Partition coefficient: n-octanol/water	: 1.38
Auto-ignition temperature	: 472°C (881.6°F)
Decomposition temperature	: Not available.
SADT	: Not available.
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

Not available.

Irritation/Corrosion

Not available.

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Section 11. Toxicological information

Classification

Product/ingredient name	OSHA	IARC	NTP
vinyl chloride	+	1	Known to be a human carcinogen.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Name	Category	Route of exposure	Target organs
vinyl chloride	Category 2	Not determined	liver

Aspiration hazard

Not available.

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 : May cause damage to organs through prolonged or repeated exposure.
Carcinogenicity : May cause cancer. Risk of cancer depends on duration and level of exposure.
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.

Section 11. Toxicological information

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
vinyl chloride	1.38	-	low

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.

United States - RCRA Toxic hazardous waste "U" List

Ingredient	CAS #	Status	Reference number
Vinyl chloride; Ethene, chloro-	75-01-4	Listed	U043

Section 14. Transport information

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN1086	UN1086	UN1086	UN1086	UN1086
UN proper shipping name	VINYL CHLORIDE, STABILIZED	VINYL CHLORIDE, STABILIZED	VINYL CHLORIDE, STABILIZED	VINYL CHLORIDE, STABILIZED	VINYL CHLORIDE, STABILIZED
Transport hazard class(es)	2.1 	2.1 	2.1 	2.1 	2.1 
Packing group	-	-	-	-	-
Environment	No.	No.	No.	No.	No.
Additional information	<p>Reportable quantity 1 lbs / 0.454 kg Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.</p> <p>Limited quantity Yes.</p> <p>Packaging instruction Passenger aircraft Quantity limitation: Forbidden.</p> <p>Cargo aircraft Quantity limitation: 150 kg</p> <p>Special provisions 21, B44, T50</p>	<p>Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.13-2.17 (Class 2).</p> <p>Explosive Limit and Limited Quantity Index 0.125</p> <p>ERAP Index 3000</p> <p>Passenger Carrying Road or Rail Index Forbidden</p>	-	-	<p>Passenger and Cargo Aircraft Quantity limitation: 0 Forbidden Cargo Aircraft Only Quantity limitation: 150 kg</p>

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

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 Water Act (CWA) 307: vinyl chloride
 Clean Air Act (CAA) 112 regulated flammable substances: vinyl chloride

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

Section 15. Regulatory information

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
Delayed (chronic) health hazard

Composition/information on ingredients

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

SARA 313

	Product name	CAS number	%
Form R - Reporting requirements	vinyl chloride	75-01-4	100
Supplier notification	vinyl chloride	75-01-4	100

SARA 313 notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

State regulations

Massachusetts : This material is listed.

New York : This material is listed.

New Jersey : This material is listed.

Pennsylvania : This material is listed.

California Prop. 65

WARNING: This product contains a chemical known to the State of California to cause cancer.

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
vinyl chloride	Yes.	No.	Yes.	No.

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 : This material is listed or exempted.

New Zealand : This material is listed or exempted.

Philippines : This material is listed or exempted.

Republic of Korea : This material is listed or exempted.

Section 15. Regulatory information

Taiwan : This material is listed or exempted.

Canada

WHMIS (Canada)

: Class A: Compressed gas.
 Class B-1: Flammable gas.
 Class D-2A: Material causing other toxic effects (Very toxic).
 Class D-2B: Material causing other toxic effects (Toxic).
 Class F: Dangerously reactive material.
CEPA Toxic substances: This material is 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.
 Class D-2A: Material causing other toxic effects (Very toxic).
 Class D-2B: Material causing other toxic effects (Toxic).
 Class F: Dangerously reactive material.

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

Health	1
Flammability	4
Physical hazards	2

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.)



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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 Carc. 1, H350 STOT RE 2, H373 (liver)	Expert judgment Expert judgment Expert judgment Expert judgment

History

Section 16. Other information

Date of printing : 10/11/2016

Date of issue/Date of revision : 10/11/2016

Date of previous issue : No previous validation

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

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** : C₄H₈
- 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 (ft³/lb)** : 6.6845
- Gas Density (lb/ft³)** : 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/m ³	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	<u>Limited quantity</u> Yes. <u>Packaging instruction</u> Passenger aircraft Quantity limitation: Forbidden. Cargo aircraft Quantity limitation: 150 kg <u>Special provisions</u> 19, T50	Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.13-2.17 (Class 2). <u>Explosive Limit and Limited Quantity Index</u> 0.125 <u>ERAP Index</u> 3000 <u>Passenger Carrying Ship Index</u> Forbidden <u>Passenger Carrying Road or Rail Index</u> Forbidden <u>Special provisions</u> 29	-	-	<u>Passenger and Cargo Aircraft</u> Quantity limitation: 0 Forbidden <u>Cargo Aircraft Only</u> 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.)

Health	1
Flammability	4
Physical hazards	2

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.

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



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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

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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

Material Name: Gasoline All Grades

SDS No. 9950
US GHS

Synonyms: Hess Conventional (Oxygenated and Non-oxygenated) Gasoline; Reformulated Gasoline (RFG); Reformulated Gasoline Blendstock for Oxygenate Blending (RBOB); Unleaded Motor or Automotive Gasoline

*** Section 1 - Product and Company Identification ***

Manufacturer Information

Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095-0961

Phone: 732-750-6000 Corporate EHS
Emergency # 800-424-9300 CHEMTREC
www.hess.com (Environment, Health, Safety Internet Website)

*** Section 2 - Hazards Identification ***

GHS Classification:

Flammable Liquid - Category 2
Skin Corrosion/Irritation - Category 2
Germ Cell Mutagenicity - Category 1B
Carcinogenicity - Category 1B
Toxic to Reproduction - Category 1A
Specific Target Organ Toxicity (Single Exposure) - Category 3 (respiratory irritation, narcosis)
Specific Target Organ Toxicity (Repeat Exposure) - Category 1 (liver, kidneys, bladder, blood, bone marrow, nervous system)
Aspiration Hazard - Category 1
Hazardous to the Aquatic Environment – Acute Hazard - Category 3

GHS LABEL ELEMENTS

Symbol(s)



Signal Word

DANGER

Hazard Statements

Highly flammable liquid and vapour.
Causes skin irritation.
May cause genetic defects.
May cause cancer.
May damage fertility or the unborn child.
May cause respiratory irritation.
May cause drowsiness or dizziness.
Causes damage to organs (liver, kidneys, bladder, blood, bone marrow, nervous system) through prolonged or repeated exposure.
May be fatal if swallowed and enters airways.
Harmful to aquatic life.

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Precautionary Statements

Prevention

Keep away from heat/sparks/open flames/hot surfaces. No smoking
Keep container tightly closed.
Ground/bond container and receiving equipment.
Use explosion-proof electrical/ventilating/lighting/equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Wear protective gloves/protective clothing/eye protection/face protection.
Wash hands and forearms thoroughly after handling.
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Do not breathe mist/vapours/spray.
Use only outdoors or in well-ventilated area.
Do not eat, drink or smoke when using this product.
Avoid release to the environment.

Response

In case of fire: Use water spray, fog, dry chemical fire extinguishers or hand held fire extinguisher.
IF ON SKIN (or hair): Wash with plenty of soap and water. Remove/Take off immediately all contaminated clothing and wash before reuse. If skin irritation occurs, get medical advice/attention.
IF exposed or concerned: Get medical advice/attention.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a poison center or doctor/physician if you feel unwell.
Get medical advice/attention if you feel unwell.
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. Do not induce vomiting.

Storage

Store in a well-ventilated place.
Keep cool. Keep container tightly closed.
Store locked up.

Disposal

Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 3 - Composition / Information on Ingredients * * *

CAS #	Component	Percent
86290-81-5	Gasoline, motor fuel	100
108-88-3	Toluene	1-25
106-97-8	Butane	<10
1330-20-7	Xylenes (o-, m-, p- isomers)	1-15
95-63-6	Benzene, 1,2,4-trimethyl-	<6
64-17-5	Ethyl alcohol	0-10
100-41-4	Ethylbenzene	<3
71-43-2	Benzene	0.1-4.9

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110-54-3	Hexane	0.5-4
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A complex blend of petroleum-derived normal and branched-chain alkane, cycloalkane, alkene, and aromatic hydrocarbons. May contain antioxidant and multifunctional additives. Non-oxygenated Conventional Gasoline and RBOB do not have oxygenates (Ethanol). Oxygenated Conventional and Reformulated Gasoline will have oxygenates for octane enhancement or as legally required.

* * * Section 4 - First Aid Measures * * *

First Aid: Eyes

In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.

First Aid: Skin

Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or with waterless hand cleanser. Obtain medical attention if irritation or redness develops.

First Aid: Ingestion

DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Monitor for breathing difficulties. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

First Aid: Inhalation

Remove person to fresh air. If person is not breathing, provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

* * * Section 5 - Fire Fighting Measures * * *

General Fire Hazards

See Section 9 for Flammability Properties.

Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. Flowing product may be ignited by self-generated static electricity. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

Hazardous Combustion Products

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke). Contact with nitric and sulfuric acids will form nitrocresols that can decompose violently.

Extinguishing Media

SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO₂, water spray, fire fighting foam, or gaseous extinguishing agent.

LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

Firefighting foam suitable for polar solvents is recommended for fuel with greater than 10% oxygenate concentration.

Unsuitable Extinguishing Media

None

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Fire Fighting Equipment/Instructions

Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment. Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing. Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

*** Section 6 - Accidental Release Measures ***

Recovery and Neutralization

Carefully contain and stop the source of the spill, if safe to do so.

Materials and Methods for Clean-Up

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal. Caution, flammable vapors may accumulate in closed containers.

Emergency Measures

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Personal Precautions and Protective Equipment

Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

Environmental Precautions

Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Prevention of Secondary Hazards

None

*** Section 7 - Handling and Storage ***

Handling Procedures

USE ONLY AS A MOTOR FUEL.
DO NOT SIPHON BY MOUTH

Handle as a flammable liquid. Keep away from heat, sparks, and open flame! Electrical equipment should be approved for classified area. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

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Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil) is loaded into tanks previously containing low flash point products (such as this product) - see API Publication 2003, "Protection Against Ignitions Arising Out Of Static, Lightning and Stray Currents."

Storage Procedures

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks".

Incompatibilities

Keep away from strong oxidizers.

* * * Section 8 - Exposure Controls / Personal Protection * * *

Component Exposure Limits

Gasoline, motor fuel (86290-81-5)

ACGIH: 300 ppm TWA
500 ppm STEL

Toluene (108-88-3)

ACGIH: 20 ppm TWA
OSHA: 200 ppm TWA; 375 mg/m³ TWA
150 ppm STEL; 560 mg/m³ STEL
NIOSH: 100 ppm TWA; 375 mg/m³ TWA
150 ppm STEL; 560 mg/m³ STEL

Butane (106-97-8)

ACGIH: 1000 ppm TWA (listed under Aliphatic hydrocarbon gases: Alkane C1-4)
OSHA: 800 ppm TWA; 1900 mg/m³ TWA
NIOSH: 800 ppm TWA; 1900 mg/m³ TWA

Xylenes (o-, m-, p- isomers) (1330-20-7)

ACGIH: 100 ppm TWA
150 ppm STEL
OSHA: 100 ppm TWA; 435 mg/m³ TWA
150 ppm STEL; 655 mg/m³ STEL

Benzene, 1,2,4-trimethyl- (95-63-6)

NIOSH: 25 ppm TWA; 125 mg/m³ TWA

Ethyl alcohol (64-17-5)

ACGIH: 1000 ppm STEL
OSHA: 1000 ppm TWA; 1900 mg/m³ TWA
NIOSH: 1000 ppm TWA; 1900 mg/m³ TWA

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Ethylbenzene (100-41-4)

ACGIH: 20 ppm TWA
OSHA: 100 ppm TWA; 435 mg/m³ TWA
125 ppm STEL; 545 mg/m³ STEL
NIOSH: 100 ppm TWA; 435 mg/m³ TWA
125 ppm STEL; 545 mg/m³ STEL

Benzene (71-43-2)

ACGIH: 0.5 ppm TWA
2.5 ppm STEL
Skin - potential significant contribution to overall exposure by the cutaneous route
OSHA: 5 ppm STEL (Cancer hazard, Flammable, See 29 CFR 1910.1028, 15 min); 0.5 ppm Action Level; 1 ppm TWA
NIOSH: 0.1 ppm TWA
1 ppm STEL

Hexane (110-54-3)

ACGIH: 50 ppm TWA
Skin - potential significant contribution to overall exposure by the cutaneous route
OSHA: 500 ppm TWA; 1800 mg/m³ TWA
NIOSH: 50 ppm TWA; 180 mg/m³ TWA

Engineering Measures

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

Personal Protective Equipment: Respiratory

A NIOSH/MSHA-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited.

Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

Personal Protective Equipment: Hands

Gloves constructed of nitrile, neoprene, or PVC are recommended.

PERSONAL PROTECTIVE EQUIPMENT

Personal Protective Equipment: Eyes

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

Personal Protective Equipment: Skin and Body

Chemical protective clothing such as of E.I. DuPont TyChem®, Saranex® or equivalent recommended based on degree of exposure. Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.

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*** Section 9 - Physical & Chemical Properties ***

Appearance:	Translucent, straw-colored or light yellow	Odor:	Strong, characteristic aromatic hydrocarbon odor. Sweet-ether like
Physical State:	Liquid	pH:	ND
Vapor Pressure:	6.4 - 15 RVP @ 100 °F (38 °C) (275-475 mm Hg @ 68 °F (20 °C)	Vapor Density:	AP 3-4
Boiling Point:	85-437 °F (39-200 °C)	Melting Point:	ND
Solubility (H2O):	Negligible to Slight	Specific Gravity:	0.70-0.78
Evaporation Rate:	10-11	VOC:	ND
Percent Volatile:	100%	Octanol/H2O Coeff.:	ND
Flash Point:	-45 °F (-43 °C)	Flash Point Method:	PMCC
Upper Flammability Limit (UFL):	7.6%	Lower Flammability Limit (LFL):	1.4%
Burning Rate:	ND	Auto Ignition:	>530°F (>280°C)

*** Section 10 - Chemical Stability & Reactivity Information ***

Chemical Stability

This is a stable material.

Hazardous Reaction Potential

Will not occur.

Conditions to Avoid

Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources.

Incompatible Products

Keep away from strong oxidizers.

Hazardous Decomposition Products

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke). Contact with nitric and sulfuric acids will form nitrocresols that can decompose violently.

*** Section 11 - Toxicological Information ***

Acute Toxicity

A: General Product Information

Harmful if swallowed.

B: Component Analysis - LD50/LC50

Gasoline, motor fuel (86290-81-5)

Inhalation LC50 Rat >5.2 mg/L 4 h; Oral LD50 Rat 14000 mg/kg; Dermal LD50 Rabbit >2000 mg/kg

Toluene (108-88-3)

Inhalation LC50 Rat 12.5 mg/L 4 h; Inhalation LC50 Rat >26700 ppm 1 h; Oral LD50 Rat 636 mg/kg; Dermal LD50 Rabbit 8390 mg/kg; Dermal LD50 Rat 12124 mg/kg

Butane (106-97-8)

Inhalation LC50 Rat 658 mg/L 4 h

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Xylenes (o-, m-, p- isomers) (1330-20-7)

Inhalation LC50 Rat 5000 ppm 4 h; Inhalation LC50 Rat 47635 mg/L 4 h; Oral LD50 Rat 4300 mg/kg; Dermal LD50 Rabbit >1700 mg/kg

Benzene, 1,2,4-trimethyl- (95-63-6)

Inhalation LC50 Rat 18 g/m³ 4 h; Oral LD50 Rat 3400 mg/kg; Dermal LD50 Rabbit >3160 mg/kg

Ethyl alcohol (64-17-5)

Oral LD50 Rat 7060 mg/kg; Inhalation LC50 Rat 124.7 mg/L 4 h

Ethylbenzene (100-41-4)

Inhalation LC50 Rat 17.2 mg/L 4 h; Oral LD50 Rat 3500 mg/kg; Dermal LD50 Rabbit 15354 mg/kg

Benzene (71-43-2)

Inhalation LC50 Rat 13050-14380 ppm 4 h; Oral LD50 Rat 1800 mg/kg

Hexane (110-54-3)

Inhalation LC50 Rat 48000 ppm 4 h; Oral LD50 Rat 25 g/kg; Dermal LD50 Rabbit 3000 mg/kg

Potential Health Effects: Skin Corrosion Property/Stimulativeness

Practically non-toxic if absorbed following acute (single) exposure. May cause skin irritation with prolonged or repeated contact. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are repeatedly exposed.

Potential Health Effects: Eye Critical Damage/ Stimulativeness

Moderate irritant. Contact with liquid or vapor may cause irritation.

Potential Health Effects: Ingestion

Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

Potential Health Effects: Inhalation

Excessive exposure may cause irritations to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.

WARNING: the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

Respiratory Organs Sensitization/Skin Sensitization

This product is not reported to have any skin sensitization effects.

Generative Cell Mutagenicity

This product may cause genetic defects.

Carcinogenicity

A: General Product Information

May cause cancer.

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IARC has determined that gasoline and gasoline exhaust are possibly carcinogenic in humans. Inhalation exposure to completely vaporized unleaded gasoline caused kidney cancers in male rats and liver tumors in female mice. The U.S. EPA has determined that the male kidney tumors are species-specific and are irrelevant for human health risk assessment. The significance of the tumors seen in female mice is not known. Exposure to light hydrocarbons in the same boiling range as this product has been associated in animal studies with effects to the central and peripheral nervous systems, liver, and kidneys. The significance of these animal models to predict similar human response to gasoline is uncertain.

This product contains benzene. Human health studies indicate that prolonged and/or repeated overexposure to benzene may cause damage to the blood-forming system (particularly bone marrow), and serious blood disorders such as aplastic anemia and leukemia. Benzene is listed as a human carcinogen by the NTP, IARC, OSHA and ACGIH.

B: Component Carcinogenicity

Gasoline, motor fuel (86290-81-5)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

Toluene (108-88-3)

ACGIH: A4 - Not Classifiable as a Human Carcinogen

IARC: Monograph 71 [1999]; Monograph 47 [1989] (Group 3 (not classifiable))

Xylenes (o-, m-, p- isomers) (1330-20-7)

ACGIH: A4 - Not Classifiable as a Human Carcinogen

IARC: Monograph 71 [1999]; Monograph 47 [1989] (Group 3 (not classifiable))

Ethyl alcohol (64-17-5)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

IARC: Monograph 100E [in preparation] (in alcoholic beverages); Monograph 96 [2010] (in alcoholic beverages) (Group 1 (carcinogenic to humans))

Ethylbenzene (100-41-4)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

IARC: Monograph 77 [2000] (Group 2B (possibly carcinogenic to humans))

Benzene (71-43-2)

ACGIH: A1 - Confirmed Human Carcinogen

OSHA: 5 ppm STEL (Cancer hazard, Flammable, See 29 CFR 1910.1028, 15 min); 0.5 ppm Action Level; 1 ppm TWA

NIOSH: potential occupational carcinogen

NTP: Known Human Carcinogen (Select Carcinogen)

IARC: Monograph 100F [in preparation]; Supplement 7 [1987]; Monograph 29 [1982] (Group 1 (carcinogenic to humans))

Reproductive Toxicity

This product is suspected of damaging fertility or the unborn child.

Specified Target Organ General Toxicity: Single Exposure

This product may cause drowsiness or dizziness.

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Specified Target Organ General Toxicity: Repeated Exposure

This product causes damage to organs through prolonged or repeated exposure.

Aspiration Respiratory Organs Hazard

The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

* * * Section 12 - Ecological Information * * *

Ecotoxicity

A: General Product Information

Very toxic to aquatic life with long lasting effects. Keep out of sewers, drainage areas and waterways. Report spills and releases, as applicable, under Federal and State regulations.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Gasoline, motor fuel (86290-81-5)

Test & Species

Conditions

96 Hr LC50 Alburnus alburnus	119 mg/L [static]
96 Hr LC50 Cyprinodon variegatus	82 mg/L [static]
72 Hr EC50 Pseudokirchneriella subcapitata	56 mg/L
24 Hr EC50 Daphnia magna	170 mg/L

Toluene (108-88-3)

Test & Species

Conditions

96 Hr LC50 Pimephales promelas	15.22-19.05 mg/L [flow-through]	1 day old
96 Hr LC50 Pimephales promelas	12.6 mg/L [static]	
96 Hr LC50 Oncorhynchus mykiss	5.89-7.81 mg/L [flow-through]	
96 Hr LC50 Oncorhynchus mykiss	14.1-17.16 mg/L [static]	
96 Hr LC50 Oncorhynchus mykiss	5.8 mg/L [semi-static]	
96 Hr LC50 Lepomis macrochirus	11.0-15.0 mg/L [static]	
96 Hr LC50 Oryzias latipes	54 mg/L [static]	
96 Hr LC50 Poecilia reticulata	28.2 mg/L [semi-static]	
96 Hr LC50 Poecilia reticulata	50.87-70.34 mg/L [static]	
96 Hr EC50 Pseudokirchneriella subcapitata	>433 mg/L	
72 Hr EC50 Pseudokirchneriella subcapitata	12.5 mg/L [static]	
48 Hr EC50 Daphnia magna	5.46 - 9.83 mg/L [Static]	
48 Hr EC50 Daphnia magna	11.5 mg/L	

Xylenes (o-, m-, p- isomers) (1330-20-7)

Test & Species

Conditions

96 Hr LC50 Pimephales promelas	13.4 mg/L [flow-through]
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96 Hr LC50 Oncorhynchus mykiss	2.661-4.093 mg/L [static]
96 Hr LC50 Oncorhynchus mykiss	13.5-17.3 mg/L
96 Hr LC50 Lepomis macrochirus	13.1-16.5 mg/L [flow-through]
96 Hr LC50 Lepomis macrochirus	19 mg/L
96 Hr LC50 Lepomis macrochirus	7.711-9.591 mg/L [static]
96 Hr LC50 Pimephales promelas	23.53-29.97 mg/L [static]
96 Hr LC50 Cyprinus carpio	780 mg/L [semi- static]
96 Hr LC50 Cyprinus carpio	>780 mg/L
96 Hr LC50 Poecilia reticulata	30.26-40.75 mg/L [static]
48 Hr EC50 water flea	3.82 mg/L
48 Hr LC50 Gammarus lacustris	0.6 mg/L

Benzene, 1,2,4-trimethyl- (95-63-6)

Test & Species

Conditions

96 Hr LC50 Pimephales promelas	7.19-8.28 mg/L [flow-through]
48 Hr EC50 Daphnia magna	6.14 mg/L

Ethyl alcohol (64-17-5)

Test & Species

Conditions

96 Hr LC50 Oncorhynchus mykiss	12.0 - 16.0 mL/L [static]
96 Hr LC50 Pimephales promelas	>100 mg/L [static]
96 Hr LC50 Pimephales promelas	13400 - 15100 mg/L [flow-through]
48 Hr LC50 Daphnia magna	9268 - 14221 mg/L
24 Hr EC50 Daphnia magna	10800 mg/L
48 Hr EC50 Daphnia magna	2 mg/L [Static]

Ethylbenzene (100-41-4)

Test & Species

Conditions

96 Hr LC50 Oncorhynchus mykiss	11.0-18.0 mg/L [static]
96 Hr LC50 Oncorhynchus mykiss	4.2 mg/L [semi- static]
96 Hr LC50 Pimephales promelas	7.55-11 mg/L [flow- through]
96 Hr LC50 Lepomis macrochirus	32 mg/L [static]
96 Hr LC50 Pimephales promelas	9.1-15.6 mg/L [static]
96 Hr LC50 Poecilia reticulata	9.6 mg/L [static]
72 Hr EC50 Pseudokirchneriella subcapitata	4.6 mg/L
96 Hr EC50 Pseudokirchneriella subcapitata	>438 mg/L
72 Hr EC50 Pseudokirchneriella subcapitata	2.6 - 11.3 mg/L [static]

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96 Hr EC50 Pseudokirchneriella subcapitata	1.7 - 7.6 mg/L [static]
48 Hr EC50 Daphnia magna	1.8 - 2.4 mg/L

Benzene (71-43-2)

Test & Species

Conditions

96 Hr LC50 Pimephales promelas	10.7-14.7 mg/L [flow-through]
96 Hr LC50 Oncorhynchus mykiss	5.3 mg/L [flow-through]
96 Hr LC50 Lepomis macrochirus	22.49 mg/L [static]
96 Hr LC50 Poecilia reticulata	28.6 mg/L [static]
96 Hr LC50 Pimephales promelas	22330-41160 µg/L [static]
96 Hr LC50 Lepomis macrochirus	70000-142000 µg/L [static]
72 Hr EC50 Pseudokirchneriella subcapitata	29 mg/L
48 Hr EC50 Daphnia magna	8.76 - 15.6 mg/L [Static]
48 Hr EC50 Daphnia magna	10 mg/L

Hexane (110-54-3)

Test & Species

Conditions

96 Hr LC50 Pimephales promelas	2.1-2.98 mg/L [flow-through]
24 Hr EC50 Daphnia magna	>1000 mg/L

Persistence/Degradability

No information available.

Bioaccumulation

No information available.

Mobility in Soil

No information available.

*** * * Section 13 - Disposal Considerations * * ***

Waste Disposal Instructions

See Section 7 for Handling Procedures. See Section 8 for Personal Protective Equipment recommendations.

Disposal of Contaminated Containers or Packaging

Dispose of contents/container in accordance with local/regional/national/international regulations.

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*** Section 14 - Transportation Information ***

Component Marine Pollutants

This material contains one or more of the following chemicals required by US DOT to be identified as marine pollutants.

Component	CAS #	
Gasoline, motor fuel	86290-81-5	DOT regulated marine pollutant

DOT Information

Shipping Name: Gasoline

UN #: 1203 Hazard Class: 3 Packing Group: II

Placard:



*** Section 15 - Regulatory Information ***

Regulatory Information

A: Component Analysis

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4).

Toluene (108-88-3)

SARA 313: 1.0 % de minimis concentration
CERCLA: 1000 lb final RQ; 454 kg final RQ

Xylenes (o-, m-, p- isomers) (1330-20-7)

SARA 313: 1.0 % de minimis concentration
CERCLA: 100 lb final RQ; 45.4 kg final RQ

Benzene, 1,2,4-trimethyl- (95-63-6)

SARA 313: 1.0 % de minimis concentration

Ethylbenzene (100-41-4)

SARA 313: 0.1 % de minimis concentration
CERCLA: 1000 lb final RQ; 454 kg final RQ

Benzene (71-43-2)

SARA 313: 0.1 % de minimis concentration
CERCLA: 10 lb final RQ (received an adjusted RQ of 10 lbs based on potential carcinogenicity in an August 14, 1989 final rule); 4.54 kg final RQ (received an adjusted RQ of 10 lbs based on potential carcinogenicity in an August 14, 1989 final rule)

Safety Data Sheet

Material Name: Gasoline All Grades

SDS No. 9950

Hexane (110-54-3)

SARA 313: 1.0 % de minimis concentration

CERCLA: 5000 lb final RQ; 2270 kg final RQ

SARA Section 311/312 – Hazard Classes

Acute Health

X

Chronic Health

X

Fire

X

Sudden Release of Pressure

--

Reactive

--

Component Marine Pollutants

This material contains one or more of the following chemicals required by US DOT to be identified as marine pollutants.

Component	CAS #	
Gasoline, motor fuel	86290-81-5	DOT regulated marine pollutant

State Regulations

Component Analysis - State

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA	RI
Gasoline, motor fuel	86290-81-5	No	No	No	No	Yes	No
Toluene	108-88-3	Yes	Yes	Yes	Yes	Yes	No
Butane	106-97-8	Yes	Yes	Yes	Yes	Yes	No
Xylenes (o-, m-, p- isomers)	1330-20-7	Yes	Yes	Yes	Yes	Yes	No
Benzene, 1,2,4-trimethyl-	95-63-6	No	Yes	Yes	Yes	Yes	No
Ethyl alcohol	64-17-5	Yes	Yes	Yes	Yes	Yes	No
Ethylbenzene	100-41-4	Yes	Yes	Yes	Yes	Yes	No
Benzene	71-43-2	Yes	Yes	Yes	Yes	Yes	No
Hexane	110-54-3	No	Yes	Yes	Yes	Yes	No

The following statement(s) are provided under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65):

WARNING! This product contains a chemical known to the state of California to cause cancer.

WARNING! This product contains a chemical known to the state of California to cause reproductive/developmental effects.

Safety Data Sheet

Material Name: Gasoline All Grades

SDS No. 9950

Component Analysis - WHMIS IDL

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:

Component	CAS #	Minimum Concentration
Toluene	108-88-3	1 %
Butane	106-97-8	1 %
Benzene, 1,2,4-trimethyl-	95-63-6	0.1 %
Ethyl alcohol	64-17-5	0.1 %
Ethylbenzene	100-41-4	0.1 %
Benzene	71-43-2	0.1 %
Hexane	110-54-3	1 %

Additional Regulatory Information

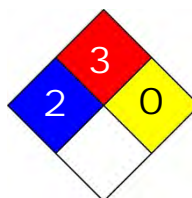
Component Analysis - Inventory

Component	CAS #	TSCA	CAN	EEC
Gasoline, motor fuel	86290-81-5	No	DSL	EINECS
Toluene	108-88-3	Yes	DSL	EINECS
Butane	106-97-8	Yes	DSL	EINECS
Xylenes (o-, m-, p- isomers)	1330-20-7	Yes	DSL	EINECS
Benzene, 1,2,4-trimethyl-	95-63-6	Yes	DSL	EINECS
Ethyl alcohol	64-17-5	Yes	DSL	EINECS
Ethylbenzene	100-41-4	Yes	DSL	EINECS
Benzene	71-43-2	Yes	DSL	EINECS
Hexane	110-54-3	Yes	DSL	EINECS

*** Section 16 - Other Information ***

NFPA® Hazard Rating

Health	2
Fire	3
Reactivity	0



HMIS® Hazard Rating

Health	2	Moderate
Fire	3	Serious
Physical	0	Minimal

*Chronic

Key/Legend

EPA = Environmental Protection Agency; TSCA = Toxic Substance Control Act; ACGIH = American Conference of Governmental Industrial Hygienists; IARC = International Agency for Research on Cancer; NIOSH = National Institute for Occupational Safety and Health; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration.; NJTSR = New Jersey Trade Secret Registry.

Literature References

None

Safety Data Sheet

Material Name: Gasoline All Grades

SDS No. 9950

Other Information

Information presented herein has been compiled from sources considered to be dependable, and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgment.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.

End of Sheet

SAFETY DATA SHEET

Hydrogen Chloride

Section 1. Identification

GHS product identifier	: Hydrogen Chloride
Chemical name	: Hydrogen chloride
Other means of identification	:
Product use	: Synthetic/Analytical chemistry.
Synonym	:
SDS #	: 001028
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	: GASES UNDER PRESSURE - Compressed gas ACUTE TOXICITY (inhalation) - Category 3 SKIN CORROSION/IRRITATION - Category 1 SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 1 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3

GHS label elements

Hazard pictograms



Signal word : Danger

Hazard statements : Contains gas under pressure; may explode if heated.
Toxic if inhaled.
Causes severe skin burns and eye damage.
Causes serious eye damage.
May cause respiratory irritation.

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.

Prevention

: Wear protective gloves. Wear eye or face protection. Wear protective clothing. Use only outdoors or in a well-ventilated area. Avoid breathing gas. Wash hands thoroughly after handling.

Section 2. Hazards identification

Response	: IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or physician. IF SWALLOWED: Immediately call a POISON CENTER or physician. Rinse mouth. Do NOT induce vomiting. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. Wash contaminated clothing before reuse. Immediately call a POISON CENTER or physician. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or physician.
Storage	: Store locked up. Protect from sunlight when ambient temperature exceeds 52°C/125°F. Store in a well-ventilated place.
Disposal	: Dispose of contents and container in accordance with all local, regional, national and international regulations.
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	: Hydrogen chloride
Other means of identification	:

CAS number/other identifiers

CAS number	: 7647-01-0
Product code	: 001028

Ingredient name	%	CAS number
hydrogen chloride	100	7647-01-0

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	: Get medical attention immediately. Call a poison center or physician. 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. Chemical burns must be treated promptly by a physician.
Inhalation	: Get medical attention immediately. Call a poison center or physician. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. 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. 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	: Get medical attention immediately. Call a poison center or physician. Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician. 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

Section 4. First aid measures

- Eye contact** : Causes serious eye damage. Contact with rapidly expanding gas may cause burns or frostbite.
- Inhalation** : Toxic if inhaled. May cause respiratory irritation.
- Skin contact** : Causes severe burns. Contact with rapidly expanding gas may cause burns or frostbite.
- 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** : Adverse symptoms may include the following: pain, watering, redness
- Inhalation** : Adverse symptoms may include the following: respiratory tract irritation, coughing
- Skin contact** : Adverse symptoms may include the following: pain or irritation, redness, blistering may occur
- Ingestion** : Adverse symptoms may include the following: stomach pains

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.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

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. In a fire or if heated, a pressure increase will occur and the container may burst or explode.

- Hazardous thermal decomposition products** : Decomposition products may include the following materials: halogenated compounds

- 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.

- 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** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not breathe gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

Section 6. Accidental release measures

- 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.
- Large spill** : Immediately contact emergency personnel. Stop leak if without risk. 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. Do not get in eyes or on skin or clothing. Do not breathe gas. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. 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). Store locked up. 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
hydrogen chloride	ACGIH TLV (United States, 3/2015). C: 2 ppm NIOSH REL (United States, 10/2013). CEIL: 7 mg/m ³ CEIL: 5 ppm OSHA PEL (United States, 2/2013). CEIL: 7 mg/m ³ CEIL: 5 ppm OSHA PEL 1989 (United States, 3/1989). CEIL: 7 mg/m ³ CEIL: 5 ppm

- 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.

Section 8. Exposure controls/personal protection

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: chemical splash goggles and/or face shield. If inhalation hazards exist, a full-face respirator may be required instead.
- Skin 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.
- 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. Yellowish.
- Molecular weight** : 36.46 g/mole
- Molecular formula** : Cl-H
- Boiling/condensation point** : -85°C (-121°F)
- Melting/freezing point** : -114°C (-173.2°F)
- Critical temperature** : 51.45°C (124.6°F)
- Odor** : Pungent.
- Odor threshold** : Not available.
- pH** : Not available.
- Flash point** : [Product does not sustain combustion.]
- Burning time** : Not applicable.
- Burning rate** : Not applicable.
- Evaporation rate** : Not available.
- Flammability (solid, gas)** : Not available.
- Lower and upper explosive (flammable) limits** : Not available.

Section 9. Physical and chemical properties

Vapor pressure	: 613 (psig)
Vapor density	: 1.3 (Air = 1)
Specific Volume (ft ³ /lb)	: 10.5263
Gas Density (lb/ft ³)	: 0.095
Relative density	: Not applicable.
Solubility	: Soluble in the following materials: cold water.
Solubility in water	: Not available.
Partition coefficient: n-octanol/water	: 0.25
Auto-ignition temperature	: Not available.
Decomposition temperature	: Not available.
SADT	: Not available.
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	: No specific data.
Incompatible materials	: No specific data.
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
hydrogen chloride	LC50 Inhalation Gas.	Rat	3124 ppm	1 hours
	LC50 Inhalation Gas.	Rat	1562 ppm	4 hours

IDLH : 50 ppm

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
hydrogen chloride	Eyes - Mild irritant	Rabbit	-	0.5 minutes 5 milligrams	-
	Skin - Mild irritant	Human	-	24 hours 4 Percent	-

Sensitization

Not available.

Mutagenicity

Not available.

Section 11. Toxicological information

Carcinogenicity

Not available.

Classification

Product/ingredient name	OSHA	IARC	NTP
hydrogen chloride	-	3	-

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Name	Category	Route of exposure	Target organs
hydrogen chloride	Category 3	Not applicable.	Respiratory tract irritation

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure : Not available.

Potential acute health effects

- Eye contact** : Causes serious eye damage. Contact with rapidly expanding gas may cause burns or frostbite.
- Inhalation** : Toxic if inhaled. May cause respiratory irritation.
- Skin contact** : Causes severe burns. Contact with rapidly expanding gas may cause burns or frostbite.
- Ingestion** : As this product is a gas, refer to the inhalation section.

Symptoms related to the physical, chemical and toxicological characteristics

- Eye contact** : Adverse symptoms may include the following: pain, watering, redness
- Inhalation** : Adverse symptoms may include the following: respiratory tract irritation, coughing
- Skin contact** : Adverse symptoms may include the following: pain or irritation, redness, blistering may occur
- Ingestion** : Adverse symptoms may include the following: stomach pains

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.

Section 11. Toxicological information

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

Product/ingredient name	Result	Species	Exposure
hydrogen chloride	Acute LC50 240000 µg/l Marine water	Crustaceans - Carcinus maenas - Adult	48 hours
	Acute LC50 282 ppm Fresh water	Fish - Gambusia affinis - Adult	96 hours

Persistence and degradability

Not available.

Bioaccumulative potential

Product/ingredient name	LogP _{ow}	BCF	Potential
hydrogen chloride	0.25	-	low

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

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN1050	UN1050	UN1050	UN1050	UN1050
UN proper shipping name	HYDROGEN CHLORIDE, ANHYDROUS	HYDROGEN CHLORIDE, ANHYDROUS	HYDROGEN CHLORIDE, ANHYDROUS	HYDROGEN CHLORIDE, ANHYDROUS	HYDROGEN CHLORIDE, ANHYDROUS
Transport hazard class(es)	2.3 (8) 	2.3 (8) 	2.3 (8) 	2.3 (8) 	2.3 (8) 
Packing group	-	-	-	-	-
Environment	No.	No.	No.	No.	No.
Additional information	<p>Inhalation hazard zone C</p> <p>Reportable quantity 5000 lbs / 2270 kg Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.</p> <p>Limited quantity Yes.</p> <p>Packaging instruction Passenger aircraft Quantity limitation: Forbidden.</p> <p>Cargo aircraft Quantity limitation: Forbidden.</p> <p>Special provisions 3</p>	<p>Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.13-2.17 (Class 2), 2.40-2.42 (Class 8).</p> <p>Explosive Limit and Limited Quantity Index 0</p> <p>ERAP Index 25</p> <p>Passenger Carrying Ship Index Forbidden</p> <p>Passenger Carrying Road or Rail Index Forbidden</p> <p>Special provisions 38</p>	-	-	<p>Passenger and Cargo Aircraft Quantity limitation: 0 Forbidden</p> <p>Cargo Aircraft Only Quantity limitation: 0 Forbidden</p>

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

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 Water Act (CWA) 311: Hydrogen chloride
Clean Air Act (CAA) 112 regulated toxic substances: Hydrogen chloride
Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Listed

Section 15. Regulatory information

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) : Listed

SARA 302/304

Composition/information on ingredients

Name	%	EHS	SARA 302 TPQ		SARA 304 RQ	
			(lbs)	(gallons)	(lbs)	(gallons)
hydrogen chloride	100	Yes.	500	-	5000	-

SARA 304 RQ : 5000 lbs / 2270 kg

SARA 311/312

Classification : Sudden release of pressure
Immediate (acute) health hazard

Composition/information on ingredients

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

SARA 313

	Product name	CAS number	%
Form R - Reporting requirements	Hydrogen chloride	7647-01-0	100
Supplier notification	Hydrogen chloride	7647-01-0	100

SARA 313 notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

State regulations

Massachusetts : This material is listed.

New York : This material is 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 : This material is listed or exempted.

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.

Section 15. Regulatory information

Canada

WHMIS (Canada)

: Class A: Compressed gas.
 Class D-1A: Material causing immediate and serious toxic effects (Very toxic).
 Class E: Corrosive material

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 D-1A: Material causing immediate and serious toxic effects (Very toxic).
 Class E: Corrosive material

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

Health	3
Flammability	0
Physical hazards	3

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.)



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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
Press. Gas Comp. Gas, H280 Acute Tox. 3, H331 Skin Corr. 1, H314 Eye Dam. 1, H318 STOT SE 3, H335	According to package On basis of test data Expert judgment Expert judgment Expert judgment

History

Date of printing : 6/24/2016
Date of issue/Date of revision : 6/24/2016

Section 16. Other information

Date of previous issue : No previous validation

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.

Section 1: IDENTIFICATION**Product Name:** Simple Green® All-Purpose Cleaner**Additional Names:****Manufacturer's Part Number:** **Please refer to Section 16***Recommended Use:** Cleaner & Degreaser for water tolerant surfaces.**Restrictions on Use:** Do not use on non-rinsable surfaces.**Company:** Sunshine Makers, Inc.
15922 Pacific Coast Highway
Huntington Beach, CA 92649 USA**Telephone:** 800-228-0709 • 562-795-6000 *Mon – Fri, 8am – 5pm PST***Fax:** 562-592-3830**Email:** info@simplegreen.com**Emergency Phone:** Chem-Tel 24-Hour Emergency Service: 800-255-3924**Section 2: HAZARDS IDENTIFICATION****This product is not classified as hazardous under 2012 OSHA Hazard Communication Standards (29 CFR 1910.1200).**OSHA HCS 2012Label Elements**Signal Word:** None**Hazard Symbol(s)/Pictogram(s):** None required**Hazard Statements:** None**Precautionary Statements:** None**Hazards Not Otherwise Classified (HNOC):** None**Other Information:** None Known**Section 3: COMPOSITION/INFORMATION ON INGREDIENTS**

<u>Ingredient</u>	<u>CAS Number</u>	<u>Percent Range</u>
Water	7732-18-5	> 84.8%*
Ethoxylated Alcohol	68439-46-3	< 5%*
Sodium Citrate	68-04-2	< 5%*
Tetrasodium <i>N,N</i> -bis(carboxymethyl)-L-glutamate	51981-21-6	< 1%*
Sodium Carbonate	497-19-8	< 1%*
Citric Acid	77-92-9	< 1%*
Isothiazolinone mixture	55965-84-9	< 0.2%*
Fragrance	Proprietary Mixture	< 1%*
Colorant	Proprietary Mixture	< 1%*

specific percentages of composition are being withheld as a trade secret*Section 4: FIRST-AID MEASURES****Inhalation:** Not expected to cause respiratory irritation. If adverse effect occurs, move to fresh air.**Skin Contact:** Not expected to cause skin irritation. If adverse effect occurs, rinse skin with water.**Eye Contact:** Not expected to cause eye irritation. If adverse effect occurs, flush eyes with water.**Ingestion:** May cause upset stomach. Drink plenty of water to dilute. See section 11.**Most Important Symptoms/Effects, Acute and Delayed:** None known.**Indication of Immediate Medical Attention and Special Treatment Needed, if necessary:** Treat symptomatically

Section 5: FIRE-FIGHTING MEASURES

Suitable & Unsuitable Extinguishing Media: Use Dry chemical, CO₂, water spray or “alcohol” foam. Avoid high volume jet water.
Specific Hazards Arising from Chemical: In event of fire, fire created carbon oxides may be formed.
Special Protective Actions for Fire-Fighters: Wear positive pressure self-contained breathing apparatus; Wear full protective clothing.

This product is non-flammable. See Section 9 for Physical Properties.

Section 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures: *For non-emergency and emergency personnel:* See section 8 – personal protection. Avoid eye contact. Safety goggles suggested.

Environmental Precautions: Do not allow into open waterways and ground water systems.

Methods and Materials for Containment and Clean Up: Dike or soak up with inert absorbent material. See section 13 for disposal considerations.

Section 7: HANDLING AND STORAGE

Precautions for Safe Handling: Ensure adequate ventilation. Keep out of reach of children. Keep away from heat, sparks, open flame and direct sunlight. Do not pierce any part of the container. Do not mix or contaminate with any other chemical. Do not eat, drink or smoke while using this product.

Conditions for Safe Storage including Incompatibilities: Keep container tightly closed. Keep in cool dry area. Avoid prolonged exposure to sunlight. Do not store at temperatures above 109°F (42.7°C). If separation occurs, mix the product for reconstitution.

Section 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Limit Values: No components listed with TWA or STEL values under OSHA or ACGIH.

Appropriate Engineering Controls: Showers, eyewash stations, ventilation systems

Individual Protection Measures / Personal Protective Equipment (PPE)

Eye Contact: Use protective glasses or safety goggles if splashing or spray-back is likely.
Respiratory: Use in well ventilated areas or local exhaust ventilations when cleaning small spaces.
Skin Contact: Use protective gloves (any material) when used for prolonged periods or dermally sensitive.
General Hygiene Considerations: Wash thoroughly after handling and before eating or drinking.

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Green Liquid	Partition Coefficient: n-octanol/water:	Not determined
Odor:	Added sassafras odor	Autoignition Temperature:	Non-flammable
Odor Threshold:	Not determined	Decomposition Temperature:	109°F
pH ASTM D-1293:	8.5 – 9.5	Viscosity:	Like water
Freezing Point ASTM D-1177:	0-3.33°C (32-38°F)	Specific Gravity ASTM D-891:	1.01 – 1.03
Boiling Point & Range ASTM D-1120:	101°C (213.8°F)	VOCs:	<i>**Water & fragrance exemption in calculation</i>
Flash Point ASTM D-93:	> 212°F	SCAQMD 304-91 / EPA 24:	0 g/L 0 lb/gal 0%
Evaporation Rate ASTM D-1901:	¼ Butyl Acetate @ 25°C	CARB Method 310**:	2.5 g/L 0.021 lb/gal 0.25%
Flammability (solid, gas):	Not applicable	SCAQMD Method 313:	Not tested
Upper/Lower Flammability or Explosive Limits:	Not applicable	VOC Composite Partial Pressure:	Not determined
Vapor Pressure ASTM D-323:	0.60 PSI @77°F, 2.05 PSI @100°F	Relative Density ASTM D-4017:	8.34 – 8.42 lb/gal
Vapor Density:	Not determined	Solubility:	100% in water

Section 10: STABILITY AND REACTIVITY

Reactivity:	Non-reactive.
Chemical Stability:	Stable under normal conditions 70°F (21°C) and 14.7 psig (760 mmHg).
Possibility of Hazardous Reactions:	None known.
Conditions to Avoid:	Excessive heat or cold.
Incompatible Materials:	Do not mix with oxidizers, acids, bathroom cleaners, or disinfecting agents.
Hazardous Decomposition Products:	Normal products of combustion - CO, CO ₂ .

Section 11: TOXICOLOGICAL INFORMATION

Likely Routes of Exposure:	Inhalation -	Overexposure may cause headache.
	Skin Contact -	Not expected to cause irritation, repeated contact may cause dry skin.
	Eye Contact -	Not expected to cause irritation.
	Ingestion -	May cause upset stomach.

Symptoms related to the physical, chemical and toxicological characteristics: no symptoms expected under typical use conditions.

Delayed and immediate effects and or chronic effects from short term exposure: no symptoms expected under typical use conditions.

Delayed and immediate effects and or chronic effects from long term exposure: headache, dry skin, or skin irritation may occur.

Interactive effects: Not known.

Numerical Measures of Toxicity

Acute Toxicity:	Oral LD ₅₀ (rat)	> 5 g/kg body weight
	Dermal LD ₅₀ (rabbit)	> 5 g/kg body weight

Calculated via OSHA HCS 2012 / Globally Harmonized System of Classification and Labelling of Chemicals

Skin Corrosion/Irritation:	Non-irritant per Dermal Irritation® assay modeling. No animal testing performed.
Eye Damage/Irritation:	Minimal irritant per Ocular Irritation® assay modeling. No animal testing performed.
Germ Cell Mutagenicity:	Mixture does not classify under this category.
Carcinogenicity:	Mixture does not classify under this category.
Reproductive Toxicity:	Mixture does not classify under this category.
STOT-Single Exposure:	Mixture does not classify under this category.
STOT-Repeated Exposure:	Mixture does not classify under this category.
Aspiration Hazard:	Mixture does not classify under this category.

Section 12: ECOLOGICAL INFORMATION

Ecotoxicity:	Volume of ingredients used does not trigger toxicity classifications under the Globally Harmonized System of Classification and Labelling of Chemicals.
Aquatic:	Aquatic Toxicity - Low, based on OECD 201, 202, 203 + Microtox: EC ₅₀ & IC ₅₀ ≥100 mg/L. Volume of ingredients used does not trigger toxicity classifications under the Globally Harmonized System of Classification and Labelling of Chemicals.
Terrestrial:	Not tested on finished formulation.
Persistence and Degradability:	Readily Biodegradable per OCED 301D, Closed Bottle Test
Bioaccumulative Potential:	No data available.
Mobility in Soil:	No data available.
Other Adverse Effects:	No data available.

Section 13: DISPOSAL CONSIDERATIONS

Unused or Used Liquid: May be considered hazardous in your area depending on usage and tonnage of disposal – check with local, regional, and or national regulations for appropriate methods of disposal.

Empty Containers: May be offered for recycling.

Never dispose of used degreasing rinsates into lakes, streams, and open bodies of water or storm drains.

Section 14: TRANSPORT INFORMATION

U.N. Number: Not applicable
Transport Hazard Class(es): Not applicable
Packing Group: Not applicable
Environmental Hazards: Marine Pollutant - NO
U.N. Proper Shipping Name: Cleaning Compound, Liquid NOI
NMFC Number: 48580-3
Class: 55
Transport in Bulk (according to Annex II of MARPOL 73/78 and IBC Code): Unknown.
Special precautions which user needs to be aware of/comply with, in connection with transport or conveyance either within or outside their premises: None known.

U.S. (DOT) / Canadian TDG: Not Regulated for shipping.
IMO / IDMG: Not classified as Hazardous
ICAO/ IATA: Not classified as Hazardous
ADR/RID: Not classified as Hazardous

Section 15: REGULATORY INFORMATION

All components are listed on: TSCA and DSL Inventory.

SARA Title III: Sections 311/312 Hazard Categories – Not applicable.
 Sections 313 Superfunds Amendments and Reauthorizations Act of 1986 – Not applicable.
 Sections 302 – Not applicable.

Clean Air Act (CAA): Not applicable

Clean Water Act (CWA): Not applicable

State Right To Know Lists: No ingredients listed

California Proposition 65: No ingredients listed

Texas ESL:

Ethoxylated Alcohol	68439-46-3	60 µg/m ³ long term	600 µg/m ³ short term
Sodium Citrate	68-04-2	5 µg/m ³ long term	50 µg/m ³ short term
Sodium Carbonate	497-19-8	5 µg/m ³ long term	50 µg/m ³ short term
Citric Acid	77-92-9	10 µg/m ³ long term	100 µg/m ³ short term

Section 16: OTHER INFORMATION

<u>Size</u>	<u>UPC</u>	<u>Size</u>	<u>UPC</u>
2 oz. Pump	043318130366	1 Gallon w/ Dilution Bottle	043318000669
2 oz. Pump	043318131035	1 Gallon	043318000799
4 oz. Pump	043318130014	1 Gallon w/ Dilution Bottle	043318001383
16 oz. Trigger	043318130021	1 Gallon w/ Dilution Bottle	043318002021
22 oz. Trigger	043318130229	1 Gallon	043318130052
24 oz. Trigger, 12 per case	043318000034	1 Gallon w/ Dilution Bottle, 112 per case	043318480140
24 oz. Trigger	043318000300	1 Gallon w/ Dilution Bottle, 4 per case	043318480416
24 oz. Trigger	043318130137	1 Gallon w/ Dilution Bottle, 24 per case	043318480492
32 oz. Trigger	043318000652	1 Gallon w/ laundry	043318002052
32 oz. Trigger	043318130335	1 Gallon w/ towel	043318001222
67.6 oz.	043318000393	140 oz.	043318001390
67.6 oz.	043318130144	140 oz., 168 per case	043318561405
1 Gallon w/ Dilution Bottle	043318000539	140 oz. w/ Dilution Bottle	043318001468
1 Gallon w/ Dilution Bottle	043318000645		

USA items listed only. Not all items listed. USA items may not be valid for international sale.

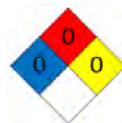
Section 16: OTHER INFORMATION - continued**NFPA:**

Health – None

Flammability – Non-flammable

Stability – Stable

Special - None

**Acronyms**

NTP National Toxicology Program

OSHA Occupational Safety and Health Administration

TSCA Toxic Substances Control Act

IARC

CPSC

DSL

International Agency for Research on Cancer

Consumer Product Safety Commission

Domestic Substances List

Prepared / Revised By: Sunshine Makers, Inc., Regulatory Department.**This SDS has been revised in the following sections:** Revised SDS layout

DISCLAIMER: The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Safety Data Sheet
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GHS

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Revision: 05/12/2015

ALCONOX**1 Identification of the Substance/mixture and of the Company/Undertaking****1.1 Product identifier**Trade name: **ALCONOX**

Application of the substance / the preparation: Cleaning material/ Detergent

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

No additional information available.

1.3 Details of the supplier of the Safety Data Sheet**Manufacturer/Supplier:**

Alconox, Inc.
30 Glenn St., Suite 309
White Plains, NY 10603
Phone: 914-948-4040



Further information obtainable from: Product Safety Department

1.4 Emergency telephone number:

ChemTel Inc.: (800)255-3924, +1 (813)248-0585

2 Hazards Identification**2.1 Classification of the substance or mixture Classification according to Regulation (EC) No 1272/2008:***Eye Irrit. 2B; H320: Causes eye irritation.***Information concerning particular hazards for human 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 the latest editions of the EU-lists, and extended by company and literature data

2.2 Label elements**Labelling according to Regulation (EC) No 1272/2008:**

The product is classified and labelled according to the CLP regulation.

Hazard pictograms:**Signal word:** Warning**Hazard-determining components of labelling:**

Sodium Alkylbenzene Sulfonate

Hazard statements:

H320: Causes eye irritation.

Precautionary statements:

P280 Wear protective gloves/protective clothing/eye protection/face protection.

P264: Wash thoroughly after handling.

P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P337+P313: If eye irritation persists: Get medical advice/attention.

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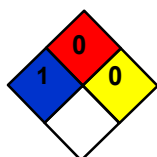
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Other Hazard description:**WHMIS-classification and symbols:**

D2B - Toxic material causing other toxic effects

**NFPA ratings (scale 0 - 4)**

Health = 1
Fire = 0
Reactivity = 0

HMIS-ratings (scale 0 - 4)

HEALTH	1		Health = 1
FIRE	0		Fire = 0
REACTIVITY	0		Reactivity = 0

2.3 Other hazards**Results of PBT and vPvB assessment**

PBT: Not applicable.

vPvB: Not applicable.

3 Composition/Information on Ingredients

3.2 Chemical characterization: Mixture

Description: Hazardous ingredients of mixture listed below.

Identifying Nos.	Description	Wt. %
CAS: 68081-81-2	Sodium Alkylbenzene Sulfonate	10 - 25%
CAS: 497-19-8	Sodium Carbonate	5-15%
CAS: 7722-88-5	Tetrasodium pyrophosphate	5-15%
CAS: N/A	Proprietary (non-classified)	40-60%

Additional information: For the wording of the listed risk phrases refer to section 16.

4 First Aid Measures

4.1 Description of first aid measures**General information:**

Contaminated individuals of chemical exposure must be taken for medical attention if any adverse effect occurs. Rescuers should be taken for medical attention, if necessary. Take copy of label and SDS to health professional with contaminated individual.

After inhalation:

Supply fresh air; consult doctor in case of complaints.

After skin contact:

Immediately wash with water and soap and rinse thoroughly. If skin irritation continues, consult a doctor.

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After eye contact:

Remove contact lenses if worn. Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.

After swallowing:

Rinse out mouth and then drink plenty of water. Do not induce vomiting; call for medical help immediately.

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

No additional information available.

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

No additional information available.

5 Firefighting Measures**5.1 Extinguishing media:****Suitable extinguishing agents:**

CO₂, powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

5.2 Special hazards arising from the substance or mixture:

No additional information available.

5.3 Advice for firefighters:**Protective equipment:**

Wear self-contained respiratory protective device.

Wear fully protective suit.

6 Accidental Release Measures**6.1 Personal precautions, protective equipment and emergency procedures:**

Product forms slippery surface when combined with water.

6.2 Environmental precautions:

Do not allow product to reach sewage system or any water course.

6.3 Methods and material for containment and cleaning up:

Pick up mechanically.

Clean the affected area carefully; suitable cleaners are: Warm water

6.4 Reference to other sections:

See Section 7 for information on safe handling.

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information

7 Handling and Storage**7.1 Precautions for safe handling:**

Ensure good ventilation/exhaustion at the workplace.

Keep receptacles tightly sealed.

Prevent formation of dust.

Information about fire - and explosion protection: No special measures required.

7.2 Conditions for safe storage, including any incompatibilities:**Storage:**

Requirements to be met by storerooms and receptacles: No special requirements.

Information about storage in one common storage facility: None required.

Further information about storage conditions: Protect from humidity and water.

7.3 Specific end use(s): No additional information available.

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8 Exposure Controls/Personal Protection

8.1 Control parameters

Ingredients with limit values that require monitoring at the workplace: Not required.

Additional information: The lists valid during the making were used as basis.

8.2 Exposure controls:

Personal protective equipment:

General protective and hygienic measures:

- Keep away from foodstuffs, beverages and feed.
- Immediately remove all soiled and contaminated clothing.
- Wash hands before breaks and at the end of work.
- Avoid contact with the skin.
- Avoid contact with the eyes and skin.

Respiratory protection:

- Not required under normal conditions of use.
- In case of brief exposure or low pollution use respiratory filter device.
- In case of intensive or longer exposure use self-contained respiratory protective device.

Protection of hands:



Protective gloves

The glove material has to be impermeable and resistant to the product. Selection of the glove material should be based on the penetration time, rates of diffusion and the degradation of the glove material.

Material of gloves:

The selection of a suitable gloves does not only depend on the material, but also on the quality, and varies from manufacturer to manufacturer.

Penetration time of glove material:

The exact break through time has to be determined by the manufacturer of the protective gloves. DO NOT exceed the breakthrough time set by the Manufacturer.

For long term contact, gloves made of the following materials are considered suitable:

- Butyl rubber, BR
- Nitrile rubber, NBR
- Natural rubber (NR)
- Neoprene gloves

Eye protection:



Safety glasses

Body protection: Protective work clothing

9 Physical and Chemical Properties

9.1 Information on basic physical and chemical properties:

General Information:

Appearance:

Form:	Powder
Color:	White
Odor:	Odorless
Odor threshold:	Not determined.
pH-value (10 g/l) at 20°C:	9.5 (NA for Powderform)

Change in condition:

Melting point/Melting range:	Not determined.
Boiling point/Boiling range:	Not determined.

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Flash point:	Not applicable.
Flammability (solid, gaseous):	Not determined.
Ignition temperature:	Not determined.
Decomposition temperature:	Not determined.
Self-igniting:	Product is not selfigniting.
Danger of explosion:	Product does not present an explosion hazard.
Explosion limits:	
Lower:	Not determined.
Upper:	Not determined.
Vapor pressure:	Not applicable.
Density at 20°C:	1,1 g/cm ³
Relative density:	Not determined.
Vapor density:	Not applicable.
Evaporation rate:	Not applicable.
Solubility in / Miscibility with water:	Soluble.
Segregation coefficient (n-octanol/water):	Not determined.
Viscosity:	
Dynamic:	Not applicable.
Kinematic:	Not applicable.
Solvent content:	
Organic solvents:	0.0 %
Solids content:	100 %
9.2 Other information:	No additional information available.

10 Stability and Reactivity

- 10.1 Reactivity:**
- 10.2 Chemical stability:**
- Thermal decomposition / conditions to be avoided:**
 No decomposition if used according to specifications.
- 10.3 Possibility of hazardous reactions:**
- Reacts with acids.
 Reacts with strong alkali.
 Reacts with strong oxidizing agents.
- 10.4 Conditions to avoid:**
- No additional information available.
- 10.5 Incompatible materials:**
- No additional information available.
- 10.6 Hazardous decomposition products:**
- Carbon monoxide and carbon dioxide
 Phosphorus compounds
 Sulphur oxides (SO_x)

11 Toxicological Information

- 11.1 Information on toxicological effects:**
- Toxicity data:** No additional information available.
- Primary irritant effect:**
- On the skin:** Irritating to skin and mucous membranes.
 On the eye: Strong irritant with the danger of severe eye injury.
 Sensitization: No sensitizing effects known.

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Additional toxicological information:

The product shows the following dangers according to the calculation method of the General EU Classification Guidelines for Preparations as issued in the latest version: Irritant.

Swallowing will lead to a strong caustic effect on mouth and throat and to the danger of perforation of esophagus and stomach.

12 Ecological Information

12.1 Toxicity:

Aquatic toxicity: No additional information available.

12.2 Persistence and degradability: No additional information available.**12.3 Bioaccumulative potential:** Not worth-mentioning accumulating in organisms.**12.4 Mobility in soil:** No additional information available.**Ecotoxicological effects:**

Remark: Harmful to fish

Additional ecological information:**General notes:**

Water hazard class 2 (German Regulation) (Self-assessment): hazardous for water.

Do not allow product to reach ground water, water course or sewage system.

Danger to drinking water if even small quantities leak into the ground.

12.5 Results of PBT and vPvB assessment:

PBT: Not applicable.

vPvB: Not applicable.

12.6 Other adverse effects: No additional information available.

13 Disposal Considerations

13.1 Waste treatment methods:**Recommendation:**

Smaller quantities can be disposed of with household waste.

Small amounts may be diluted with plenty of water and washed away. Dispose of bigger amounts in accordance with Local Authority requirements.

The surfactant used in this product complies with the biodegradability criteria as laid down in Regulation (EC) No. 648/2004 on detergents. Data to support this assertion are held at the disposal of the competent authorities of the Member States and will be made available to them, at their direct request or at the request of a detergent manufacturer.

Uncleaned packaging:

Recommendation: Disposal must be made according to official regulations.

Recommended cleansing agents: Water, together with cleansing agents, if necessary.

14 Transport Information

14.1 UN-Number:

DOT, ADR, ADN, IMDG, IATA:

Not Regulated

14.2 UN proper shipping name:

DOT, ADR, IMDG, IATA:

Not Regulated

14.3 Transport hazard class(es):

DOT, ADR, IMDG, IATA:

Class:

Not Regulated

Label:

-

14.4 Packing group:

DOT, ADR, IMDG, IATA:

Not Regulated

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14.5 Environmental hazards:**Marine pollutant:** No**14.6 Special precautions for user:** Not applicable.**14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code:** Not applicable.**UN "Model Regulation":** Not Regulated

15 Regulatory Information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture:**United States (USA):****SARA:****Section 355 (extremely hazardous substances):** None of the ingredient is listed.**Section 313 (Specific toxic chemical listings):** None of the ingredient is listed.**TSCA (Toxic Substances Control Act):** All ingredients are listed.**Proposition 65 (California):****Chemicals known to cause cancer:** None of the ingredient is listed.**Chemicals known to cause reproductive toxicity for females:** None of the ingredient is listed.**Chemicals known to cause reproductive toxicity for males:** None of the ingredient is listed.**Chemicals known to cause developmental toxicity:** None of the ingredient is listed.**Carcinogenic Categories:****EPA (Environmental Protection Agency):** None of the ingredient is listed.**TLV (Threshold Limit Value established by ACGIH):** None of the ingredient is listed.**NIOSH-Ca (National Institute for Occupational Safety and Health):** None of the ingredient is listed.**OSHA-Ca (Occupational Safety & Health Administration):** None of the ingredient is listed.**Canada:****Canadian Domestic Substances List (DSL):** All ingredients are listed.**Canadian Ingredient Disclosure list (limit 0.1%):** None of the ingredient is listed.**Canadian Ingredient Disclosure list (limit 1%):**

497-19-8	Sodium Carbonate
7722-88-5	Tetrasodium pyrophosphate
151-21-3	Sodium dodecylsulphate

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

16 Other Information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Relevant phrases:

H320: Causes eye irritation.

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ALCONOX

Abbreviations and Acronyms:

ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road.
IMDG: International Maritime Code for Dangerous Goods.
DOT: US Department of Transportation.
IATA: International Air Transport Association.
GHS: Globally Harmonized System of Classification and Labelling of Chemicals.
ACGIH: American Conference of Governmental Industrial Hygienists.
NFPA: National Fire Protection Association (USA).
HMIS: Hazardous Materials Identification System (USA).
WHMIS: Workplace Hazardous Materials Information System (Canada).
VOC: Volatile Organic Compounds (USA, EU).
LC50: Lethal concentration, 50 percent.
LD50: Lethal dose, 50 percent.

SDS Created by:

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Tampa, FL, 33647
Tel: 1-844-GSM-INFO (1-844-476-4636)
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Attachment D

Site Orientation

URS will conduct a site safety briefing for a person's initial visit to the site. The briefing will be conducted:

- Prior to the start of work;
- For any new URS or sub consultant personnel; and
- At each mobilization, or whenever there is a change in task or significant change in task location.

All personnel working on the project who have received the site briefing (including the HASP review) will sign the Personal Acknowledgement located at the end of the HASP. Visitors may receive a shortened version to address the hazards specific to their visit.

The following items, at minimum, will be discussed during the site safety briefing:

- Contents of this HASP;
- The Emergency Response Plan;
- Contractor SH&E Management expectations;
- Injury management, including notification and hospital and occupational clinic locations;
- The URS 4-Sight program;
- Stop Work authority;
- The JSAs (Attachment E) for the tasks that will be performed on a given job;
- Completion of a THA each day (Attachment E);
- Types of hazards at the site and means for minimizing exposure to them;
- Instructions for new operations to be conducted, and safe work practices;
- PPE that must be used;
- Lone worker check-in procedures;
- Emergency evacuation routes, muster points, and tornado/storm shelters; and
- Location and use of emergency equipment.

These meetings must be documented and maintained in the project files.

Attachment E

Project/Task-Specific Pre- Job Safety Analysis

The preparer shall download and prepare one Pre-Job Hazard Assessment for each discrete task being performed during the project (i.e. Driving, Inspection, Sample Collection, etc.). Checklist **S3NA-209-FM4*** shall be used. The URS electronic job safety analysis (eJSA) toolbox* may also be used to find previously approved job safety analyses (JSAs)

Insert list of Pre-Job Hazard Assessments or Job Safety Analysis here. Include after this cover sheet in the final HASP.

Blank Daily THA and Daily Tailgate Forms

The preparer shall download a sufficient number of copies of the daily Task Hazard Analysis and Tailgate Meeting form* (**DCS SH&E ecosystem page**) and insert after this cover sheet in the final HASP. One copy of the THA/ Tailgate MUST be prepared at the start of each shift, and signed by all staff involved in the operation. The THA should be consulted and updated throughout the day if conditions change.

*Client required equivalents may be substituted

JOB SAFETY ANALYSIS

URS Corporation NYSDEC, Former Kenwood Cleaners, Schenectady, Schenectady County, NY	DATE 2/2/17	<input checked="" type="checkbox"/> NEW <input type="checkbox"/> REVISED	PAGE 1 of 7
WORK ACTIVITY (Description): Boring/Well Markouts and Utility Clearance			
DEVELOPMENT TEAM	POSITION/TITLE	REVIEWED BY:	POSITION/TITLE
Chuck Dusel	Project Manager	Peter Gregory, MPH, CSP, STS	ASHEM
Kevin J. McGovern, PG, CPG, CHMM	Plan Preparer/ Sr. Environmental Scientist		
MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE CRITICAL ACTIONS FOR TASK-SPECIFIC REQUIREMENTS)			
<input checked="" type="checkbox"/> REFLECTIVE VEST <input checked="" type="checkbox"/> HARD HAT <input checked="" type="checkbox"/> SAFETY GLASSES <input checked="" type="checkbox"/> PPE CLOTHING Level D with long pants or as required by changing conditions as determined by SSO, ASHEM or RSHEM	<input checked="" type="checkbox"/> SAFETY SHOES Steel-toe <input type="checkbox"/> HEARING PROTECTION ear plugs not required for personnel outside 30-ft safety zone or if operator's vehicle door and window is closed	<input type="checkbox"/> AIR PURIFYING RESPIRATOR required as specified in HASP and determined by SSO, ASHEM or RSHEM	<input checked="" type="checkbox"/> GLOVES nitrile/leather as required by task-specific critical actions of JSA <input checked="" type="checkbox"/> OTHER All PPE must be worn as specified in task-specific critical actions of JSA
JOB STEPS¹	POTENTIAL HAZARDS²	CRITICAL ACTIONS TO MITIGATE HAZARDS³	
Boring/Well Markouts and Utility Clearance	Vehicular traffic	Reflective vests required	
		Use cones or other barricades as necessary	
		Be aware of site traffic patterns. Try and place borings away from heavy traffic routes.	
	Underground Utilities	Contact Dig-Safe	
		Mark utility locations in the field prior to drilling	
		Receive Dig Permit/clearances.	
	Adjacent Site Activities	Coordinate with appropriate personnel and obtain approval for drilling locations	
		Keep aware of any adjacent activities and traffic	
	Spray Paint	Keep can pointed away from face	
		Do not use damaged cans.	
		Wear gloves	
	Slips, Trips and Falls	Wear appropriate PPE (safety glasses/goggles) to prevent flying debris from causing eye or other injuries	
		Proper footwear (work boots required)	
		Personnel shall be vigilant in providing clear footing, clearly identifying obstructions, holes, stick ups, or other tripping hazards and maintaining an awareness of uneven terrain and slippery surfaces.	
	Hand Hazards	The use of cellular telephones (texting, making or receiving calls) is prohibited while walking in work areas.	
		Wear proper gloves for task (nitrile and/or cut-resistant gloves). Tools will be utilized by the intended use only.	
			Keep hands away from moving parts, pinch points and equipment with stored energy.

JOB SAFETY ANALYSIS

URS Corporation NYSDEC, Former Kenwood Cleaners, Schenectady, Schenectady County, NY	DATE 2/2/17	<input checked="" type="checkbox"/> NEW <input type="checkbox"/> REVISED	PAGE 2 of 7
WORK ACTIVITY (Description): Clearing Initial 5 Feet of Boring/Monitoring Well Installation			
DEVELOPMENT TEAM	POSITION/TITLE	REVIEWED BY:	POSITION/TITLE
Chuck Dusel	Project Manager	Peter Gregory, MPH, CSP, STS	ASHEM
Kevin J. McGovern, PG, CPG, CHMM	Plan Preparer/ Sr. Environmental Scientist		
MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE CRITICAL ACTIONS FOR TASK-SPECIFIC REQUIREMENTS)			
<input checked="" type="checkbox"/> REFLECTIVE VEST <input checked="" type="checkbox"/> HARD HAT <input checked="" type="checkbox"/> SAFETY GLASSES <input checked="" type="checkbox"/> PPE CLOTHING Level D with long pants or as required by changing conditions as determined by SSO, OSHER or ASHEM	<input checked="" type="checkbox"/> SAFETY SHOES Steel-toe <input checked="" type="checkbox"/> HEARING PROTECTION ear plugs not required for personnel outside 30-ft safety zone or if operator's vehicle door and window is closed	<input type="checkbox"/> AIR PURIFYING RESPIRATOR required as specified in HASP and determined by SSO, OSHER or ASHEM	<input checked="" type="checkbox"/> GLOVES nitrile/leather as required by task-specific critical actions of JSA <input checked="" type="checkbox"/> OTHER All PPE must be worn as specified in task-specific critical actions of JSA
JOB STEPS¹	POTENTIAL HAZARDS²	CRITICAL ACTIONS TO MITIGATE HAZARDS³	
Using Drum Vac, Compressor, and Air Knife to excavate and hand clear to a depth of 5 feet in a borehole	Vehicular traffic	Reflective vests required	
		Use cones or other barricades as necessary	
		Be aware of site traffic patterns. Try and place borings away from heavy traffic routes.	
	Repetitive Strain/ Motion Injuries	Participate in a "Stretch and Flex" program as part of morning tailgate meetings.	
	Jackhammer and concrete saw	Use metatarsal protective gear and appropriate PPE. Use water during concrete work to mitigate dust.	
	Air Knife	Keep air knife downhole at all times. Use dust mitigation measures and wear appropriate PPE	
	Pinch points/trailers	Use spotter for backup driving and keep hands away from pinch points. Use wheel chocks when stationary.	
	Cold Weather Exposure	Wear appropriate clothing	
		Take frequent warming breaks	
		Drink hot liquids	
	Adjacent Site Activities	Keep aware of any adjacent activities and traffic	
	Equipment failure (i.e. air hose attachments, etc.)	Ensure that whip checks are being inspected before each use.	
		Check all connections to confirm proper fit.	
	Noise (>85 dB)	Hearing protection required.	
	Slips, Trips and Falls	Proper footwear (work boots required)	
Personnel shall be vigilant in providing clear footing, clearly identifying obstructions, holes, stick ups, or other tripping hazards and maintaining an awareness of uneven terrain and slippery surfaces.			
The use of cellular telephones (texting, making or receiving calls) is prohibited while walking in work areas.			
Hand Hazards	Wear proper gloves for task (nitrile and/or cut-resistant gloves). Tools will be utilized by the intended use only.		
	Keep hands away from moving parts, pinch points and equipment with stored energy.		

JOB SAFETY ANALYSIS

URS Corporation NYSDEC, Former Kenwood Cleaners, Schenectady, Schenectady County, NY	DATE 2/2/17	<input checked="" type="checkbox"/> NEW <input type="checkbox"/> REVISED	PAGE 3 of 7
WORK ACTIVITY (Description): Drilling			
DEVELOPMENT TEAM	POSITION/TITLE	REVIEWED BY:	POSITION/TITLE
Chuck Dusel	Project Manager	Peter Gregory, MPH, CSP, STS	ASHEM
Kevin J. McGovern, PG, CPG, CHMM	Plan Preparer/ Sr. Environmental Scientist		
MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE CRITICAL ACTIONS FOR TASK-SPECIFIC REQUIREMENTS)			
<input checked="" type="checkbox"/> REFLECTIVE VEST <input checked="" type="checkbox"/> HARD HAT <input checked="" type="checkbox"/> SAFETY GLASSES <input checked="" type="checkbox"/> PPE CLOTHING Hooded chemical-resistant clothing (coveralls and long-sleeved jacket; coveralls; one or two-piece chemical-splash suit; disposable chemical-resistant coveralls). Uncoated Tyvek® or equivalent.	<input checked="" type="checkbox"/> SAFETY SHOES Steel-toe <input checked="" type="checkbox"/> HEARING PROTECTION ear plugs not required for personnel outside 30-ft safety zone or if operator's vehicle door and window is closed	<input checked="" type="checkbox"/> AIR PURIFYING RESPIRATOR required as specified in HASP and determined by SSO, ASHEM or RSHEM	<input checked="" type="checkbox"/> GLOVES nitrile/leather as required by task-specific critical actions of JSA <input checked="" type="checkbox"/> OTHER All PPE must be worn as specified in task-specific critical actions of JSA
JOB STEPS	POTENTIAL HAZARDS	CRITICAL ACTIONS TO MITIGATE HAZARDS	
Drilling and Monitoring Well Installation (sonic and/or HSA drilling techniques)	Repetitive Strain/ Motion Injuries	Participate in a "Stretch and Flex" program as part of morning tailgate meetings	
	Chemical exposure (dermal)	Wear nitrile gloves and other PPE as necessary.	
	Noise (>85 dB)	Hearing protection required.	
	Heavy Equipment	Avoid blind spots designated by operator.	
		Check back-up alarms	
		Reflective vests required while working near rigs.	
		Wear appropriate PPE (hard hat safety glasses, steel-toed boots)	
	Cold Weather Exposure	Wear appropriate clothing	
		Take frequent warming breaks	
		Drink hot liquids	
	Slips, Trips and Falls	Proper footwear (work boots required)	
		Personnel shall be vigilant in providing clear footing, clearly identifying obstructions, holes, stick ups, or other tripping hazards and maintaining an awareness of uneven terrain and slippery surfaces.	
		The use of cellular telephones (texting, making or receiving calls) is prohibited while walking in work areas.	
	Hand Hazards	Wear proper gloves for task (nitrile and/or cut-resistant gloves). Tools will be utilized by the intended use only.	
Keep hands away from moving parts, pinch points and equipment with stored energy.			

JOB SAFETY ANALYSIS

URS Corporation NYSDEC, Former Kenwood Cleaners, Schenectady, Schenectady County, NY	DATE 2/2/17	<input checked="" type="checkbox"/> NEW <input type="checkbox"/> REVISED	PAGE 4 of 7
WORK ACTIVITY (Description): Soil Sampling			
DEVELOPMENT TEAM	POSITION/TITLE	REVIEWED BY:	POSITION/TITLE
Chuck Dusel	Project Manager	Peter Gregory, MPH, CSP, STS	ASHEM
Kevin J. McGovern, PG, CPG, CHMM	Plan Preparer/ Sr. Environmental Scientist		
MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE CRITICAL ACTIONS FOR TASK-SPECIFIC REQUIREMENTS)			
<input checked="" type="checkbox"/> REFLECTIVE VEST <input checked="" type="checkbox"/> HARD HAT <input checked="" type="checkbox"/> SAFETY GLASSES <input checked="" type="checkbox"/> PPE CLOTHING Hooded chemical-resistant clothing (overalls and long-sleeved jacket; coveralls; one or two-piece chemical-splash suit; disposable chemical-resistant overalls). Uncoated Tyvek® or equivalent.	<input checked="" type="checkbox"/> SAFETY SHOES Steel-toe <input checked="" type="checkbox"/> HEARING PROTECTION ear plugs not required for personnel outside 30-ft safety zone or if operator's vehicle door and window is closed	<input checked="" type="checkbox"/> AIR PURIFYING RESPIRATOR required as specified in HASP and determined by SSO, ASHEM or RSHEM	<input checked="" type="checkbox"/> GLOVES nitrile/leather as required by task-specific critical actions of JSA <input checked="" type="checkbox"/> OTHER All PPE must be worn as specified in task-specific critical actions of JSA
JOB STEPS	POTENTIAL HAZARDS	CRITICAL ACTIONS TO MITIGATE HAZARDS	
Soil Sampling During Drilling	Repetitive Strain/ Motion Injuries	Participate in a "Stretch and Flex" program as part of morning tailgate meetings	
	Chemical exposure (dermal)	Wear nitrile gloves, uncoated Tyvek and other PPE as necessary.	
	Noise (>85 dB)	Hearing protection required. Monitor with sound level meter.	
	Heavy Equipment	Avoid blind spots designated by operator.	
		Check back-up alarms	
		Reflective vests required while working near rigs.	
		Wear appropriate PPE (hard hat safety glasses, steel-toed boots)	
	Cold Weather Exposure	Wear appropriate clothing	
		Take frequent warming breaks	
		Drink hot liquids	
	Slips, Trips and Falls	Proper footwear (work boots required)	
		Personnel shall be vigilant in providing clear footing, clearly identifying obstructions, holes, stick ups, or other tripping hazards and maintaining an awareness of uneven terrain and slippery surfaces.	
The use of cellular telephones (texting, making or receiving calls) is prohibited while walking in work areas.			
Hand Hazards	Wear proper gloves for task (nitrile and/or cut-resistant gloves). Tools will be utilized by the intended use only.		
	Keep hands away from moving parts, pinch points and equipment with stored energy.		

JOB SAFETY ANALYSIS

URS Corporation NYSDEC, Former Kenwood Cleaners, Schenectady, Schenectady County, NY	DATE 2/2/17	<input checked="" type="checkbox"/> NEW <input type="checkbox"/> REVISED	PAGE 5 of 7
WORK ACTIVITY (Description): Well Development, Fluid Level Gauging, Groundwater Monitoring			
DEVELOPMENT TEAM	POSITION/TITLE	REVIEWED BY:	POSITION/TITLE
Chuck Dusel	Project Manager	Peter Gregory, MPH, CSP, STS	ASHEM
Kevin J. McGovern, PG, CPG, CHMM	Plan Preparer/ Sr. Environmental Scientist		
MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE CRITICAL ACTIONS FOR TASK-SPECIFIC REQUIREMENTS)			
<input checked="" type="checkbox"/> REFLECTIVE VEST <input checked="" type="checkbox"/> HARD HAT <input checked="" type="checkbox"/> SAFETY GLASSES <input checked="" type="checkbox"/> PPE CLOTHING Hooded chemical-resistant clothing (overalls and long-sleeved jacket; coveralls; one or two-piece chemical-splash suit; disposable chemical-resistant overalls). Uncoated Tyvek® or equivalent.	<input checked="" type="checkbox"/> SAFETY SHOES Steel-toe <input type="checkbox"/> HEARING PROTECTION ear plugs not required for personnel outside 30-ft safety zone or if operator's vehicle door and window is closed	<input checked="" type="checkbox"/> AIR PURIFYING RESPIRATOR required as specified in HASP and determined by SSO, ASHEM or RSHEM	<input checked="" type="checkbox"/> GLOVES nitrile/leather as required by task-specific critical actions of JSA <input checked="" type="checkbox"/> OTHER All PPE must be worn as specified in task-specific critical actions of JSA
JOB STEPS	POTENTIAL HAZARDS	CRITICAL ACTIONS TO MITIGATE HAZARDS	
Groundwater Sampling	Repetitive Strain/ Motion Injuries	Participate in a "Stretch and Flex" program as part of morning tailgate meetings	
	Chemical exposure (dermal)	Wear nitrile gloves, uncoated Tyvek and other PPE as necessary.	
	Cold Weather Exposure	Wear appropriate clothing	
		Take frequent warming breaks	
		Drink hot liquids	
	Potential Electrical Hazards	If using extension cords and powered sampling equipment, check cords and equipment before use.	
	Injury during lifting	Lift with knees	
		Ask for assistance with heavy objects	
		Keep back straight and do not twist	
	Manage contaminated purge water and materials	Keep generation of excess contaminated purge water and materials to a minimum and manage according to work plan.	
Slips, Trips and Falls	Proper footwear (work boots required)		
	Personnel shall be vigilant in providing clear footing, clearly identifying obstructions, holes, stick ups, or other tripping hazards and maintaining an awareness of uneven terrain and slippery surfaces.		
	The use of cellular telephones (texting, making or receiving calls) is prohibited while walking in work areas.		
Hand Hazards	Wear proper gloves for task (nitrile and/or cut-resistant gloves). Tools will be utilized by the intended use only.		
	Keep hands away from moving parts, pinch points and equipment with stored energy.		

JOB SAFETY ANALYSIS

URS Corporation NYSDEC, Former Kenwood Cleaners, Schenectady, Schenectady County, NY	DATE 2/2/17	<input checked="" type="checkbox"/> NEW <input type="checkbox"/> REVISED	PAGE 6 of 7
WORK ACTIVITY (Description): Decontamination of Equipment			
DEVELOPMENT TEAM	POSITION/TITLE	REVIEWED BY:	POSITION/TITLE
Chuck Dusel	Project Manager	Peter Gregory, MPH, CSP, STS	ASHEM
Kevin J. McGovern, PG, CPG, CHMM	Plan Preparer/ Sr. Environmental Scientist		
MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE CRITICAL ACTIONS FOR TASK-SPECIFIC REQUIREMENTS)			
<input checked="" type="checkbox"/> REFLECTIVE VEST <input checked="" type="checkbox"/> HARD HAT <input checked="" type="checkbox"/> SAFETY GLASSES <input checked="" type="checkbox"/> PPE CLOTHING Hooded chemical-resistant clothing (coveralls and long-sleeved jacket; coveralls; one or two-piece chemical-splash suit; disposable chemical-resistant overalls). Uncoated Tyvek® or equivalent.	<input checked="" type="checkbox"/> SAFETY SHOES Steel-toe <input type="checkbox"/> HEARING PROTECTION ear plugs not required for personnel outside 30-ft safety zone or if operator's vehicle door and window is closed	<input checked="" type="checkbox"/> AIR PURIFYING RESPIRATOR required as specified in HASP Addendum and determined by SSO, ASHEM or RSHEM	<input checked="" type="checkbox"/> GLOVES nitrile/leather as required by task-specific critical actions of JSA <input checked="" type="checkbox"/> OTHER All PPE must be worn as specified in task-specific critical actions of JSA
JOB STEPS	POTENTIAL HAZARDS	CRITICAL ACTIONS TO MITIGATE HAZARDS	
Decontamination of Equipment	Flying debris	Use safety glasses with a face shield and/or goggles	
	Chemical Exposure	Wear appropriate PPE (nitrile gloves, uncoated Tyvek).	
	Noise (>85 dB)	Hearing protection required.	
	Particulates	Implement engineering controls (wetting) if high levels of particulates are created.	
		Use PPE (uncoated Tyvek® coveralls, chemical-resistant overboots, nitrile gloves,	
	Hot water and steam	If pressure washer is used, use goggles and face shield, and gloves. Keep wand pointed away from hands and face and other people.	
Manage debris and wastewater appropriately	Keep debris generation to a minimum if possible. Manage in accordance with work plan.		

JOB SAFETY ANALYSIS

URS Corporation NYSDEC, Former Kenwood Cleaners, Schenectady, Schenectady County, NY	DATE 2/2/17	<input checked="" type="checkbox"/> NEW <input type="checkbox"/> REVISED	PAGE 7 of 7
WORK ACTIVITY (Description): Survey			
DEVELOPMENT TEAM	POSITION/TITLE	REVIEWED BY:	POSITION/TITLE
Chuck Dusel	Project Manager	Peter Gregory, MPH, CSP, STS	ASHEM
Kevin J. McGovern, PG, CPG, CHMM	Plan Preparer/ Sr. Environmental Scientist		
MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE CRITICAL ACTIONS FOR TASK-SPECIFIC REQUIREMENTS)			
<input checked="" type="checkbox"/> REFLECTIVE VEST <input checked="" type="checkbox"/> HARD HAT <input checked="" type="checkbox"/> SAFETY GLASSES <input checked="" type="checkbox"/> PPE CLOTHING Level D with long pants or as required by changing conditions as determined by SSO, ASHEM or RSHEM	<input checked="" type="checkbox"/> SAFETY SHOES Steel-toe <input type="checkbox"/> HEARING PROTECTION ear plugs not required for personnel outside 30-ft safety zone or if operator's vehicle door and window is closed	<input type="checkbox"/> AIR PURIFYING RESPIRATOR required as specified in HASP and determined by SSO, ASHEM or RSHEM	<input checked="" type="checkbox"/> GLOVES nitrile/leather as required by task-specific critical actions of JSA <input checked="" type="checkbox"/> OTHER All PPE must be worn as specified in task-specific critical actions of JSA
JOB STEPS¹	POTENTIAL HAZARDS²	CRITICAL ACTIONS TO MITIGATE HAZARDS³	
Survey well/boring locations, etc.	Repetitive Strain/ Motion Injuries	Participate in a "Stretch and Flex" program as part of morning tailgate meetings	
	Vehicular traffic	Reflective vests required	
		Use cones or other barricades as necessary	
		Be aware of site traffic patterns. Try and place borings away from heavy traffic routes.	
		Coordinate with appropriate personnel	
	Adjacent Site Activities	Keep aware of any adjacent activities and traffic	
	Cold Weather Exposure	Wear appropriate clothing	
		Take frequent warming breaks	
		Drink hot liquids	
	Spray Paint	Keep can pointed away from face	
		Do not use damaged cans.	
		Wear gloves	
		Wear appropriate PPE (safety glasses/goggles) to prevent flying debris from causing eye or other injuries	
	Injury during lifting	Lift with knees	
Ask for assistance with heavy objects			
Keep back straight and do not twist			
Slips, Trips and Falls	Proper footwear (work boots required)		
	Personnel shall be vigilant in providing clear footing, clearly identifying obstructions, holes, stick ups, or other tripping hazards and maintaining an awareness of uneven terrain and slippery surfaces. The use of cellular telephones (texting, making or receiving calls) is prohibited while walking in work areas.		