JSS CONSULTING
Environmental Consulting Services

PIPELINE SPECIALISTS LTD. DIESEL AND NATURAL GAS PIPELINE & BAHAMAS GRID COMPANY LTD. & ISLAND GRID SOLUTIONS LTD. TRANSMISSION AND DISTRIBUTION PROJECT

Environmental Management Plan

Prepared by: JSS Consulting

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Executive Summary

The Pipeline Specialists Ltd. Diesel and Natural Gas Pipeline & Bahamas Grid Company Ltd. & Island Grid Solutions Ltd. Transmission and Distribution Project is located between Clifton Pier and Blue Hills Power Plant on the island of New Providence.

The Client proposes to install one (1) 8” carbon steel diesel pipeline and one (1) 12” carbon steel natural gas pipeline in parallel. Both pipelines will extend approximately 13.5 miles from Clifton Pier to Blue Hills Power Plant. Additionally, improvements are proposed for the Transmission and Distribution grid to connect various transmission lines and substations. Including the installation of overhead lines and replacement of 218 existing wooden poles to 178 steel poles.

This Environmental Management Plan (EMP) has been designed to assist with the Health, Safety, Social and Environmental (HSSE) Policy to ensure that all construction activities are conducted in a manner that results in minimum adverse impacts to the environment. The EMP details mitigation measures that will be employed by management, staff and subcontractors during construction and operation.

1.0 Introduction

1.1 Scope, Purpose and Objective

The Pipeline Specialists Ltd. Diesel and Natural Gas Pipeline & Bahamas Grid Company Ltd. & Island Grid Solutions Ltd. Transmission and Distribution Project Environmental Management Plan (EMP) defines the Environmental Management System measures, work practices and procedures that will be developed and implemented during the building of the Project facilities with the specific objective of ensuring the minimization of environmental impacts during the Contractor's works.

Furthermore, this EMP outlines the specific mitigation measures that will be implemented to eliminate or reduce any adverse environmental impacts associated with the Contractor's and Sub-contractor's activities. Specifically, the purpose of the EMP is to:

- Ensure the contractor and subcontractor(s) commitment to minimize environmental effects.
- Document environmental concerns and implement appropriate protection measures.
- Provide guidance to the Project Management Team regarding procedures for protecting the natural environment and minimizing environmental impacts.
- Provide relevant information and training regarding environmental issues, as and when required.
- Provide a reference to applicable legislative requirements.
- Ensure that the necessary systems are implemented to manage social impacts associated with the Project.
- Maintain health and safety standards on site.

The objective of the Project includes the following:

- Installation of one (1) 12" carbon steel dry natural gas pipeline and one (1) 8" carbon steel Diesel pipeline.
- Improve the existing Transmission and Distribution grid to connect various transmission lines and substations.
    - Installation of approximately 16 miles of overhead lines.
    - Replacement of 218 existing wooden poles approximately 60 feet in height, 22" in diameter, spaced 300 – 350 feet apart and installation of 178 steel poles, approximately 75 feet in height above ground, 30" in diameter, spaced 300 – 400 feet apart.

2.0 Project Description

The proposed location of the Project will extend from Clifton Pier terminal to Blue Hills Power Plant, New Providence. Clifton Pier will be the point of origin for pipeline installations, whereas Blue Hills Power Plant will be the end point. The estimated length of the pipeline is projected to be 13.5 miles from the starting point to the end point.

The 'Pipeline Specialists Ltd. Liquid Natural Gas (LNG) to Power' project adds enormous value to all citizens and residents of New Providence by essentially allowing for a redundant energy source for the entire island, increasing the overall reliability and sustainability of energy, and improving the overall quality of life. The Liquid Natural Gas (LNG) will be transported via barge onto the island and off-loaded to a new LNG Storage and Vaporization facility located at the Clifton Pier Terminal. The LNG will be vaporized at this location to convert LNG from liquid form into dry natural gas, and transport natural gas via pipeline to the Blue Hills Power Plant. The Blue Hills Power Plant will be upgraded with new gas turbines and combined cycle equipment, and the dry natural gas will serve as fuel gas for the plant, generating an additional 200 MW of electric power for the Island.

The proposed location of the Transmission and Distribution grid improvements will extend from Clifton Pier to Blue Hills Power Plant and Big Pond Switching Station. Improvements to the Transmission and Distribution grid will connect various transmission lines and substations together, to create redundancy by adding back-feed/switching capabilities. The Project proposes improvements to five (5) transmission connections and three (3) substations. This will include the installation of approximately 16 miles of overhead lines and the replacement of 218 existing wooden poles approximately 60 feet in height, 22" in diameter, and installation of 178 steel poles, approximately 75 feet in height, 30" in diameter. The spacing from the existing wooden poles will increase from 300 – 350 feet apart to 300 – 400 feet apart for the steel poles.

Additional benefits of the LNG pipeline and construction of electric transmission lines and substations include:

- Safer Means of Transport
    - Shorter and direct routes used to transport material
    - Fewer trucks needed to haul material
- High Energy Density
    - Increase reliability of electrical service
    - Improvement to grid's resiliency against extended storm-related outages
- Low Environmental Impacts
    - Produce fewer emissions
    - Improve air quality
- Economic Benefits

- Job provision
- Lower maintenance cost

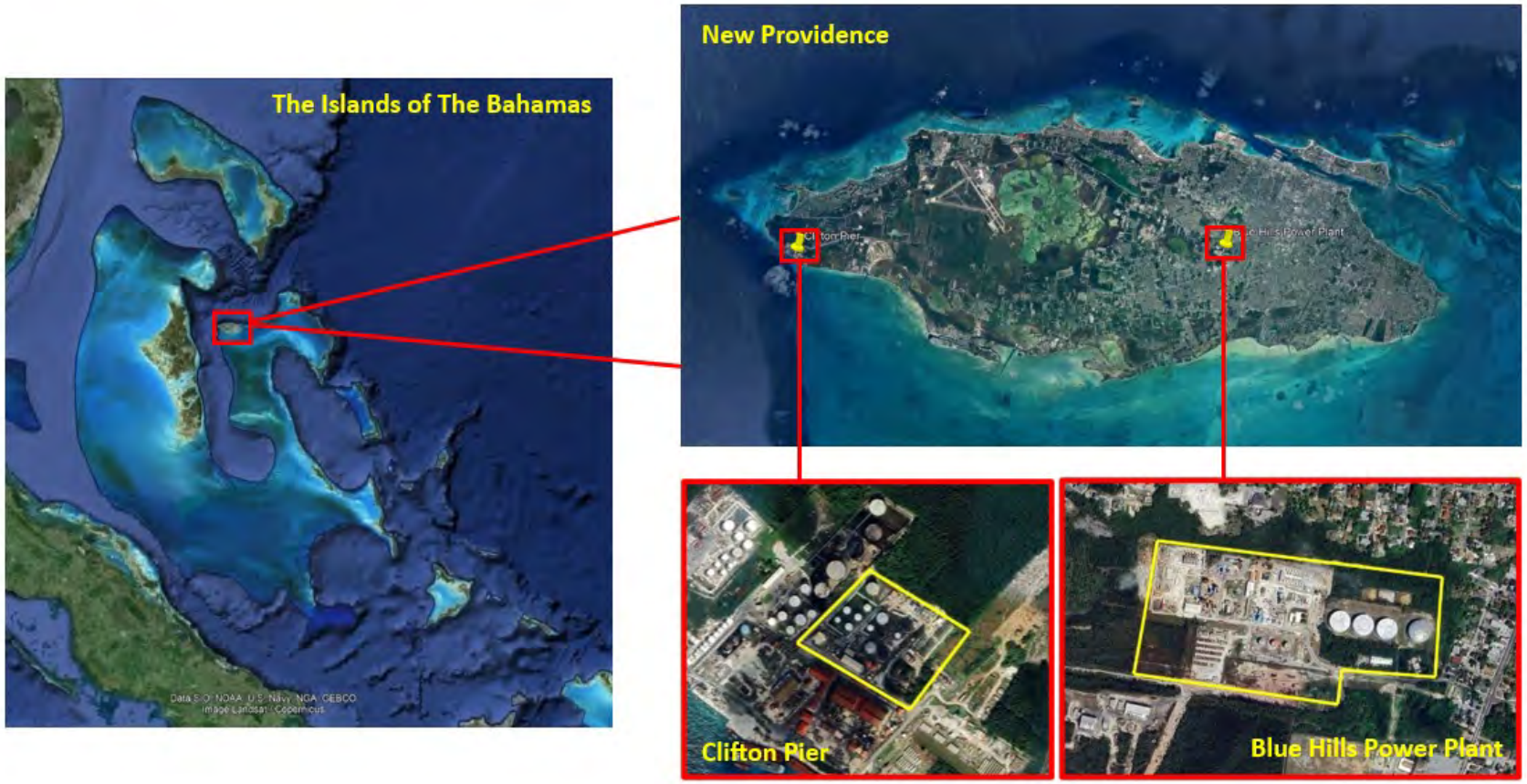


Figure 1: Location Map of Clifton Pier and Blue Hills Power Plant.

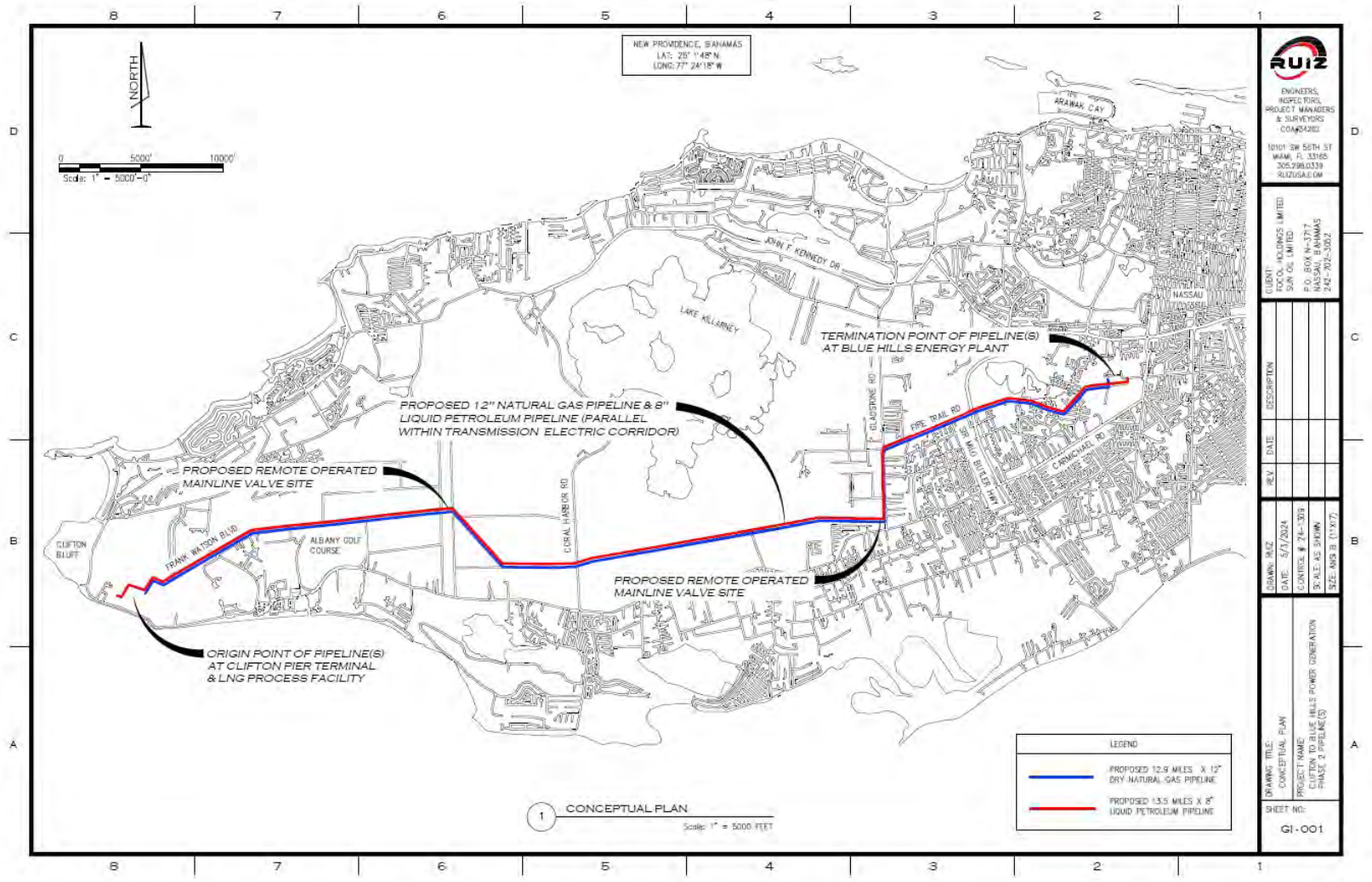

NEW PROVIDENCE, BAHAMAS
LAT: 25° 1' 48" N
LONG: 77° 24' 18" W
NORTH
0 5000' 10000'
Scale: 1" = 5000'-0"
ARAWAK CAY
JOHN F. KENNEDY DR
LAKE KILLARNEY
NASSAU
TERMINATION POINT OF PIPELINE(S)
AT BLUE HILLS ENERGY PLANT
PROPOSED 12" NATURAL GAS PIPELINE & 8"
LIQUID PETROLEUM PIPELINE (PARALLEL
WITHIN TRANSMISSION ELECTRIC CORRIDOR)
GLADSTONE RD
FIRE TRAIL RD
CARMICHAEL RD
SIR MILO BUTLER HWY
PROPOSED REMOTE OPERATED
MAINLINE VALVE SITE
CORAL HARBOR RD
CLIFTON BLUFF
FRANK WATSON BLVD
ALBANY GOLF COURSE
PROPOSED REMOTE OPERATED
MAINLINE VALVE SITE
ORIGIN POINT OF PIPELINE(S)
AT CLIFTON PIER TERMINAL
& LNG PROCESS FACILITY
LEGEND
PROPOSED 12.9 MILES X 12"
DRY NATURAL GAS PIPELINE
PROPOSED 13.5 MILES X 8"
LIQUID PETROLEUM PIPELINE
1 CONCEPTUAL PLAN
Scale: 1" = 5000 FEET
RUIZ
ENGINEERS,
INSPECTORS,
PROJECT MANAGERS
& SURVEYORS
CLIENT:
FOCOL HOLDINGS LIMITED
SUN OIL LIMITED
P.O. BOX N-377
NASSAU, BAHAMAS
242-302-3062
DESCRIPTION
DATE
REV.
DRAWN: RUIZ
DATE: 5/1/2024
CONTROL #: 276-309
SCALE: AS SHOWN
SIZE: ANSI B (11"x17")
DRAWING TITLE:
CONCEPTUAL PLAN
PROJECT NAME:
CLIFTON TO BLUE HILLS POWER GENERATION
PHASE 2 PIPELINE (S)
SHEET NO:
GI-001

Figure 2: Proposed Pipeline Installation Plan

Figure 3: Proposed Transmission and Distribution Modification Plan.

3.0 Existing Site Conditions

3.1 Pipeline Specialists Ltd. Diesel and Natural Gas Pipeline & Bahamas Grid Company Ltd. & Island Grid Solutions Ltd. Transmission and Distribution Project

The proposed site is not inhabited but is near established roadways, agricultural lands, and populated urban areas. Illegal dumping of construction waste materials and derelict vehicles was also observed on the proposed project site (see Photo 1).

Photo 1: Illegal dumping observed on the proposed project site.

The terrestrial site spans 13.5 miles or approximately one hundred and sixty-five (165) acres and contains one (1) terrestrial ecosystem, Interior Upland. There were two (2) vegetation classes observed on the site, Human Altered Environment, and Inland Freshwater Wetland. The site topography can be described as relatively flat, except for pit caves, solution holes, and an eolian ridge (east-west) in the southwestern section of the site (See Photo 2). The ridge runs parallel to the Frank Watson Roadway and continues eastwards for 3.5 miles. Soil type can be described as limestone substrate throughout the proposed project site. Vegetation growth can be described as secondary growth due to disturbance by human activity.


Photo 2: Eolian ridge and pit cave observed on the project site.

3.2 Transmission and Distribution Grid Improvement – Powerline Extension

The BPL Powerline Extension project is a 1.7-mile proposed powerline extension between Blue Hills and the Tucker Road Power Stations. There were no structures observed within the proposed site. However, vagrants/squatters in addition to subsistence farming, and illegal dumping (construction waste and derelict vehicles) were observed in certain areas of the site. The site starts on an east-west eolian ridge and progresses north through the old swash system of Big Pond National Park.

3.2.1 Habitat Description

The terrestrial spans 1.7 miles and contains one (1) terrestrial ecosystem, an interior upland. There were two (2) vegetation classes observed within the proposed site, a Dry Broadleaf Evergreen Forest, and a Human-altered Environment. Vegetation growth throughout the site can be described as secondary growth.

The dry broadleaf evergreen forest that exists on the project site is a *Bursera simarouba-Lysosome latisiliquum-Sideroxylon salicifolium* Forest Alliance (see Photo 3). It consists of species such as *Swietenia mahoganii* (West Indian Mahogany), and *Ardisia escallionides* (Marlberry). Avifauna such as *Myiarchus sagrae lucaysiensis* (La Sagra's Flycatcher), and *Setophaga ruticilla* (American Redstart) were observed in this vegetation class.

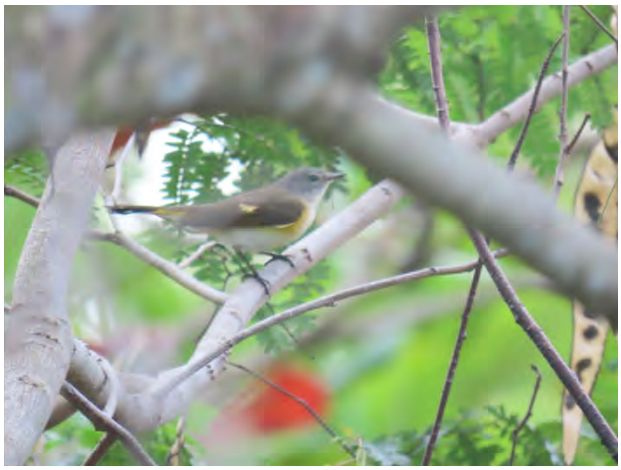



Photo 2: Left – *Bursera simarouba-Lysiloma latisiliquum-Sideroxylon salicifolium* Forest Alliance; Right – *Setophaga ruticilla* (American Redstart) in a *Lysiloma latisiliquum* (Wild Tamarind).

Three (3) dominant human-altered environments exist on the project site, paved & unpaved roads, manicured landscapes, and a *Megathyrus maximus-Schinus terebinthifolius-Sporobulus domingensis* Shrubland Alliance. The manicured landscapes exist along paved roads and on the borders of commercial and residential properties and consist of horticultural species such as *Bauhinia variegata* (Poor Man's Orchid) and agricultural species such as *Magnifera indica* (Mango). A *Megathyrus maximus-Schinus terebinthifolius-Sporobulus domingensis* Shrubland Alliance dominates the northern portion of the site and would have originally been a part of the swash system of Big Pond (see Photo 5). It contains wetland species such as *Typha domingensis* (Cattail) and *Sporobulus virginicus* (Seashore Rush Grass). Avifauna such as *Setophaga tigrina* (Cape May Warbler) and *Crotophaga ani* (Smooth-billed Ani) were observed in this vegetation class.


Photo 3: Left – Manicured Landscape; Right – *Setophaga tigrina* (Cape May Warbler) in *a Bauhinia variegata* (Poor Man's Orchid).


Photo 4: Left – *Megathyrus maximus-Schinus terebinthifolius-Sporobulus domingensis* Shrubland Alliance; Right – *Crotophaga Ani* (Smooth-billed Ani) on illegally dumped mattress.

4.0 Laws, Regulations and Requirements

The Contractor will be required to utilize accepted regulatory standards as a minimum to protect the environment, the health and safety of all personnel (Contractor, Sub-contractors and third parties) working on the Project, and any others who may be affected by the Project activities.

4.1 National Environmental Laws and Regulations Applicable to The Bahamas

Table 1: National Laws and Regulations of The Bahamas

Act Title	Year Enacted	Comments
Environmental Health Services Act	1987	This act develops regulations that limit the amount of air pollution permitted
The Environmental Planning and Protection bill	2019	Provides a framework to regulate, prevent, and control air, soil, and water pollution.

Water & Sewerage Corporation Act	1976	Provides regulatory framework for the management of water resources in The Bahamas.
Environmental Health Services Act	1987	Provides the framework for environmental regulations that will ensure compliance for The Project. The Act authorized the Department of Environmental and Health Services (DEHS) to develop regulations that prevent and control air pollution, soil contamination and preserve water quality.
Wild Animals Protection Act	1968	Prohibits the taking, capturing or hunting of any animal without a permit.
Wild Birds Protection Act	1952	Prohibits the taking, capturing or hunting of any animal without a permit. Protects birds and eggs during closed season.
Plants Protection Act	1916	Relates to plant disease and controls importation of plants to prevent outbreaks of exotic disease and establishment of unwanted species.

Conservation and Protection of the Physical Landscape of The Bahamas Act	1997	Protects physical landscape from environmental degradation, flooding and removal of hills; regulates filling of wetlands, drainage basins or ponds; prohibits digging or removing sand from beaches and sand dunes; and prevents harvesting or removing protected trees. In order to perform activities that may affect the physical landscape of The Bahamas, permits must be obtained for these activities. The Department of Physical Planning issues the permits and enforces the regulations.
Disaster Preparedness Response Act	2006	This Act provides for a more effective organization of the mitigation of, preparedness for, response to and recovery from emergencies and disasters.
Ministry of the Environment Act	2019	This Act establishes the Ministry of the Environment to oversee the integrity of the environment of The Bahamas, to make the minister responsible therefore a corporation sole, to establish the

		environmental administration fund and the environmental trust fund and for matters connected thereto.
Health and Safety at Work Act	2002	This act provides the framework to ensure a healthy and safe work environment. It outlines how employers and employees should conduct themselves.
Environmental Impact Assessment Regulations,	2020	To provide procedures for a Certificate of Environmental Clearance (CEC). The Regulations provide procedures for the review of proposed projects inclusive of monitoring and compliance requirements. The Regulations dictate the requirements for a Certificate of Environmental Compliance (CEC).
The Merchant Shipping (Oil Pollution) Act	1976	The Act provides for the proper registration of ships, the control, regulation and orderly development of merchant shipping in The Bahamas, proper qualification of seamen and regulation of employment conditions for seamen.

		These provisions advocate ship safety and competency which prevent shipping accidents that can be detrimental to the marine environment as well as human casualties.
Natural Gas Act	2024	Regulates the import, storage, transport, and retail of natural gas, establishes licensing for facilities and terminals, and sets safety standards. The Utilities Regulation and Competition Authority (URCA) oversees compliance, issues licenses, monitors activities, and protects consumer interests to ensure efficient, safe, and sustainable operation of the natural gas industry in The Bahamas.

4.2 National Environmental Policies of The Bahamas

Table 2: National Environmental Policies of the Bahamas

Relevant National	**Subject**	**Summary**
National Policy for the Adaptation to Climate Change 2005	Climate change assessment for the immediate and project adaptation techniques for The Bahamas.	The National Policy for the Adaptation to Climate Change outlines a national framework to meet the goals and objectives of the United Nations Framework

		Convention on Climate Change (UNFCC). The Bahamas is committed to reduce greenhouse gases and address climate change impacts.
National Invasive Species Strategy for The Bahamas, 2013	Identifies and recommends a management framework for the control and eradication of invasive species.	The National Invasive Species Strategy for The Bahamas originally published in 2003, was updated in 2013 as part of the Global Environment Facility funded project, Mitigating the Threats of Invasive Alien Species in the Insular Caribbean (MITIASIC). It sets forth a management framework for the control and eradication of invasive species.
National Biodiversity Strategy and Action Plan, 1999	A plan to maintain biodiversity through sustainable development for a small island developing nation.	The Bahamas Government is committed to conserve biodiversity and to pursue sustainable development. This document highlights the role of biodiversity in the Bahamian social and environmental context and recommends measures to ensure its compatibility with future development.

4.3 ISO 1400

The ISO 14000 is a set of industry standards that provide practical tools for companies and organizations of all kinds looking to manage their environmental responsibilities.

ISO 14001:2015 and its supporting standards such as ISO 14006:2011 focus on environmental systems to achieve this. The other standards in the family focus on specific approaches such as

audits, communications, labeling and life cycle analysis, as well as environmental challenges such as climate change.

4.4 Occupational Safety and Health Administration (OSHA)

In the absence of specific health and safety construction regulations, Contractors should adhere to the Occupational Safety and Health Administration (OSHA) regulations. OSHA is an agency of the United States Department of Labor. OSHA's mission is to "assure safe and healthy working conditions for working men and women by setting and enforcing standards and by providing training, outreach, education and assistance". The agency is also charged with enforcing a variety of whistleblower statutes and regulations. OSHA's workplace safety inspections have been shown to reduce injury rates and injury costs without adverse effects to employment, sales, credit ratings, or firm survival. Regulations such as the use of Personal Protective Equipment (PPE), housekeeping, safety training and education, fall protection and working in confined space etc.

5.0 Government Departments

All Government departments that will be involved with aspects of approval and permitting of this project include:

Ministry of Public Works

The Ministry of Public Works maintains physical infrastructure in the country.

Department of Physical Planning

The Department of Physical Planning will authorize and provide permits for activities such as dredging, filling, harvesting and removal of protected trees, roadworks, and any work that will affect coastlines.

Department of Environmental Planning and Protection (DEPP)

The Department of Environmental Planning and Protection will review and approve the Environmental Management Plan (EMP) for the Project. Environmental reports will be submitted to DEPP monthly.

Forestry Unit

The Forestry Unit will authorize and provide permits for harvesting and removal of protected trees.

6.0 Environmental Management Framework

This EMP and associated environmental documentation will be maintained and updated throughout the duration of the construction. Revisions to this document will be performed if:

- New project design parameters or construction methodologies are approved and introduced that could change the environmental impact or mitigation measures.
- Changing environmental requirements, commitments, or conditions by Local Authorities as a result of incidents and deviations.

The Client has not been required to develop this plan for construction but to ensure environmental compliance it was completed and will be implemented by the Contractor and Environmental Manager.

6.1 Construction Management

The role of the Client is to ensure that environmental compliance is implemented by the Contractor and Environmental Manager (EM) during construction. The Contractor will ensure that all environmental requirements stipulated in the EMP are brought to the attention of the Sub-contractors and service providers, as it relates to their work, and ensure that they are in compliance.

The role of the EM is to track environmental inspections conducted by the Environmental Monitor (EMO), including potential hazards. The EM has authorization to stop construction operations as a result of environmental issues and will enforce all hold points. The EM will communicate daily with the EMO to ensure that environmental measures are implemented prior to the commencement of work. Monthly site visits will be conducted with special oversight of construction in environmentally sensitive areas.

The Project Manager (PM) will ensure that all environmental requirements stipulated in the plan are brought to the attention of the Sub-contractors and service providers, as it relates to their work, and ensure that they are in compliance.

The EMO role will be conducting daily inspections and ensuring that all environmental measures are implemented.

Resumes for the EM and EMO are to be submitted to DEPP for approval prior to the start of renovation.

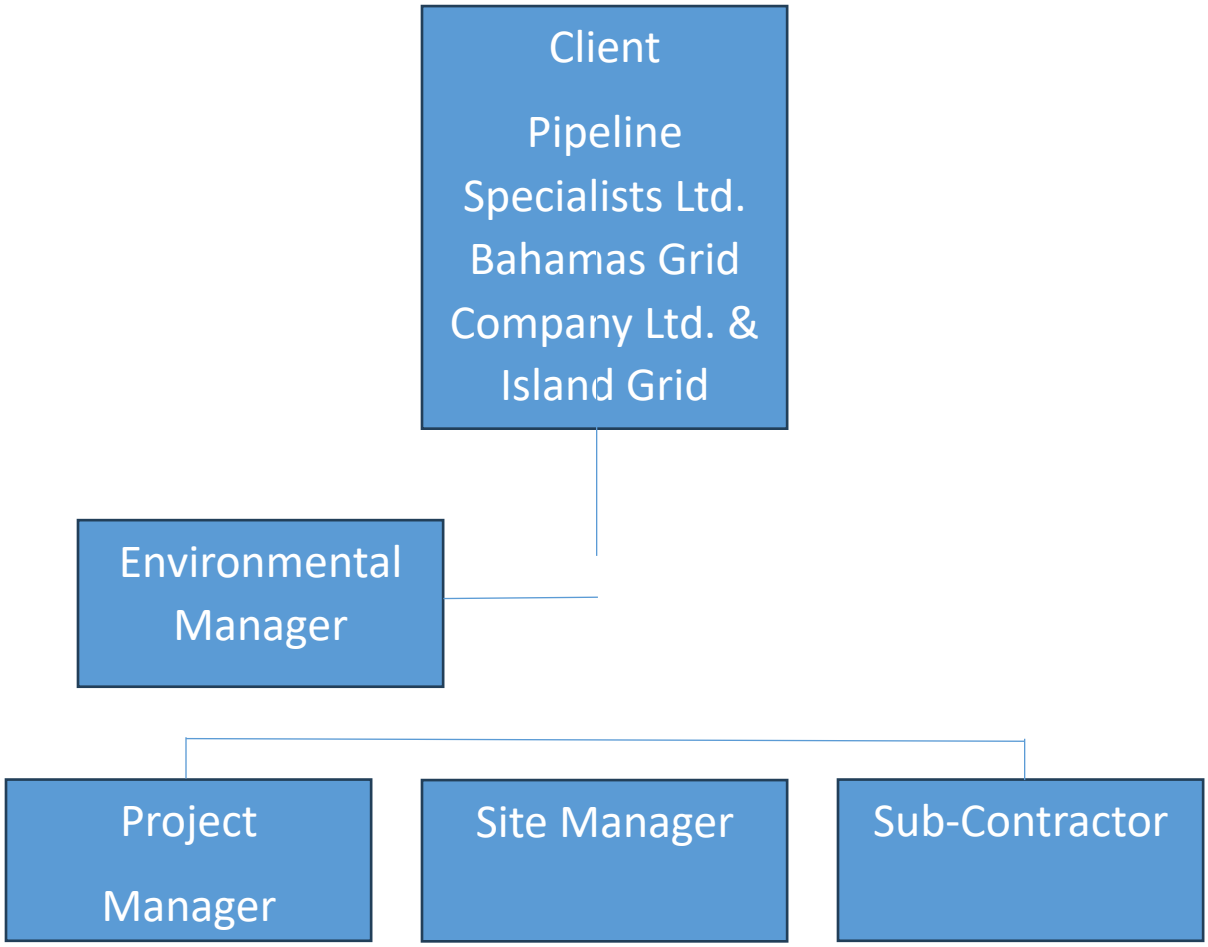


Figure 4: Environmental Management Framework.

7.0 Environmental Management Tools

The environmental management tools below will be used as a part of the overall environmental management system to avoid, reduce, or mitigate environmental impacts associated with construction activities:

7.1 Site Inspections

Site inspections are a review of crucial parts of the works, ensuring that the works progress as intended, both in terms of quality and compliance. The site inspections will be conducted by the EM using the site monitoring checklist and in compliance with the EMP. Site inspections will occur monthly or as needed for emergencies. The site inspections may include the following:

- Site Safety and Health Materials
- Solid/Hazardous Waste Management.
- Dust & Air Pollution.
- Noise Monitoring.
- Environmental Control Measures – checks of items such as safety, dust, and noise pollution.

These are to be performed daily. DEPP will determine the frequency of inspections. DEPP is invited to attend inspections and inspections may be conducted upon their request. Records of inspections will be available to all parties. Inspections will also be done after intense or prolonged inclement weather.

7.2 Reports and Communications

The following reports should be submitted to the Client for review:

- **Site Reports** - prepared regularly during the construction phase and issued to the Client.
- **Incident Reports** - reports accidents and dangerous occurrences during that month.
- **Monthly Environmental Reports** – reports the environmental standards on site and addresses any environmental concerns.
- **Daily Environmental Checklists** - electronic daily reports will be provided and included in the monthly reports for the duration of construction.
- **Complaints Received** – any grievances and responses received during this period.

7.3 Incident Reports

In the case of incidents, all aspects of the incident are to be addressed and entered to the relevant logs for appropriate review (See Appendix B-1: Incident Report Form). The PM is to be notified of any incident with actual or potential site impacts on the community or the biophysical environment immediately. The PM will inform the EM and Client who will make an assessment, determine any actions to be taken, followed by a detailed report and measures to mitigate against any further occurrence.

7.4 Checklist of Environmental Stipulations

The Contractor, further to the above items will use the following as a guide for general execution of the works:

- There shall be clear demarcation of the extent of Contractor's work site(s) including the limit of works.
- Health and safety equipment (including protective clothing and boots) shall be available and in use. First aid kits and fire extinguishers will be mandatory.
- Refueling and mechanic sites are lined and bunded to confine and mitigate the effects of spillage and will be protected from rainwater.
- Discharge of dust and fumes shall be minimized by constant wetting of loose material and maintenance of machinery on site.
- Noise abatement on construction sites shall minimize avoidable inconvenience to local populations.
- Dump trucks shall be equipped with tarpaulins or similar devices to prevent material spillage, and roads will be kept clean of mud and construction debris.
- There will be no disposal of non-biodegradable materials on site and all spoils will be removed to the New Providence Ecology Park (NPEP).
- Used oils shall be containerized and transported with other scrap equipment to an approved facility.
- There shall be NO burning of waste on site.
- The Contractor shall remove all construction equipment and scrap waste from the site on completion.
- The Worker's Code of Conduct (see Appendix F: Workers Code of Conduct) will be upheld at all times on the Project site.
- Access to workers' grievance mechanism.

7.5 Documentation

All method statements (step-by-step procedure detailing how the contract works may be carried out) and other relevant documents are to be reviewed by the EM prior to the execution of works to ensure that all social mitigation measures are considered.

All documentation relative to and including this EMP will be maintained at the site office for the duration of the Project. Reference documentation which includes contract documents, Contractor's plans, listed and associated records, reports, permits, procedures, and site

instructions to be maintained for viewing by all parties of the Project. Any relative documentation will be available electronically.

7.6 Meetings

Periodic meetings should be held that include necessary parties, to discuss ongoing, upcoming works, or any issues incurred during works to ensure proper communication.

7.7 Environmental and Safety Training

Training of **ALL** site workers will be conducted by the Contractor and the Client to include Site Induction and Toolbox Talks. All workers are to undergo the Site Induction and Toolbox Talks should be conducted on a weekly basis. The training should ensure that all employees understand their obligation to exercise due diligence for environmental matters including:

- Familiarization with the requirements of the EMP (summary of the EMP and all associated management plans).
- Environmental/accident emergency response training (outlining potential environmental emergencies and relevant contacts and response procedures), including spill management/response procedures.
- Familiarization with site environmental controls (bunded areas, spill kit locations etc.).
- Monitoring programs.
- Site signage will be erected as needed to display messages on site to alert personnel of surrounding works and/or hazards.
- Training will also include the code of conduct, with an emphasis on gender-based violence and sexual harassment, as well as the existence of the Grievance Mechanism for workers.

7.8 Construction Methodology

Construction works are expected in the third quarter of 2024. The contractor will be required to provide method statements for installation works prior to commencement of works. Construction methods will also be employed to minimize or mitigate impacts on the environment.

7.8.1 Method Statement

The Method Statement is specifically for “Phase 2” of the Pipeline Specialists Ltd. LNG TO POWER project, related specifically to the pipeline (see Appendix A: LNG TO POWER – PHASE 2 Method Statement and Transmission and Distribution Scope of Work). Phase 2 essentially calls for the installation of approximately 13.5 miles of a new 12” carbon steel dry natural gas pipeline. In

addition, the Project will include approximately 13 miles of a new 8" carbon steel liquid petroleum (Diesel) pipeline in parallel.

The proposed location and layout of the Work Site is shown in Figure 2. The site layout is indicative only and may be adjusted by the contractor during the construction process. The construction of the site will take up to thirty (30) weeks dependent on weather conditions.

7.8.2 Proposed Works

All work is to be completed in accordance with the Ministry of Works and the manufacturer's specification. The proposed works are as follows:

- Installation of one (1) 12" carbon steel dry natural gas pipeline and one (1) 8" carbon steel Diesel pipeline in parallel
- Improvement to the existing Transmission and Distribution grid to connect various transmission lines and substations.
    - Installation of approximately 16 miles of overhead lines.
    - Replacement of 218 existing wooden poles approximately 60 feet in height, 22" in diameter, spaced 300 – 350 feet apart and installation of 178 steel poles, approximately 75 feet in height above ground, 30" in diameter, spaced 300 – 400 feet apart.
- Earthworks

Consideration has been given to the types of heavy equipment that are expected to be used during the construction works. The standard equipment to be used is listed below. The equipment to be used depends on maximizing the efficiency of the works.

- Excavator
- Pipelayer
- Drill Rig
- Grader
- Roller
- Front End Loader
- Dump Truck
- Construction of Substations

Due to the large scope of works, the construction workforce will be maximized.

Contractors will be engaged to undertake the construction activities. These contractors will be housed in the local area, and as such, no construction camp sites will be developed for construction activities.

8.0 Environmental Impacts

There are minimal long-term negative impacts expected to the natural resources in the area. Construction will be closely monitored to prevent over clearing or contamination of the adjacent terrestrial habitats. The Contractor is also required to adhere to the guidelines established in this document, as listed in the sections of the EMP below.

Generally, the potential environmental issues associated with the Project include the following:

- Loss of Terrestrial Habitat
- Water Quality
- Air, Dust, and Noise Pollution
- Fuel, Waste Oil, or Chemical Spills.
- Waste Management
- Sewage and Refuse Disposal
- Introduction of Airborne Hazardous Materials

The Contractor will take particular care to avoid unnecessary disturbance or damage to the environment and will correct any condition which has resulted from the Contractor's operations, and which constitutes, or which may result in, unnecessary damage or disturbance to property and the environment.

9.0 Register of Significant Aspects and Impacts

Environmental impacts of the Project are impacts to the natural communities and wildlife in the area that can be reasonably inferred, considering the footprint of impacts, and known habitats on-site. Other expected impacts are those related to normal construction and operation such as waste generation and disposal, fueling, use of potentially hazardous materials as well as other accidents or malfunctions, which may entail an environmental component. The Register of Significant Impacts considers potential impacts that may be due to construction activities. The Register will be used in the development of method statements to proactively manage and mitigate potential impacts pertaining to the Project. The Register of Significant Aspects and Impacts evaluates the potential impacts and assigns risk and magnitude scores. Risk Scores measure the likelihood of the impact occurring and are measured on a scale of 1-10 with 1 being unlikely to occur and 10 being highly likely to occur. Magnitude scores measure the scale of the impact, if it occurs. Magnitude ranges are parameters Low, Medium, and High. Low Impact refers to short-term localized impact reversible in 1 year. Medium Impact refers to moderate term implications reversible in a 5-year period. High Impact refers to long term impacts that are not reversible within 5 to 10 years or are irreversible.

Table 3: Register of Significant Aspects and Impacts

Significant Aspect and Impact	**Activity**	**Potential Impact**	**Environmental Management Strategy**	**Risk Score**	**Magnitude Score**
CONSTRUCTION PHASE					
Ecosystem and Biodiversity	Clearing	Habitat and wildlife destruction	*Site works conducted in human altered areas. *Site clearing will be limited, and limits of work identified prior to commencement of works. *All invasive species to be removed. *Prior communication to ensure that clearing is within the limits. *HDD limits extensive land clearing.	6	High

			*Steel pole installations will follow existing pathways. *Approximately 0.22 miles of clearing for new transmission is required. *Bushfires during dry seasons.		
Ground Water Quality	Heavy Equipment and Hazardous Waste	Fuel spills. Introduction of Hazardous substances into groundwater. Hazardous substances may include sediment, wastewater, lubricants, fuels, and hydraulic fluids.	*Implement the fuel spill prevention and cleanup plan. *Sediment and erosion control methods will be in place prior to and during construction. *Fuel storage will be limited to an area that is away from the trenches and prepared with impermeable material to contain any spills. *No refueling operations near wetlands or open water sources.	6	High
Ground Water Quality	Utility Installation	Flooding Damage to Existing Foreign Utilities Sedimentation	*Dewatering operations to be discharged into temporary retention basins or exfiltration trenches. *HDD trenchless methods to minimize disturbances. *Pipeline to be installed a minimum of 3 to 4 feet.	8	High

			*The welded joints are sandblasted and coated along the entire pipeline to prevent corrosion. * Silt fencing to be installed in front of wetlands and national parks to prevent contamination or pollution by surface run-off. * Clearing methods will include shearing the trees to ground level and leaving the root mats intact to minimize soil disturbance. *Work in close coordination with foreign utility owners. *A minimum of one (1) laborer with operator qualifications per construction crew required.		
Air Quality	Excavation	Dust Plant die back Worker's health and safety	*Use of dust masks. *Watering excavation sites. *Fill material to be reused for backfilling after pipeline is installed. *Excavation limited to foundation construction *Dump trucks moving loose material will be covered with tarpaulins.	7	Medium
Noise Pollution	Excavation and all construction activities	Sound intensity	*Avoid usage of machines/equipment with extra noise. *Ensure that equipment is properly maintained to decrease noise emissions.	5	Low

			*Idling will be kept to a minimum. Machines/equipment not in use for prolonged periods must be turned off. *Contractor grievance mechanism		
Solid Waste	Construction Activities	Increase of solid and hazardous waste	*Solid waste will be collected at least twice per week. *Waste will be transported to NPEP for proper disposal. *Excavated material will be reused in construction. *Hazardous waste to be stored correctly and disposed of by a licensed contractor.	8	Medium
Solid Waste	Clearing	Vegetative Waste	*Materials to be disposed of at NPEP.	6	High
Sewage and Refuse Disposal	Installation of Portable Potties	Water Quality	*Portable toilets and handwashing stations will be used during construction. *Portable potties will be secured to prevent falling over. *There should be one toilet for every 10 staff and separate facilities for men and women on site. *Facilities to be stationed away from trench.	5	Medium

			*Sewerage to be collected by a licensed contractor.		
Safety for the Workers and the Public	All site works	Accidents and Injuries	*The mandatory use of PPE (helmets, safety belts, masks, gloves, and boots) by workers depending on the nature of work. *All workers are familiar with site emergency response plans and safety procedures. *Workers familiar with material handling procedures. *First responders identified and present on site.	10	High
Traffic and Transport	Utility Installation	Traffic Accidents at Trench	*Trenches are left open for no longer than 24 hours between trenching and pipe laying. Once the pipelaying is completed, trenches are backfilled. During the exposure time the trenches are surrounded by reflective cones. *HDD trenchless method will be used to minimize disturbances to sensitive environmental areas, thoroughfares and driveways. *No road closure is needed for pipeline installation. *Most pipeline installations occur on the side of roadways. *Advanced warning signs to be used during construction.	3	Low

OPERATIONAL PHASE					
Air Quality	Operation Activities	Pollution Leak in Pipeline Worker's health and safety	*Odorant will be added to ensure that any potential leak can be detected. *Natural gas is lighter than air and will follow the path of least resistance. Natural gas will safely dissipate in the atmosphere. *Implement monitoring and control systems for pipelines. *The mandatory use of PPE (hardhats, safety glasses, ear protection, leather work gloves, work boots, harness, lanyards, respirators, etc.) *Pipeline markers are installed to raise awareness of the pipeline's presence.	6	High
Groundwater Quality	Operation Activities	Leak in Pipeline Worker's health and safety	*Implement a Spill Response. *Spill kits to be positioned at designated areas adjacent to fuel storage areas. *Implement monitoring and control systems for pipelines. *Substance will be transported as dry natural gas in pipeline. If a leak should occur, the dry natural gas pass through the soil and rise into the atmosphere until it safely dissipates. *Workers to be trained in spill response.	6	High

			*Workers to be dressed in PPE (thermal protective clothing, safety goggles, thermal leather water resistant gloves and respiratory protection). *Pipeline markers are installed to raise awareness of the pipeline's presence.		
Ecosystem and Biodiversity	Operation Activities	Habitat and wildlife destruction Pipeline Explosion or Fire Worker's health and safety	*Bushfires during dry seasons. *Periodic clearing of underbrush during maintenance. *Overhead power lines can result in injury or death to avian species as a result of collision. * Fire Control Plan. *Emergency Response Plan. *Implement monitoring and control systems for pipelines *Trained personnel response to fire and explosions response.	6	High

10.0 Environmental Impacts and Mitigation

10.1 Physical Environmental Impacts

10.1.1 Ground Water Quality

Construction activities can result in potential contamination impacts as a result of petrochemical from heavy equipment and hazardous chemical spills. Trenching for pipeline installation can create pathways for potential pollutants to migrate into groundwater and can lead to contamination.

Mitigating potential impacts to groundwater quality is crucial for the construction phase of the Project due to the site's proximity to natural water bodies, including the Harold and Wilson Ponds National Park. The Project footprint does not fall within the boundary of the National Parks. However, during construction, silt fencing will be installed in front of wetlands and national parks to prevent contamination or pollution by surface run-off. During construction the pipeline will be installed at a minimum of three feet (3 ft) to four feet (4 ft) and will minimize disturbance to the water tables. To mitigate spill concerns, potential sources of releases will be identified prior to commencement. Fuel storage will be limited to designated areas with impermeable containment and refueling operations will be conducted away from water bodies. Heavy equipment will be regularly maintained, with a schedule and log to ensure immediate repair of leaks. In the event of a spill, the Fuel Spill Prevention Plan (see Appendix D: Fuel Spill Prevention Plan) will be implemented.

Negative impacts on groundwater quality may arise from dewatering during utility trenching and stockpile erosion. Dewatering for utility trenching will involve careful excavation, with water pumped away from vegetation, open water bodies, and exposed groundwater. This process will be managed through temporary retention basins or exfiltration trenches. To minimize disturbances, horizontal directional drilling (HDD) a form of trenchless method will be used.

Activities during the operational phase also pose an incredible risk to groundwater quality due to prospective pipeline leaks. As a result, both a Spill Response Plan as well as monitoring and control systems for the pipeline will be implemented.

10.1.2 Flooding

Flooding is highly likely on the site due to its urban surroundings and low-lying location. Construction activities, such as utility installation, can increase flooding risks but can be managed through dewatering and HDD trenchless operations. For construction with high groundwater concerns, large volume trash pumps will direct dewatered effluent into sediment control devices to slow velocity and manage erosion. Discharge points will be evaluated throughout the construction phase, typically into temporary retention basins or exfiltration trenches with high volume rates potentially directed to deep injection wells. Excavation and dewatering near existing

structures will require foundation reinforcement and soil improvements to maintain structural integrity and safety, following OSHA section 1926.651 guidelines.

10.1.3 Air Pollution

The construction activities will be extensive, and as a result dust will accumulate regularly on site in work areas. This dust will be a hazard to human health and can cause eye irritation and respiratory issues. The surrounding vegetation will be affected as well, with dust coating the leaves and produce. To reduce the impact of dust, the following activities should be implemented:

- Clearing should only include the footprint needed for the construction of the site.
- Water is to be used as a dust retardant as needed.
- Screening and fencing should be used to reduce wind, improve aesthetics, and mark the limit of works.
- The use of Proper Protective Equipment (PPE) including dust masks and eyewear/safety glasses.
- Dump trucks moving loose material are to be covered with tarpaulins.

10.1.4 Noise Pollution

The Project construction activities will increase the level of noise that will affect nearby businesses and residences. The general rule shall be that construction operations be restricted to daylight hours between 0700 hrs. and 1900 hrs. Any reason to work outside these hours to increase the progress of works, local communities will be given advance notice, and specific requests will be reasonably accommodated. Any high noise activities will be coordinated with surrounding businesses and communities, when possible, to limit disturbances.

10.2 Natural Environment Impacts

10.2.1 Impacts on Vegetation

During the construction and operational phase, impacts to vegetation will be limited because site works will be conducted in human altered areas. To mitigate the loss of the vegetation ecosystem and protected species, construction activities should be limited to the proposed structural footprint of the Project. The HDD method will be used to minimize disturbances to environmentally sensitive areas. Additionally, all areas disturbed during construction will be restored to their original state or as close to it as physically possible. Native vegetation that falls outside of the area required for the development and utilities should be left intact.

Protected species within the Project area should be carefully removed and transplanted. Permits for removal and transplantation should be obtained from the Forestry Unit before

commencement of any work. Additionally, most of the protected trees were observed outside of the construction footprint, thus limiting damage to the vegetation.

10.2.2 Wildlife Impacts and Management

Transmitting over long distances along power lines can result in higher mortality risks to birds. Additionally, it can create electrocution and collision risks to certain avian species. Some birds are more susceptible to collide than others, especially species with small wings but relatively large bodies and birds that fly in flock patterns. To mitigate these impacts, the modification of various transmission lines and poles into a single pole-line to limit impacts.

During the construction phase as well as the operational phase, great effort should be placed on observing the presence and management of all wildlife on site. The following actions should be implemented to ensure management of wildlife present on the site:

- All Site Inductions will include guidance on how to deal with wildlife encounters, including any species at risk that may be present, and arrangements for dealing with injured or orphaned wildlife. This guidance should be summarized in a handout suitable for quick reference by on-site staff and be available in areas that all employees on site will have access to.
- Prior to clearing vegetation, the EM or wildlife specialist will schedule inspections for wildlife, installation of protective fencing, pre-stressing, and onsite briefings for Contractors.
- Areas of retained vegetation should be identified and clearly marked with fencing and signage.
- A site map should identify areas prone to wildlife appearance and areas that should be avoided, if possible, to prevent disturbance of habitat.
- Clearing pathways for greenspaces are to be cleared manually and not by heavy equipment.

10.2.3 Solid Waste

The site is located from Western to Central New Providence with an organized and managed waste management system located at New Providence Ecology Park (NPEP). The Project should seek to reduce the production of waste and recycle material as much as possible. Waste bins should be provided and secured on site and emptied on a weekly basis.

There is the potential for hazardous waste impacts associated with the construction and operational phases. All equipment and hazardous material will be stored in designated locations to reduce the risk of spills and pollution events. All hazardous waste should be disposed of by licensed contractors and according to DEHS protocol. Waste tickets should be collected when hazardous waste is disposed of (see Appendix B-2: Hazardous Waste Report Form).

Vegetative waste will be created during the renovation of the site. The use of invasive species in mulch will promote the spread of seedlings throughout the site and should be disposed of according to the Invasive Species Management Plan (see Appendix C: Invasive Species Management Plan). The trees may be carefully cut down and treated with herbicide, removed manually or by heavy equipment. All the accumulated debris should be handled properly and ensure that all seedlings are removed.

10.2.4 Construction Waste

Construction waste will accumulate due to activities on site and can become an eyesore and result in health and safety hazards for humans and wildlife. Therefore, construction waste should be properly managed, and materials reused where possible during the construction phase of the Project.

10.3 Socioeconomic Impacts

10.3.1 Land Use Impacts

Construction activities will occur in human altered areas, resulting in minimal disturbances. The HDD method will also limit impacts to environmentally sensitive areas, thoroughfares and driveways. Additionally, visual and aesthetic impacts will occur as a result of heavy equipment, signage, and other construction activities. To mitigate visual impacts, good housekeeping will be enforced, and restoration efforts will be conducted to areas disturbed during construction.

The aesthetic effects of transmission lines can have a negative impact, especially where proposed lines cross natural landscapes and private properties. The new steel transmission poles which are approximately 75 feet in height, 30” in diameter can be considered eye sores and incompatible with agricultural landscapes or residential neighborhoods. The modification of various transmission lines and transmission poles will result in minimal disturbances to existing paths whether previously disturbed or occupied. To minimize land use impacts, the proposed construction method will collocate these facilities into a single pole-line, allowing for a clean and minimal profile. Additionally, the poles will extend 300 – 400 feet apart, resulting in less installation requirements.

10.3.2 Traffic Impact

During the construction and operational phase traffic impacts will be minimal. The HDD trenchless method will be used to minimize disturbances to thoroughfares and driveways. There will be no road closure as pipeline installation will occur on the side of roadways.

Additionally, existing road/driveway corridors will be utilized during construction and operations of Transmission and Distribution grid improvement, and no new access roads are anticipated.

10.3.3 Community Impact

The potential direct impacts to adjacent communities will include an increase in noise levels. To mitigate these impacts, construction works will occur during daylight hours. If work is required outside these hours, local communities will be given advance notice, and reasonable requests will be accommodated.

11.0 Environmental Protection and Mitigation Plans

The Contractor must avoid unnecessary disturbance or damage to the environment and must correct any damage caused. Mitigations to reduce the risk of appendix impacting the surrounding environment are as follows:

11.1 Construction Management Plans

11.1.1 Sediment Control Plan

The Project construction site is low lying, with certain areas being predominantly covered by vegetation. Protecting surrounding vegetation, and the existing water table is a high priority. It requires a group effort to ensure that the control measures laid out in this Sediment Control Plan are adhered to diligently for the duration of the Project.

The overall goal is to ensure that the site is free from the risk of non-point source pollutants. Control measures to mitigate this are extremely important during the construction phase as the risk of leaching increases due to the movement of construction material and equipment and human travel.

The main construction activities that pose the greatest risk are transport and deposit of fill material to site, stockpile erosion, base formation, and dewatering.

All employees, including Sub- contractors, should be trained and given instructions on their role in this control plan.

Site Preparation

Prior to erosion and sediment control measures being implemented, careful examination of the Project site and surrounding area should be documented. This should identify any noticeable drainage patterns, changes in soil type and any potential problems that may arise due to slope differences on site.

Boundaries of the site should be defined, clearly marked and communicated to heavy equipment operators. Ensure that the site will have stable access points and that areas are mapped out for adequate staging of materials as well as containment areas. Minimize disturbed areas by delineating construction zones and surrounding vegetation that will remain.

Control Measures

The following control measures will be implemented to help mitigate the potential hazard due to sediment during construction. The following measures should be practiced. Daily monitoring of the controls mentioned below is important to ensure an efficient process.

For Transporting Materials:

- Any truck used to transport/haul soil or fill material to, from or on site, should be fitted with a cover/ tarpaulin.
- Speed control restrictions on the site should be strictly followed.
- All routes where trucks will be travelling while accessing or exiting the site should be inspected before moving.
- To ensure stability, travel routes should be monitored and maintained when necessary.
- All access points to the site should be stabilized with appropriate fill material.
- For large cargo transport, traffic control flaggers and in some cases, spotters should be used.
- An established access point for materials should be designated.

Deposit of Material on Site:

- Speed limits will be designated on site for all moving equipment and strictly enforced.
- Materials should only be left in designated storage areas.
- Materials should be safely secured at the end of each day.

Base Formation Reclamation:

- Silt fencing will be installed where needed prior to commencement of works and inspected daily.
- Water trucks will be used if necessary.

Stockpile Erosion:

- Stockpiles should be stored away from open water sources.
- They should be protected with anchored polyethylene sheeting during dry seasons and contained with silt fencing if within 100 ft of water.

- During wet seasons they should be secured.

Utility Installation:

- Trenches used for utility installation should always be appropriate size.
- Back fill trenches within 24 hours of opening.

General Erosion control and construction impact minimization techniques will include:

- Inspect and maintain sediment erosion controls.
- Clearing methods will include shearing the trees to ground level and leaving the root mats intact to minimize soil disturbance.
- No hazardous substances will be allowed to escape into open water or nearby vegetation at the work site. Should a concern with water quality arise work will stop, and the EM will be contacted immediately.

If deemed necessary, water quality testing may be conducted. The EM retains the right and responsibility to suspend site work and to require the Contractor to take corrective action if water quality parameters are not in compliance with allowable levels. Work may be suspended until adequate corrective measures have been implemented to the satisfaction of the Client.

11.1.2 Flood Control Plan

With the changes to the environment due to construction, the natural flow of water will be affected resulting in an increased amount and flow rate of water around the site and into existing waterbodies. The Project site runs parallel to Harold and Wilson Ponds National Parks which are areas prone to flooding during significant periods of rainfall. To help mitigate this, a series of controls for the activities that pose the greatest risk and potential for flooding was developed. During the construction and operation phase, the risk of flooding will be of concern. The Flood Control Plan will show proposed flood control measures to be used for the Project and any nearby areas that may be affected along with the accompanied execution plan for the listed control measures.

The activities that have the potential for flooding include earthworks and utility installation during construction, and storm water runoff as well as direct runoff from precipitation during operation. Extreme weather conditions as well as hurricanes also present the risk of flooding during operation. To assist with minimizing the impact due to potential flooding, the following methods of control will be considered:

CONSTRUCTION PHASE

Utility Installation

Construction includes grading and filling, excavation for the foundation, and trenching for utilities. The Contractor will ensure that all environmental mitigations are implemented such as silt fencing and limited exposure of excavated sites and trenches.

Trenching for utilities may expose groundwater. If water is experienced during trenching, the trench size will be limited to control the amount of water exposed at any period. Dewatering will not be done directly into open water or vegetated areas.

Grading

The site will be graded away from the main road to contain water from direct precipitation within the site.

Temporary Drainage Basin

The drainage design should include a series of drainage basins that will collect water from the surface. A maintenance program will be implemented to ensure that the drainage basins are kept free from debris and function as intended.

Topography and Drainage

The Project site is very low-lying making it prone to flooding. During construction the site should be graded to a higher elevation to mitigate flooding.

OPERATIONAL PHASE:

Buffer Zones

Some natural vegetation should be left in place to minimize the impacts of construction activities by absorbing the impacts while still serving as habitat for wildlife and greenspaces for the community.

11.1.3 Solid Waste Management Plan

Implementation of a Waste Management Plan will assist in ensuring the protection of human and environmental health as well as the groundwater supply. This plan will define the management process for the various waste streams associated with the construction phase. The goal is to ensure that the site employs waste reduction and recycling practices to reduce, re-use where possible and recycle where feasible. The plan should be communicated to all persons entering the site as it requires full cooperation from all employees and visitors.

Waste materials should be classified into waste streams and considered for reuse or recycling before being removed and disposed of at the New Providence Ecology Park. Communication with

the public is important to reduce the construction debris going into dumpsite as materials such as scrap wood, concrete and glass etc., can be repurposed.

Site Preparation

During the initial stages of the site prior to construction, designated locations for storage of materials should be laid out. All material, if possible, should be stored in an area free from obstruction and with means to cover the material from the elements and to reduce any potential runoff pollution.

Types of Waste:

The construction phase will create a wide range of waste with some waste being more harmful to the environment than others. It's important that all Sub-contractors are aware of the different types of waste and disposal methods on site. Some examples of the waste generated due to construction are:

- Non-Hazardous Waste – Wood, Glass, Plastic, Paper, Food etc.
- Hazardous Waste – Adhesive, Aerosol Cans, Paint and Paint Thinners, Solvents, Concrete, Asphalt, Lightbulbs, Batteries, Insulation etc.

Waste Management Controls:

Efforts to control any risks associated with the waste should start at the site to ensure protection for human and environmental health. This will be of huge benefit when transporting to New Providence Ecology Park and managing the types of waste created.

Storage Collection and Disposal:

Waste bins should be strategically positioned around the site and designated for different waste generated. This will ensure that waste material that can be recycled remains clean and will reduce the need for sorting. Each bin should be numbered to help with identifying each bin's purpose and monitored to ensure compliance from Sub-contractors.

Contractors and Sub-contractors are responsible for collecting and disposal of the waste generated from their work activities. They should be made aware of the disposal policies and procedures on site as well as the location of bins for appropriate waste material. Once containers are full, they should be handled based on their contents and promptly transported to New Providence Ecology Park to prevent over filling and returned to location. Bins should be checked for any leaks or damages before reuse.

The following practices and procedures will be applied:

- Ensure that an adequate number of appropriate waste containers are available on site.

- All spill clean-up material (i.e., used sorbent pads) will be stored in lined containment drums and disposed of at an approved facility.
- Designate a safe area for temporary waste storage with adequate containment, secure and protected from weather until removal and disposal can be arranged.
- Remove all waste materials from the site as soon as possible.
- Any portable toilet(s) that are on-site should be secured to avoid being knocked over by heavy winds and vandalism. They must be adequately maintained on a regular basis by a licensed contractor. Toilets must be located more than 150ft from the edge of any open water body.

If potentially contaminated soils or waters are encountered during the work, the Contractor will contact the EM immediately. Contaminated soils or waters must be assessed by a qualified environmental consultant and disposed of off-site at a regulated facility.

The construction phase will create a lot of debris that will then be directed to New Providence Ecology Park. This will include general waste, construction debris, as well as hazardous waste. Reducing the debris deposited into the landfill is of high priority. Table 3 will show proposed handling procedures for the various waste.

Table 4: Handling procedures for solid waste

Material	**Waste Form**	**End of life Option**	**Handling Procedure**
Clean Wood scrap	Solid	Recycled	Reused on site.
Concrete	Solid	Recycled	Crushed and used as fill.
Scrap Metal	Solid	Recycled	Responsibility of Sub-contractor. Stored in separate area covered until disposed.
Insulation material	Solid	Repurposed	Stored in separate area covered until disposed. Sub-contractor responsibility
Other wastes (Human generated, office generated)	Solid	Landfill	Stored in appropriate containers until disposed of in landfill.

Residual Waste:

Residual waste refers to waste that cannot be disposed of by usual means (e.g., old tires or contaminated waste). Unused equipment, spare parts or discarded parts should be identified, dated, logged, and stored away in a safe location away from the public. The future need for these materials should be assessed and if not necessary for future work, arrangements for removal from site.

Hazardous Waste:

All work must be completed in a manner that ensures water quality standards are maintained. Hazardous materials such as concrete, paint, solvents, and other chemicals may be high in pH and are considered harmful; therefore, there shall be no contact with open water through spillage, hosing off surfaces, rain, cleaning of tools, or concrete washout. Hazardous materials will be kept in a covered storage location to prevent the potential for mixing with water and substances being released into the environment. A concrete and equipment washing site will be bunded, lined to contain any concrete and chemicals. All accepted washing locations must be cleaned up prior to demobilization. Any excess material shall be removed upon project completion and disposed of at the New Providence Ecology Park.

Any waste that falls into the category of hazardous should be collected immediately after being generated and stored safely in a designated area until removal and disposal is arranged. That area should be free from obstruction, structural defects, and only used to store hazardous waste. Appropriate signage should also be used to depict hazards in the area as well as a no smoking sign. All hazardous liquid waste should be in approved containers with original label and stored with Material Safety Data Sheets (MSDS), and on spill containment pallets. This area should be monitored, and access limited. If surplus product must be disposed of, the manufacturer or local recommended methods for proper disposal will be followed. All hazardous waste spilled into the environment should be reported (See Appendix B-2: Hazardous Waste Report Form) and the EM and PM should be notified.

For all waste that will be referenced as e-waste ex. electronic devices, careful consideration will be given to prevent any potential toxic materials from being released into any nearby bodies of water, soil and air. E-waste is hazardous and should also be stored in the hazardous waste area until disposal methods are arranged.

Site Inspections

Weekly routine inspections by the Contractor should occur to assist with the management of waste on site. It's important to track and plan, if possible, for the creation of construction debris. This can help mitigate any potential fire hazards or environmental risks on the site. Monitoring of the bins and the hazardous waste disposal area should be given special attention.

11.1.4 Noise and Light Control Plan

Noise and light disturbances due to construction activities need to be managed to reduce the impacts to the surrounding areas and wildlife. Contractors should be aware of and identify any sources of noise or light disturbances and train all on-site workers to be aware of noise or light issues and how to minimize disturbances where possible. The level of noise and light from construction plant operation shall be periodically assessed by the Contractor and the Client in relation to the significance of potential disturbance.

Noise

The Contractor will maintain equipment in good order to minimize extraneous noise. The general rule shall be that construction operations shall be restricted to daylight hours between 0700 hrs. and 1900 hrs. Where there is a reason to work outside these hours to speed up the progress of works, local communities will be given advance notice, and specific requests will be reasonably accommodated. Any complaints from local communities concerning noise shall be reported to the Client and steps taken wherever possible to conform to local wishes, for instance in relation to the specific timing of activities.

To manage noise impacts during construction hours, Contractors shall utilize accepted noise control techniques, such as:

- Maintaining equipment in good working order.
- Implement the use of the best available control technologies to reduce noise such as mufflers and silencers.
- Implement a speed limit to slow vehicles and limit noise generation.
- Turn off idling equipment when not in use.

Light:

If construction is to occur during hours when enough daylight is not available, and lighting of the work area is required, the Contractor is expected to manage excess lighting and glare by:

- Strategic placement of lights away from residential areas.
- Tilting lights downwards.
- Using shielding to restrict the glare of lights.

11.1.5 Air Pollution Management Plan

Mitigation techniques to lower the amount of air pollution are vital in managing the environment of the site. Through the use of air quality control measures, the impacts that the construction

phase will have on the air quality will be minimized. These air quality controls will be guided by the following techniques and principles:

- Spray earthworks, roads, and other surfaces as necessary with water to reduce dust generation.
- A water truck will be employed, as required, to dampen work areas, exposed debris, and stockpiles to prevent the emission of excessive dust from the site.
- The access road will be periodically maintained to ensure they are free of debris.
- All equipment used and all facilities erected on site are to be designed and operated to control the excessive emission of dust, fumes, and any other air impurity into the atmosphere.
- Contractor/Sub-contractors will maintain all construction equipment to reduce exhaust emissions.
- The Engineer will visually monitor levels of dust deposition and air quality, the effectiveness of dust emission controls and the construction site and the impacts of any nuisance on adjoining properties.

11.1.6 Vegetation Management Plan

During the construction phase, there will be an unavoidable loss of vegetation, including protected species such as *Pinus caribaea*. The developer must ensure that the percentage of vegetation removal is minimal and only occurs within the direct footprints of the Project.

Construction BMPs:

- Protection of sensitive environmental features.
- Fencing shall be placed along sensitive environmental features such as vegetation to be retained and protected tree species to protect from encroachment, illegal dumping, and damage from machinery.
- There will be no burning of materials on site.
- The construction team will receive training on protected tree species and sensitive environmental features.
- A walkover survey shall be conducted prior to the commencement of works.
- Heavy machinery will undergo routine maintenance to prevent leaks, spills, and/or other mechanical failures which may cause environmental harm.

Protected Species Management

The continual preservation of protected species is paramount. In the case that a protected species lies within that area, efforts should be made to carefully relocate the plant outside the

construction area. Protected Trees shall be removed only upon receipt of a Permit to Harvest a Protect Tree as permitted by the Forestry Unit.

Invasive Species Management

The efficient management of invasive species found around the site is paramount. These plants should be completely removed, including the root system, and incinerated when appropriate. The invasive species should not be reused as mulch to reduce the spread of seeds and potential regrowth.

Operational Phase

During the operational phase, the protection in vegetation onsite and adjacent to the site should be is important. The developer will take care to ensure that vegetation on the site be undamaged by operational activities.

Any invasive alien species observed on the Project site during the operational phase will be removed. The entire invasive species should be removed, including the root system, and incinerated when appropriate. Maintenance personnel should be trained to recognize invasive species common to the area and eradicate species based on control recommendations. Any invasive species removed should be replaced with native species, if feasible. If herbicides and/or pesticides are required, they shall be used according to protocols laid out in the Invasive Species Management Plan (See Appendix C: Invasive Species Management Plan).

All protected species on the site and adjacent to the site should remain intact and undamaged. Maintenance personnel should be trained to recognize protected species on site. All Green Corridors should be maintained during operational phase as they are a buffer against strong winds and are habitats for birds and other wildlife in the area.

A proper waste management system should be implemented to prevent pollution of remaining and adjacent vegetation at the Project site. There should not be dumping of domestic or hazardous waste into the surrounding vegetation.

11.1.7 Wildlife Management Plan

There were twenty species of birds and twenty-nine (29) other terrestrial species such as snakes, lizards, frogs, identified on site. It is unlikely that this is a full representation, and a variety of wildlife may be encountered during works. The following procedures outline the instructions staff members should be followed in any interaction with wildlife. The safest course of action to follow is to avoid contact with wildlife and allow them the right of way, as most animals are not aggressive unless threatened. If an avian nest or wildlife is discovered, construction should halt

immediately, and the EM/EMO be contacted. The EM/EMO consultant should consult with the Animal Control Unit. The Animal Control Unit contact information is 325-1173.

Feeding – No animals should be fed under any circumstances. Providing animals with human food (e.g., chips, candy) can harm them. Food should not be left out in the open around the Project site where it might attract animals.

Disturbing nests – Staff should not damage or attempt to move nests or eggs if they are found. If nests or eggs are found, the EM should then consult with the PM and Client to decide on a course of action as it relates to either halting construction activities until after the nesting period or transferring the nests outside of the construction area. The Animal Control Unit can be contacted for guidance.

Disturbing young or juveniles – Staff should not interfere with or harm young or juvenile animals if they are encountered. If young animals are found on site, the Operations Manager and/or EM should be notified so they can contact the relevant agency. With some young, the parents are usually close by and may attack if the young are threatened. A human approaching, touching,

or picking up young can be perceived as a threat. If a young animal is observed alone for more than two hours contact the Animal Control Unit at 325-1173.

Disturbing adult wildlife – Staff should not interfere with or harm adult animals if they are encountered. Usually, the animal will move away if it is left alone. If staff feel threatened by an animal, such as a snake, they should contact the Operations Manager and/or the EM who can contact the relevant agency for assistance. Agencies involved in safe wildlife removal include the Animal Control Unit.

Hunting and fishing – No hunting or fishing will be allowed at the Project site, whether in the terrestrial or marine environment.

Injury or death – If wildlife is injured at the Project site, whether it is self-inflicted or by accident, the Operations Manager and/or EM should be contacted immediately so they can quickly make contact with the relevant agency for assistance in treating the injured animal.

If wildlife is killed at the Project site, whether self-inflicted or by accident, the Operations Manager and/or EM should be contacted immediately so they can document the incident for inclusion in their environmental and social reports. If the wildlife is an endangered or threatened species, the Animal Control Unit should be contacted as they may want to collect and preserve the animal or document the death.

Human injury from wildlife encounter – If a staff member or Sub-contractor is injured on site because of an encounter with wildlife, immediate first aid treatment should be sought as some

scratches and bites can result in infection or disease transmission. Evaluation during first aid treatment will determine whether further medical treatment is necessary.

Operational Phase

Protection of wildlife during the operational phase of the Project is also important. During the operational phase, the above procedures for "feeding ", "disturbing nest", "disturbing young wildlife" and "disturbing adult wildlife" should be followed. Additional procedures that staff should take to protect wildlife encountered on site include:

- Minimizing light impacts and glare. If lights are utilized at night for the purpose of securing the site, the Project is expected to manage excess lighting and glare by:
- Strategic placement of lights away from residential areas.
- Tilting lights downwards.
- Using shielding to restrict the glare of lights
- Avoid the use of ultraviolet light.
- An Employee Wildlife Management education training programme should be designed and implemented. This should include prohibiting hunting harassment of wildlife within the Project vicinity.
- Implement a Waste Management Plan. There should be and sufficient amount of waste bins on site. Waste bins should be secured, have lids, and removed from site and emptied on a regular basis to prevent wildlife from accessing waste bins.

11.1.8 Traffic Management Plan

This project will result in a minor increase in commercial traffic, primarily large trucks. The traffic management plan aims to minimize the amount of impact on the public road and to establish a framework for vehicles and pedestrian movement within the site. The contractor is responsible for implementing the plan, ensuring that trucks are covered to avoid the obstruction of roadways and vehicle inspections for dirt before they leave the site.

All dirt, soil, and rubble will be removed from vehicles via a wheel wash or vehicle wash-down area near the site exit.

Traffic management on the site will include:

- Designated haul routes for commercial vehicles.
- Maintenance of low speeds for driving on site.
- Only authorized personnel should operate heavy construction machinery.

- Traffic control/signage on site and on the road directly in front of the Project site during times of heavy commercial vehicle and/or heavy equipment traffic to prevent accidents with private vehicles.
- Flag men where needed.
- Wheel wash or vehicle wash down near/at site exit.
- Regular cleaning of roads.
- Securing the site (e.g., fencing) to prevent pedestrians from traversing the site and to protect adjacent vegetation from damage.
- Ensuring all workers wear high visibility vests so that drivers of commercial vehicles and heavy equipment can see them; and
- Training all workers in traffic hazards on site in an effort to avoid injury and loss of life.

Pedestrian-only routes and vehicle-only routes will be established on the site to provide safety for workers. These routes should be clearly designated by signage and strictly adhered to. Table 4 below outlines protocols for vehicle and pedestrian route.

Table 5: Protocols for Vehicle and Pedestrian Route

Pedestrian Only Routes	Vehicle Only Routes
• Be located a reasonable distance away from areas of vehicle activity. • Be clearly separated from vehicle routes with barricades, or other suitable means, excluding flagging. • Be wide enough to safely accommodate the volume of employees likely to use them during peak times. • Be free from obstructions and have safe and even footing. • Be clearly signed. • Provide safe crossings.	• Routes are wide enough to safely accommodate the number of vehicles likely to use them at peak times. • Take into consideration pedestrians. • Routes allow easy access to delivery areas. • Routes are free of obstructions and are clearly and suitably signed. • Routes eliminate or reduce the need for excessive movement and reversing. • Temporary structures and surrounding vegetation are protected from vehicle impact. • There are measures to prevent vehicles depositing mud on the roadways.

	• Banksman/flagmen should accompany all heavy machinery to minimize risk of pedestrian injury or damage to surrounding environment.

Once construction activities commence, the public will be advised of instances of inconvenience or disturbance, such as changes to traffic routes and times of excessive noise. Signage will also be utilized on and near the site to advise of traffic diversions and active construction areas. At least one sign needs to include information about the onsite Contractor inclusive of a telephone number and email address for contacting them. Contact information will also be provided for DEHS, DEPP and Ministry of Works.

Development of the Project can result in an increase in commercial traffic (mainly clinic patients and guest) to and from site during the operational phase. Traffic management on-site during the operational phase will include.

- All roadways and walkways should remain free of obstruction.
- Implement vehicular-only and pedestrian-only routes (See Table 4 above).
- Implement an Emergency Response Plan (See Appendix E).
- Minimize truck deliveries during peak hours.
- For oversized vehicles, coordinate with local authorities, use escort vehicles, and provide advance notification to community.
- Use of signs and markings on the property to prevent accidents. Clear road markings like reflective paint and signs should be used to alert pedestrians and vehicle operators to traffic hazards.
- Have a designated loading/unloading zone away from pedestrian routes.
- All traffic routes, maneuvering/loading areas and parking lots should be well lit. Areas that should be given special attention include junctions, buildings, walkways, and vehicles route.
- Not scheduling maintenance activities during peak traffic times.

During the operational phase the parking lot will be used by workers/staff, visitors, trucks, and other vehicles of the clinic. To ensure safety of pedestrian in the parking lot, the parking areas should be:

- Located away from busy pedestrian travel routes.

- Have designated walkways leading to and from parking areas which are separated from vehicles or vehicle routes. For example, the use of physical controls like barriers or bollards to prevent vehicles from crossing into pedestrian walking areas.
- Clearly marked, contain signs, be well-lit, and unobstructed.

12.0 Archeological Findings Plan

The Project does not fall within the boundary of a national park but is located north of the Primeval Forest National Park (PFNP) and south of the Harold and Wilson Ponds National Park (HWPNP). Therefore, there should be no impacts to historical resources as a result of construction activities. However, if items or areas of potential archaeological significance are identified during construction works, the following steps will be taken:

- ALL works in the area will cease immediately.
- Any potential archaeological findings of significance will be protected from any damage or disturbance by maintaining a 50-foot barrier and erecting signage. The contractor will notify the Client and the Antiquities, Monuments and Museum Corporation (AMMC) to determine the next steps and coordinate final arrangements.
- If a human burial is encountered, all activity that may potentially disturb the unmarked burial site, or its immediate area, will cease immediately. By law, the discovery or exposure of unmarked human burials requires the immediate termination of all activities that might further disturb the burial or its immediate area and require notification of the appropriate authorities.

In case of possible findings, all construction personnel will undergo training which will include instructions for the steps listed above.

13.0 Emergency Response Plan

The Emergency Response Plan is a component of the Environmental Management System, which is developed as an effective tool in protecting personnel, property, and the environment. Environmental Emergency Response Plans (ERP) will identify potential environmental emergencies and how to prevent, prepare, respond and recover from the associated adverse environmental impacts.

The purpose of the ERP is to eliminate, reduce and/or mitigate the health, safety and environmental impact of any uncontrolled, unplanned or accidental incidents. The ERP addresses requirements for prevention, preparedness, response, recovery and reporting of various incidents.

The ERP provides measures covering the following areas of an environmental emergency:

1.0 Prevention – actions taken to reduce or eliminate the probability of an emergency occurring.
2.0 Preparedness – measures taken prior to an emergency to ensure an effective response.
3.0 Response – actions taken to respond to an actual emergency. These actions provide a controlled, effective and timely response.
4.0 Recovery – actions taken to recover from an emergency that could be short-term or long-term activities. The aim is to return all systems to normal operations.
5.0 Reporting – provides protocol for notifying the appropriate agencies.

Potential impacts of not planning and preparing for environmental emergencies are threats to the health and safety of workers and the public, air contamination, soil, surface water or groundwater contamination, destruction of wildlife habitat, damage to property, equipment and resources and result in legal infractions and penalties.

13.1 Fuel Spill Prevention Plan

The Fuel Spill Prevention Plan was implemented for Contractors using equipment and processes that can potentially result in the occurrence of a spill(s). The Spill Response Plan was developed for the use of all contractors and sub-contractors, to prevent and control any spillage associated with the Project in accordance with Environmental, Health and Safety regulations (see Appendix D: Fuel Spill Prevention Plan).

13.2 Health and Safety Plan

The Site Engineer (SE) will be designated as the site Health and Safety Officer (HSO) and the Foreman as acting HSO in SE absence. Basic first aid training of these persons will be required. There shall always be a fully equipped first aid box at all work sites and a list of local emergency telephone numbers in case of accident (See Appendix E: Emergency Response Plan). Minor and major accidents shall be recorded and reported (See Appendix B-1: Incident Report Form).

The Contractor shall ensure that all staff, including Sub-contractors, undergo safety training and inductions. These training events will educate workers on the best practices for working (to include but not limited to):

- With hazardous materials,
- At heights,
- In confined spaces,
- Welding safety (hot works),
- With heavy equipment,
- Emergency procedures,

- Confined spaces,
- Excavation and safe digging practices,
- Lifting operation and lifting equipment,
- Plant, vehicle and equipment – checking procedures,
- Site / road traffic rules and requirements,
- Site security arrangements, and
- Vehicles – safe driving practices and checklists

Toolbox Talks

At the HSO's discretion regular "Toolbox Talks" will be conducted after the initial Site Induction. The Toolbox Talks will include information on some or all of the topics listed above depending upon the site-specific conditions: -

A Toolbox Talks form / Site Induction register form shall be completed for each talk and shall contain the following information: -

- Supervisors Printed Name & Signature,
- Date,
- Site/Project Name,
- Topics of Talk, and
- Printed name and signature of each operative attending.

Site Rules

Site-specific rules will be posted within the canteen / office and copies will be given to all personnel working on the site. They will contain, for example, details of No Smoking requirements, dress code, PPE requirements, emergency arrangements, any gender-based violence behavior, etc.

Site Inspections

The Site Engineer/Safety officer will inspect sites for compliance with approved working methods and contractual requirements. The Bahamas labour laws, and occupational health and safety policies shall always be applied.

The emergency assembly site should be identified before works begin and relayed to workers on site during Site Induction and Toolbox Talks. In case of any emergency the staff will meet in this area, away from the building and near the site exit for easy evacuation.

Worker Health and Safety

A health and safety policy for site workers should be established by the Contractor prior to the commencement of works. The Contractor should ensure that the policy is readily available for all workers on site and encompasses the following mitigation measures to prevent an incident from occurring:

- Construction/Renovation areas should be clearly defined with safety signs and barriers to prevent possible incidents.
- Routine checks of health and safety equipment should be performed to ensure that they are properly functioning.
- All Workers should be properly trained in the proper use of construction equipment.
- All workers must be trained in the proper use of all health and safety equipment.
- All workers must be trained in the proper handling and management/ disposal of all types of waste.
- All workers are to be provided with suitable and sufficient hygiene and welfare facilities e.g. restrooms, lunch spaces, lockers, toilets, first aid, clean drinking and washing water, etc.
- All equipment and machinery shall be maintained in a good state of repair throughout the renovation period.
- Equipment maintenance will be carried out on an impermeable surface.
- Regular inspection and repair of all equipment and machinery will be carried out to prevent any leakage.

Use of Personal Protective Equipment (PPE)

Personal Protective Equipment (PPE) including protective suits, gloves, hard hats, respirators, and goggles shall be worn in areas designated for their use. At all times work sites shall be maintained in an orderly, safe, and tidy state. Precautions against fire accidents shall be taken and appropriate fire safety equipment supplied and clearly indicated at work sites.

13.3 Emergency Response Plan

Emergencies associated with the Project may include fires, explosions, storms, accidents and malfunctions. The Emergency Response Plan is detailed in Appendix E.

13.4 Hurricane Preparedness Plan

The Hurricane Preparedness Plan serves the purpose of a guideline for contactors before, during and after the hurricane, while providing background information, it is detailed to ensure

minimum damage and shutdown time. Hurricane season occurs annually from June 1 to November 30.

The following notifications determine the actions to be implemented:

- Hurricane/Tropical Storm watches mean that a hurricane or tropical storm is possible in the specified area.
- Hurricane/Tropical Storm warnings mean that a hurricane or tropical storm is expected to reach the area, typically within 24 hours.

The PM will remain up to date with weather alerts via radio, TV or social media and evacuate in accordance with local authority advisory.

The contractor is required prior to a severe weather event to ensure that all equipment is secured, and incomplete structures are covered.

Some or all the following hurricane preparation materials and equipment may be available:

- Concrete Anchors
- Duct Tape
- Garbage Bags
- Generators
- Ground Anchors
- Fuel
- Misc. Hardware and Fasteners
- Netting
- Plastic Sheeting
- Plywood
- Pumps
- Rope
- Sandbags
- Shoring and Bracing
- Water
- Wire

Hard copies of contact lists, plans and other important documents are to be kept in a safe place. These documents should include:

- An emergency evacuation plan.
- Emergency contact information for employees.
- List of hurricane preparation materials, equipment, and their sources.

- Vendors and contractors who can provide recovery services and replacement supplies.
- Procedures to follow in the event of exposed electrical wires, hazardous material leaks or structural damage.
- A contact list of back-up personnel to call if recovery teams are unable to return to work.

The PM and SE are to monitor the weather closely once a Tropical Storm Watch is issued. Both local and international weather services should be monitored for accurate information.

Once the National Weather Service issues a Hurricane Watch, it is time to secure structures and equipment on the job site for the storm by implementing the following actions:

- Use rope, sandbags, ground anchors and other items to weigh down materials that could easily fly away.
- Cover materials with plastic sheeting, netting or garbage bags to prevent water damage.
- Stack loose materials together and secure them with rope or duct tape to keep them from dispersing.
- Complete work on partially completed structures to minimize damage if time allows.

After a Hurricane Warning is announced the following actions should be implemented:

- Loose materials or expensive equipment should be moved or secured.
- Construction dumpsters should be picked up or covered with a tarp.
- Remove or tie down portable bathrooms.
- Remove hazardous chemicals to prevent them from being released into the environment.
- Remove materials, tools or equipment that can be damaged by rising water.
- Move heavy equipment and machinery to a garage or other covered structure.
- Tear down and store light-weight fence screens and job site signage.
- Move any portable electronics, job site plans and other important documents from the construction trailer to a safe location offsite.
- Turn off power to the site and make sure fuel is available for power generators.
- Board up door and window openings.
- Tarp or board up any other large openings.
- Place sandbags around the perimeter of structures as reinforcement.
- The site evacuation plan should be implemented once the site is secured.

Once the All Clear has been given after a storm the PM and SE may return to the site to assess damages and determine cleanup efforts. Upon returning to site the following steps are to be taken:

- Be careful when walking in standing water, which may contain sharp or jagged objects.

- Use caution when entering the building because structural elements may be weakened.
- Rent a dumpster to safely dispose of materials that were damaged by the storm.
- Plan to remove water
- During a hurricane, water will inevitably flood your work site. Removing it is important for the safety of your property and neighboring structures. Standing water can soften the ground, compromising structural stability.
- Place pumps in excavations or basements before the storm hits.
- Have dehumidifiers and fans available to dry out the space.
- Discharge water to the storm water system.

The construction hurricane plan should be communicated to staff prior to the start of hurricane season and a briefing should be held once it is determined that severe weather is eminent. Hurricane preparedness is essential for a safe construction site.

14.0 Grievance Mechanism

The Project Manager will forward grievances to respective departments within New Providence. Grievances will be recorded, documented and addressed within a one (1) week period. The grievances expressed by stakeholders and the response plan will be shared with the Department of Environmental Planning and Protection (DEPP). Signage will be posted with the grievance mechanism. All comments and relative responses associated with the public grievance mechanism will be included in the monthly environmental reports.

15.0 Conclusion

The Diesel and Natural Gas Pipeline Project aims to construct two pipelines that extend approximately 13 miles, running from Clifton Pier to Blue Hills Power Plant. The purpose of the natural gas pipeline is to transport and supply the new gas turbines and combined cycle equipment at the Blue Hills Power Plant. It is projected to supply the plant with an additional 200-megawatt electric power. As a result, the goal of the Project is to improve the quality of life for residents in New Providence by providing a more reliable and sustainable energy source, safer means of transport, high energy density, low environmental impacts and economic benefits.

Additionally, The Project proposes to improve the existing Transmission and Distribution grid to connect various transmission lines and substations. The installation of approximately 16 miles of overhead lines and replacement of 218 existing wooden poles to 178 steel poles will connect various transmission lines and substations together to create redundancy by adding back-

feed/switching capabilities. Thus, increasing the reliability of electrical service and improving the grid's resiliency against extended storm-related outages.

The proposed mitigation measures outlined in the EMP can prevent or minimize any negative environmental impacts that may occur during construction. The EMP should be utilized to guide renovation and construction activities on the Project site.

APPENDICES

Appendix A: Pipeline Specialists Ltd. NG TO POWER – PHASE 2 Method Statement and Transmission and Distribution Lines Scope of Works

METHOD STATEMENT

PROJECT NAME: FOCOL LNG TO POWER – PHASE 2

PREPARED BY: ROLAND J. RUIZ, P.E.

PROJECT NO:

DATE: JUNE 12TH, 2024

WORK LOCATION: Clifton Pier to Blue Hills, New Providence

APPROVED BY:

PROJECT TIMELINE: Q3 - 2024

DATE:

DESCRIPTION OF WORK (Purpose of the work to be performed)

The FOCOL LNG TO POWER project adds enormous value to all citizens and residents of New Providence by essentially allowing for a redundant energy source for the entire island, increasing overall reliability and sustainability of energy, and improving overall quality of life. In general, the overall plan is as follows: Liquid Natural Gas (LNG) will be transported via barge onto the island, and off-loaded to a new LNG Storage and Vaporization facility located at the Clifton Pier Terminal. The LNG will be vaporized at this location to convert LNG from liquid form into dry natural gas, and transport natural gas via pipeline to the Blue Hills Power Plant. The Blue Hills Power Plant will be upgraded with new gas turbines and combined cycle equipment, and the dry natural gas will serve as the fuel gas to the plant in order to generate an additional 200 MW of electric power for the Island.

This Method Statement is specifically for "Phase 2" of the FOCOL LNG TO POWER project, related specifically to the pipeline. Phase 2 essentially calls for the installation of approximately 13 miles of a new 12" carbon steel dry natural gas pipeline, In addition, the project will include approximately 13 miles of a new 8" carbon steel liquid petroleum (Diesel) pipeline in parallel.

LOCATION

Clifton Pier to Blue Hills, New Providence

TIMESCALE / DURATION

Project Activities to begin immediately for Design & Permitting Phase. Materials Procurement and Construction Activities to begin Q3 of 2024, for a Duration of approximately 30 weeks.

RISK MITIGATION

(Varies, refer to the Work Method Section)

RELATED ASSESSMENTS

EIA to establish a base line prior to excavation activity. CEC document to be completed and submitted for review/approval with detailed drawings for the project.

SKILLS/TRAINING

(Refer to the Work Method section under "Qualification of Pipeline Construction Personnel" and "Joining of Pipe and Features")

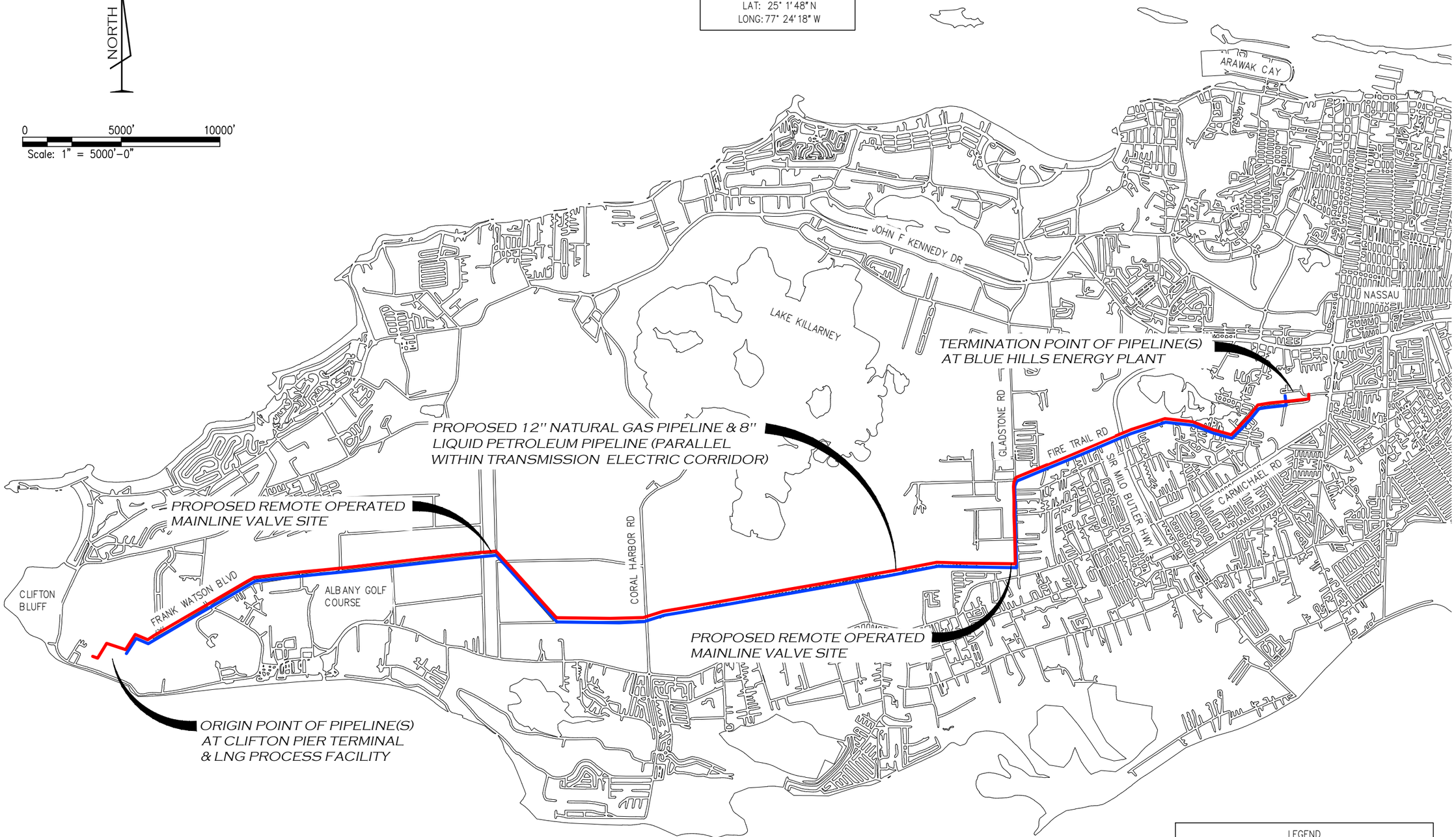
EQUIPMENT / MATERIALS

(Varies, refer to the Work Method Section)

NEW PROVIDENCE, BAHAMAS
LAT: 25° 1'48" N
LONG: 77° 24'18" W

NORTH

0 5000' 10000'
Scale: 1" = 5000'-0"



LEGEND	
	PROPOSED 12.9 MILES X 12" DRY NATURAL GAS PIPELINE
	PROPOSED 13.5 MILES X 8" LIQUID PETROLEUM PIPELINE

1 CONCEPTUAL PLAN
Scale: 1" = 5000 FEET

RUIZ
ENGINEERS, INSPECTORS, PROJECT MANAGERS & SURVEYORS
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10101 SW 56TH ST
MIAMI, FL 33165
305.298.0339
RUIZUSA.COM

CLIENT: FOCOL HOLDINGS LIMITED
SUN OIL LIMITED
P.O. BOX N-3717
NASSAU, BAHAMAS
242-702-3052

REV.	DESCRIPTION	DATE

DRAWN: RUIZ
DATE: 5/3/2024
CONTROL #: 24-1309
SCALE: AS SHOWN
SIZE: ANSI B (11X17)

DRAWING TITLE: CONCEPTUAL PLAN
PROJECT NAME: CLIFTON TO BLUE HILLS POWER GENERATION PHASE 2 PIPELINE(S)

SHEET NO:
GI-001

WORK METHOD (Details of type and scope of works to be performed)

1. PIPELINE DESIGN

1.1. Pipeline design and safety would be in strict accordance with regulations set forth by the Pipeline and Hazardous Materials Safety Administration, Department of Transportation of the United States of America.

1.2. The proposed 12" dry natural gas pipeline will be in specific accordance with Part 192 "Transportation of Natural and Other Gas by Pipeline" of Title 49 of the Code of Federal Regulations of the United States of America, and with ASME/ANSI B31.8.

1.3. The proposed 8" liquid petroleum (diesel) pipeline will be in specific accordance with Part 195 "Transportation of Hazardous Liquids by Pipeline" of Title 49 of the Code of Federal Regulations of the United States of America.

1.4. The pipes will be designed to listed specifications, with the appropriate seam type, wall thickness and grade of steel to allow for the design pressure of the systems.

1.5. Allowable Design pressure on the pipeline(s) will include factors of safety with respect to "Class Locations" relative to the surrounding buildings intended for human occupancy and other high consequence areas.

1.6. Generally, the planned hoop stress exerted by the internal design pressure of the pipelines will not exceed 50% of the specified minimum yield stress of the selected steel (Factor of safety = 2)

1.7. The pipeline system will include mainline block valves. These mainline block valves will have remote operation capabilities for quicker response in the event of an emergency. The valve locations will be selected so that each point along the pipelines will be less than 4 miles (6.4 kilometers) to each valve.

1.8. The pipeline will be designed and constructed to allow for passage of in-line inspection (ILI) tools. This will allow for the operator to use advanced ILI tools for analysis of potential third-party caused deformation, Internal & external corrosion direct assessments, and similar assessments, in accordance with the pipeline's integrity management plan.

1.9. At the point of origin, the pipeline will have means of protection against accidental over pressuring by using redundant pressure reducing valves, and full capacity relief valves.

1.10. Natural gas is generally safe, non-toxic, odorless and colorless, and its specific gravity is 0.6 relative to air; meaning in the event of a leak, it will generally rise and safely dissipate into air (as opposed to propane, a much heavier and flammable fluid). But because Methane (the primary constituent in natural gas) is naturally odorless, At the point of origin, the dry

natural gas pipeline will have an odorant injection system to make the natural gas detectable to humans at 50% of its lower explosive level in the unlikely event of a leak.

1.11. Critical pipeline parameters such as pressures, flow rates, temperatures, remote valve control, valve positioning, odorant control, and other instrumentation and control elements will be monitored and controlled via a SCADA system within a control room. Logic will be programmed to allow for alarms and shutdowns upon certain critical conditions to ensure public safety.

1.12. A line marker indicating "Warning," "Caution," or "Danger" followed by the words "Gas Pipeline" and "Diesel Pipeline" as applicable, along with FOCOL's name telephone number will be provided at each road crossing, and at line of sight from each other (approximately one every 1000 feet)

2. MATERIALS

2.1. Pipeline materials will be USA made carbon steel to API Specification 5L, "Specification for Line Pipe," latest edition, (API Spec 5L)

2.2. Shipment and transportation of pipe shall be in accordance with API Recommended Practice 5LW, "Recommended Practice for Transportation of Line Pipe on Barges and Marine Vessels," 3rd edition, September 2009, (API RP 5LW)

2.3. Pipeline valves shall be to ANSI/API Specification 6D, "Specification for Pipeline Valves", latest edition, (ANSI/API Spec 6D)

2.4. Other pipeline features such as elbows, tees, outlets, flanges, and other features shall be in accordance with applicable ASME/ANSI standards.

2.5. The engineer of record will review and approve all mill test reports for all purchased materials prior to construction.

2.6. Records of material properties are to be kept for the life of the pipeline(s)

3. QUALIFICATION OF PIPELINE CONSTRUCTION PERSONNEL

3.1. A written operator qualification (OQ) plan will be adopted for the covered tasks necessary for the project construction. OQ requirements will be established by using Industry standard qualification material covered tasks such as welding, pressure testing, coating, excavation, and other project related tasks.

3.2. OQ task list will be established prior to project commencement and all laborers intending to work on the pipeline will be required to produce evidence of completed OQ for each given tasks to be performed.

3.3. Veriforce will be the industry standard platform used for OQ verification.

3.4. Records for all laborers and operator qualifications will need to be kept for the life of the pipelines.

4. JOINING OF PIPE AND FEATURES

4.1. Pipe joints and fittings shall be joined by welding, to API Standard 1104, "Welding of Pipelines and Related Facilities," latest edition, (API Std 1104)

4.2. Weld procedure for new construction girth welds and fillet welds for the project will be designed to API 1104. The weld procedure will then be lab-qualified by destructive examination. The welding procedure will be recorded in detail, including the results of the qualifying tests.

4.3. All welders shall then be tested and qualified to the qualified weld procedure. Documentation for all procedure and welder qualifications will be reviewed and approved by the engineer of record prior to commencement. Records demonstrating each individual welder qualification at the time of construction shall be retained for a minimum of 5 years following construction

4.4. Field bending of pipe and mitering of pipe will not be allowed. All changes in direction will be performed by cutting segmentable elbows to appropriate angles

5. GENERAL CONSTRUCTION

5.1. Damage prevention to existing foreign utilities and pipeline will be performed by close coordination with the utility owners and agencies for each respective utilities. In addition, construction crews will require at least one (1) laborer with OQs for utility locating, in order to use designation methods (transmitters, receivers, ground penetrating radar, etc) to locate and identify all foreign utilities lines within the route of construction.

5.2. The pipeline installation method for Road crossings, sensitive environmental areas, and other select areas will be by horizontal directional drilling trenchless methods to minimize disturbances to surfaces and existing conditions. Refer to Appendix "A" for more details on horizontal directional drilling.

5.3. The pipeline installation method for other non-sensitive areas will be by open cut excavation trenching and ditching. Minimum depth of cover at all areas of all pipelines will be 36 inches from top of pipe to normal grade. Excavations to be in accordance with OSHA requirements in section 1926.651 under an approved trench safety plan.

5.4. Construction dewatering operations for certain construction activities with high groundwater table concerns would be performed using by large volume trash pumps, and routing dewatered effluent into sediment control devices to slow down velocity and control erosion. Point of discharge for each site requiring dewatering would be evaluated on a case by case, but generally would be discharged into temporary retention basins, or temporary exfiltration trenches, constructed specifically for each dewatering operation. Areas of high volume rates needed from drawdown would be discharged into temporary deep injection wells, if needed.

5.5. Excavation and dewatering in the immediate vicinity of existing structure and utilities would require specific foundation reinforcement and/or soil improvements in order to protect the integrity of said structures and provide a safe working environment. The design for means and methods of protecting this and any related existing structure will be in accordance with OSHA section 1926.651.

5.6. Seasonal and weather variations are to be expected during construction, and as such, dewatering shall cease during and immediately after a major storm event.

5.7. The ditches for the pipelines shall be backfilled with clean sand that provides firm support under the pipe; and prevents damage to the pipe and pipe coating from equipment or from the backfill material.

5.8. Caution tape reading “gas and diesel line below” will be provided within the trench approximately one (1) foot from grade prior to backfill, in order to warn of the presence of gas lines and diesel lines to third parties performing excavations within the vicinity of the pipelines.

5.9. At areas where high groundwater and buoyancy force will present a risk, the Pipelines will be equipped with weights to counteract said upward forces.

5.10. Traffic control will be provided for work areas within the clear space of a road or highway. Advanced warning signs, channeling devices (barrels, cones, drums), flagger operations, and similar traffic control safety metrics will be utilized.

5.11. Safety perimeters utilizing caution tape will be established for work zones and pressure testing

6. STRENGTH AND LEAK TESTING

6.1. Upon pipeline installation completion, and prior to placing new pipelines in service, Strength and Leak Testing will be conducted. A formal test plan will be produced that will ensure discovery of all potentially hazardous leaks in the segments being tested.

6.2. For safety reasons, Fresh water will be used for pressure testing since water is an incompressible fluid.

6.3. Test pressure for the pipelines will be at least 1.5 times the design pressure of the pipelines. Maximum test pressure will be evaluated and established to ensure allowable stresses of the pipelines are not exceeded during the strength test.

6.4. Test durations will be determined based on select lengths to ensure any leaks are appropriately detected.

6.5. Test record will be provided to the engineer for approval prior to commissioning the pipelines. Records of the strength test shall be kept for the life of the pipelines

6.6. Upon completion of the testing and dewatering of the pipelines, drying foam pigs, dryers, inert gases, and desiccants will be utilized to ensure no residual water nor moisture remains within the pipelines. Moisture content levels will be tested using dew point readers.

7. CATHODIC PROTECTION AND A/C MITIGATION

7.1. The pipelines will be factory externally coated with fusion bonded epoxy with an added abrasion resistant overlay

7.2. Girth welds of the pipelines will be sandblasted down to bare metal (near white sspc sp 10) and field-coated with an approved two-part epoxy coating system. An additional moisture cured outerwrap will be applied to girth welds at areas where pipeline will be installed by directional drilling methods.

7.3. The pipelines will be cathodically protected for corrosion control by using galvanic anodes, designed for the application. Soil resistivity testing will be conducted prior to design of the cathodic protection system.

7.4. Zinc ribbon will be provided in areas near high voltage electric overhead lines to prevent the impacts of induced alternating current from parallel electric transmission lines and ensure proper pipeline grounding for safety.

7.5. Testing cable leads will be cad welded to the pipeline at select areas and into a provided terminal post (Test Stations) for cathodic protection testing via pipe to soil potentials for electrical measurement to determine the adequacy of cathodic protection.

7.6. Within 6 months after project completion and placing the pipelines in service, An assessment to assess any coating damage and ensure integrity of the coating using direct current voltage gradient (DCVG) and alternating current voltage gradient (ACVG) will be performed to review and approve information about the integrity of the pipeline coating.

8. INSPECTION, QUALITY ASSURANCE AND QUALITY CONTROL

8.1. The construction of the pipeline segment will be done under a quality assurance plan addressing pipe inspection, hauling and stringing, welding, non-destructive examination of girth welds, applying and testing field applied coating, lowering of the pipeline into the ditch, padding and backfilling, and hydrostatic testing.

8.2. The engineer will designate an independent Certified Welding Inspector for the duration of the project to conduct all Visual inspection of welding to ensure that the welding is performed in accordance with the welding procedure.

8.3. The inspector will visually inspect each length of pipe and each feature at the site of installation to ensure that it has not sustained any visually determinable damage that could impair its serviceability

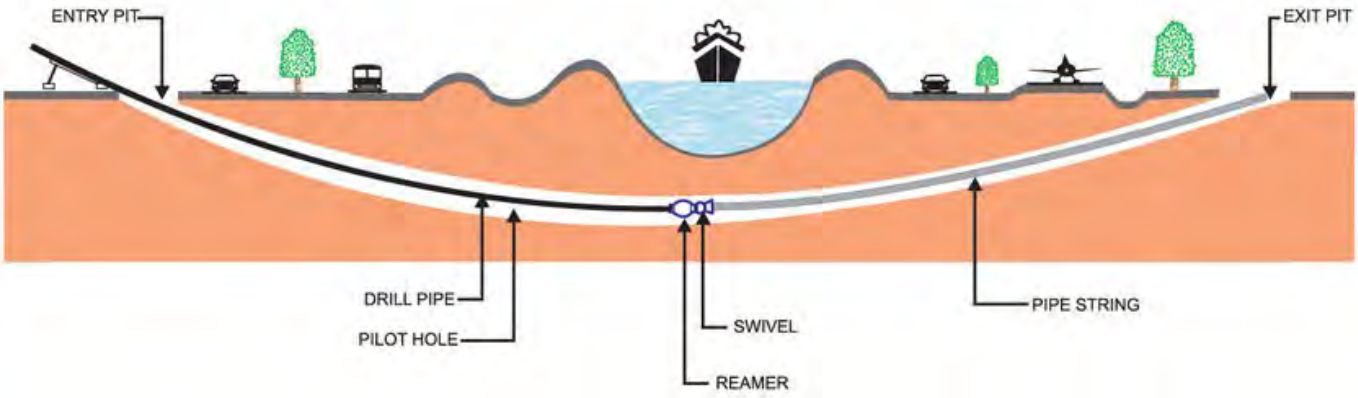
8.4. 100% of girth welds on the pipelines are to be nondestructively examined via radiography testing (X-ray). 100% of fillet welds on the pipelines are to be nondestructively examined via magnetic particle testing.

9. COMMISSIONING

9.1. The pipelines will be commissioned upon successful completion of the strength and leak test. The gas pipeline will be purged of air by use of gas, utilizing a slug of inert gas released into the line before the gas. A written purging and packing plan will be produced prior to commissioning.

APPENDIX "A"

INSTALLATION OF STEEL PIPE BY HORIZONTAL DIRECTIONAL DRILLING



The pipeline installation method for Road crossings, sensitive environmental areas, and other select areas will be by horizontal directional drilling trenchless methods to minimize disturbances to surfaces and existing conditions. The following summarizes the general steps, precautions and procedures taken to successfully install piping via horizontal directional drilling.

1. Safety and Equipment

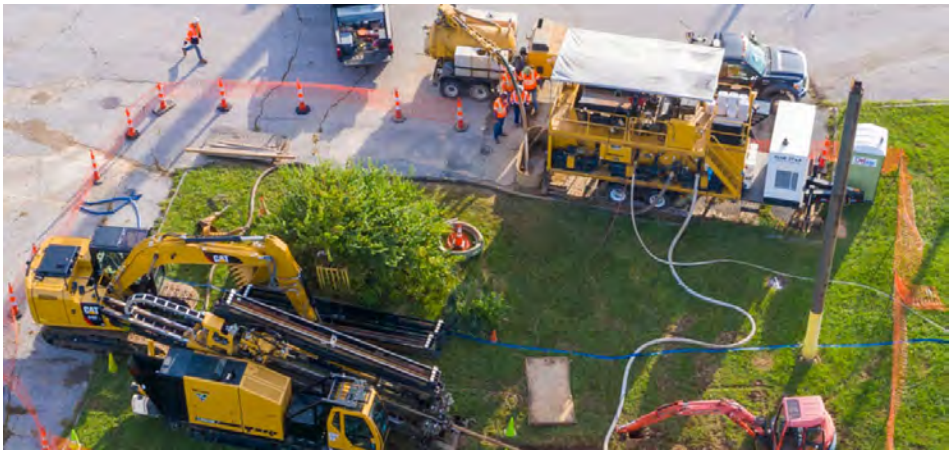
    a. All personnel shall be aware of applicable safety requirements identified in the Project Specifications and have required PPE and equipment in place before beginning procedure.

    b. **NOTE:** The Personal Protective Equipment (PPE) identified for this work task represents the minimum requirements to complete a job task safely. Additional PPE may be required depending on work conditions and available engineering controls. All personnel should review all hazards associated with a job in order to select the most appropriate additional PPE.

2. Safety From Electrical Shock

    a. Precautions to prevent electrical shock during pipe boring operations shall be taken. The pipe boring equipment shall be properly grounded to ensure operator protection in the event the bore rod or reamer comes in contact with an energized electric cable. During pipe boring operations and prior to touching, personnel should check all cables and equipment with a voltage detector. Personnel operating and coming in contact with pipe boring equipment should wear:
        i. Steel-toe or composite-toe boots
        ii. Dielectric overshoes that are clearly and permanently marked with ASTM F1117, supplier or manufacturer name, size and AC voltage rating.

iii. Hard hat (required if working in a construction zone or where head hazards are present)
iv. Electrically insulated gloves (Class 2) with a voltage rating of 17,000 volts or more must be readily available on the machine in case of strike and must be donned before exiting the machine.
v. Safety glasses
vi. Reflective vest DOT Class II (required if working near vehicular traffic)



Typical rig side staging area

3. Boring Instructions

a. Prior to Bore
i. Identify location of the planned drill path and measure the total length of the bore
ii. Ensure that all utilities along the bore path are marked. The bore crew should perform a visual inspection of the area surrounding the bore path to identify utilities that may have gone unmarked.
1. Above ground facilities such as transformers, pedestals, water boxes, valve boxes dip poles, sewer clean outs, and manholes are signs that underground utilities may exist.
2. Signs of recent excavations might also indicate the presence of underground utilities in the area.
3. If near commercial or residential structures, look for meters and other service facilities to confirm the presence of the marked utilities and their approximate location(s).
4. Special consideration should be given to water and sewer systems within the area that are private and cannot be easily located.
5. Ground-penetrating radar may be an effective means to identify hard to find utilities.
6. Internal sewer inspection cameras with lateral launch capabilities can be especially helpful in locating sewer laterals.
iii. All utilities which will be bored over or under, “cross bored”, must be exposed/spotted directly over the proposed bore path.

iv. When installed, ensure bore equipment stakes are installed a safe distance away from marked utilities.
v. When appropriate, make sure all grounding rods are installed a safe distance away from marked utilities.
vi. For directional bores, be sure the drill head locating device is calibrated and functioning properly within manufacturer specifications.
vii. For directional bores, consider the proper disposal and control of excess drilling fluids.

b. Performing Directional Bore

i. Determine proper location of drilling equipment and properly secure it from moving during drilling, reaming, or pullback.
ii. Mount a drill head onto a drill rod.
iii. A drilling slurry of water and bentonite, polymer, or a combination of both is used. Ensure that the reserve of this mixture is kept at an acceptable level throughout the drilling, reaming, and pullback process.
iv. Excess slurry or mud must be removed from the entry and exit pits. Use a Vac-truck or similar means to dispose of the mixture.
v. Following the drill manufacturer's instructions, guide the drill head into the ground. It may be necessary to excavate an entry pit to allow for the proper angle of entry to be achieved.
vi. Turn on the pump used for the drilling slurry once the drill head has fully entered the ground.
vii. Using the sonde located in the drill head and compatible locating equipment, monitor the location and depth of the drill head for the length of the bore. Ensure that existing utilities are avoided.
viii. Advance the drill head by attaching additional rods. Steering of the drill head can be achieved by pushing and/or rotating the rods. If necessary, apply proper lubrication to the inner and/or outer rod threads to ensure they can be separated.
ix. If an obstruction is reached, back the drill head up and direct it away from this area either horizontally or laterally.
x. Ensure the drill head is always at a sufficient depth to avoid “frack out” or seepage of drilling slurry/mud to the surface. If this happens, stop the drill head, shut off the drilling

Typical downhole hydraulic motor with rock bit for cutting hard rock

slurry pump, and clean up the excess mixture. Back the drill head up and direct it away from this area, either horizontally or laterally.

xi. Multiple passes can be made to ensure the final bore hole diameter is 120% to 150% of the pipe size to be installed. If this is necessary, remove the drill head once it has exited the ground, install the reamer, and follow instructions for pullback. Repeat steps above for boring to get the reamer to the exit pit. Perform this as many times as necessary, using a larger reamer head each time to achieve the proper sized bore hole.

Typical Drill string welded and coated, prepped for pullback

c. Performing Pull Back

i. Attach the pipe to the pulling head. Using a swivel, attach the pulling head to the reamer.
ii. Use a holiday detector/jeep to find pinholes in coating. Repair prior to pull back.
iii. Visually inspect the coating as the pipe enters the ground to ensure it is not damaged. Pipe coating must be a minimum of 47 mils prior to pullback.
iv. Ensure all joints or other coating damages are coated using a two part epoxy. Prior to pulling pipe back make sure the proper mil thickness has been applied and that the epoxy coating has properly cured.
v. After pullback, inspect the leading end of the pipe for coating damage. As workspace allows, the inspection of a minimum pipe length of 10 feet is recommended or a length sufficient to ensure sound pipe coating integrity.

vi. If coating damage is found, additional pipe shall be inspected to determine the extent of the damage and repaired as necessary per Procedure of Application of Coating. As appropriate based on inspection findings, consult with Engineer of Record for final determination on any further action required.

Typical pipeline pullback

ROADMAP: PROJECT MILESTONES[1]

Phase 1
- July 2024[2]
- 57 MW of New Gas Generation at Clifton only

Phase 2
- January 2025
- 114 MW Gas Generation

Phase 3
- 4Q 2025
- 175 MW Gas Generation in combined cycle

Phase 4
- 2Q 2026
- 190 MW Gas generation

LNG VESSEL TO BULLET TANKS

- Use LNG vessel as storage until 8 onshore bullet tanks in place
- LNG vessel refills monthly
- 2 GE Turbines at BPL Clifton CPPS (temporary)

LNG PIPELINE: GAS TO BHPP

- Natural Gas pipeline installed from Clifton Pier to Blue Hills;
- 2 more GE turbines operate on gas at BPL Blue Hills Power Plant (BHPP)
- Weekly LNG Deliveries from Shell

COMBINED CYCLE

- Weekly LNG Deliveries to 4 GE Turbines operating in combined cycle at BPL Blue Hills Power Plant

FLOATING STORAGE UNIT (FSU)

- Moored at Clifton Pier with ~3 months LNG storage
- 15-year time charter
- BPL Station A converted to operate on LNG

Requests to DEPP:

1. Use of existing environmental data
2. Present environmental reports in phases as per the above plans
3. Obtain approvals from DEPP in phases as per the above plans
4. Next steps

[1]Timeline dependent on commercial agreements and Government approvals including permitting
[2]Expected start up is 3-5 months after Government commitment

November 1, 2024

Re: Island Grid's T&D Improvements on New Providence Island, The Bahamas

On behalf of Bahamas Grid Company and Island Grid, Pike Electric will serve as construction contractor while Pike Engineering will provide the engineering and regulatory support services for the Project. In addition, Pike Engineering has contracted directly with Waypoint Consulting to support the environmental and regulatory review process where needed. Waypoint Consulting (Melissa Alexiou) is a Bahamian-owned company and approved by the Department of Environmental Planning & Protection (DEPP).

Currently, the majority of the existing transmission and distribution (T&D) network is radially-fed, meaning that little-to-no redundancy exists to maintain electrical service to consumers when outages occur as a result of planned or unplanned outages. The T&D grid improvements outlined below will tie many of the various transmission lines and substations together, creating redundancy by adding back-feed/switching capabilities. These T&D network upgrades will significantly increase the reliability of electrical service and improve the grid's resiliency against extended storm-related outages. Figure A illustrates the proposed improvements while Table A and Table B describes the individual scopes of work in more detail.

Figure A

Legend

- Future Substation
- Clifton - Big Pond #1 132kV Transmission Line[1]
- Clifton - Blue Hills 132kV Transmission Line[1]
- Clifton - Big Pond #2 132kV Transmission Line[1]
- Big Pond - Blue Hills 132kV Transmission Line[2] (future)

Notes

[1]Transmission alignments are not to scale and are shown for informational purposes only.

[2]Final alignment to be determined following the completion of engineering and easement acquisition.

While various individual improvements are proposed, they are all interdependent on one another to meet the service capacity and reliability needs of New Providence Island, and thus are considered one single "Project". Pike understands that land-disturbing work conducted in The Bahamas necessitates a review by DEPP, and if determined that the Project is acceptable a Certificate of Environmental Clearance ("CEC") will be issued. Following the issuance of the CEC permit, applicable building permits may also be required from the Ministry of Works and Department of Physical Planning.

Five transmission-related improvements and three substations are initially proposed, with other similar improvements to be made in the future as determined to be necessary. The vast majority of the initial work exists within either a footprint of an existing facility (i.e. transmission right-of-way), or on parcels cleared of vegetation and occupied/disturbed by previous activities (i.e. substations).

Transmission Line General Specifications

- Existing Poles to be Replaced: Wood poles, typically 60 feet in height, 22" in diameter, spaced 300-350' apart.
- Replacement Poles: Steel poles, typically 75 feet in height above ground, 30" in diameter, spaced 300-400' apart. Augured hole for the installation of the poles will be 4' in diameter, resulting in about 10 cubic yards of material to be spoiled and spread within existing right-of-way per pole location.
- Access: Due to the existing transmission right-of-way that has been utilized for many years to construct and maintain the lines, each of the transmission corridors has high-quality access roads to the existing and new structure locations. Minimal, if any, improvements will be necessary to accommodate construction access.

Table A

Table A: Transmission Scopes of Work	
Clifton – Big Pond #1 132kV	
Scope	15.6 miles of overhead line. Reconductor to 795 aluminum conductor steel-reinforced cable (ACSR) and optical ground wire (OPGW). Of the total length, 13.7 miles need poles replaced. Within these pole-rebuild areas, 218 existing poles will be removed and only 178 will be installed due to increased span lengths.
Category of Activity	Modification (existing cleared transmission right-of-way)
Clifton – Big Pond #2 132kV	
Scope	14.7 miles of overhead line. Reconductor to 795 ACSR and OPGW. Of the total length, only 4.6 miles need poles replaced. Within these pole-rebuild areas, 81 existing poles will be removed and 83 will be installed.
Category of Activity	Modification (existing cleared transmission right-of-way)
Clifton – Blue Hills 132kV	
Scope	13.1 miles of overhead line. Install OPGW only. No work anticipated on the transmission line to rebuild the poles or reconductor.
Category of Activity	Modification (existing cleared transmission right-of-way)
3-way Switch Pole at JFK Blvd / Gladstone Rd	
Scope	New switch pole to be installed to tie the Clifton - Big Pond #1 132kV and Clifton - Skyline 132kV lines together. Installed within existing transmission right-of-way.
Category of Activity	Modification (existing cleared transmission right-of-way)
Big Pond – Blue Hills 132kV (see Figure B)	
Scope	1.9 miles total. Approximately 0.90 miles will attach to same poles being rebuilt for the Clifton – Big Pond #2 line. Approximately 0.76 will include a new route alignment between Roberts Dr and Blue Hills Power Station, which will include an estimated 21 poles. Existing road/driveway corridors are expected to be utilized for construction, and no new access roads are anticipated.
Category of Activity	54% Modification (existing cleared transmission right-of-way), 46% New Construction

Table A (Continued)

Table A: Transmission Scopes of Work	
Big Pond – Blue Hills 132kV (see Figure B)	
Scope	1.66 miles total. From the Big Pond Switching Station to just below Roberts Drive, approximately 0.90 miles of the Big Pond – Blue Hills line will attach to the same poles being rebuilt for the Clifton – Big Pond #2 line. This section will be constructed double-circuit. From the general area south of Roberts Drive, the Big Pond – Blue Hills line will continue south for approximately 0.76 miles to the Blue Hills Substation utilizing single-circuit construction. Portions of this section will involve overbuilding existing distribution along Chapel Drive. This will involve constructing the new transmission line, removing the existing distribution poles, then reattaching the distribution conductor to the new transmission poles. This construction method is beneficial as it collocates these facilities into a single pole-line, allowing for a clean and simple profile. While subject to change depending on final design, approximately 21 transmission poles are estimated for this new section of line. Benefits to this alignment include the utilization of existing road/driveway corridors for access, so no new access roads are anticipated to be constructed. Approximately 0.10 miles of new tree clearing will be required along Chapel Drive. An additional 0.12 miles of clearing will be needed between the Commonwealth and Global Prayer Grotto and Blue Hills Power Station, an area characterized by slopes that approach 70 feet of elevation change. Engineering has determined that only a pole at the top and bottom of these steep slopes will be needed. Because the conductor can be strung between the poles utilizing pedestrian methods of pulling a "fingerline" attached to the conductor, no access roads will be needed on the slopes. Clearing methods will include shearing the trees to ground level and leaving the root mats intact, which minimizes soil disturbance.
Category of Activity	54% Modification (existing cleared transmission right-of-way), 46% New Construction

Figure B

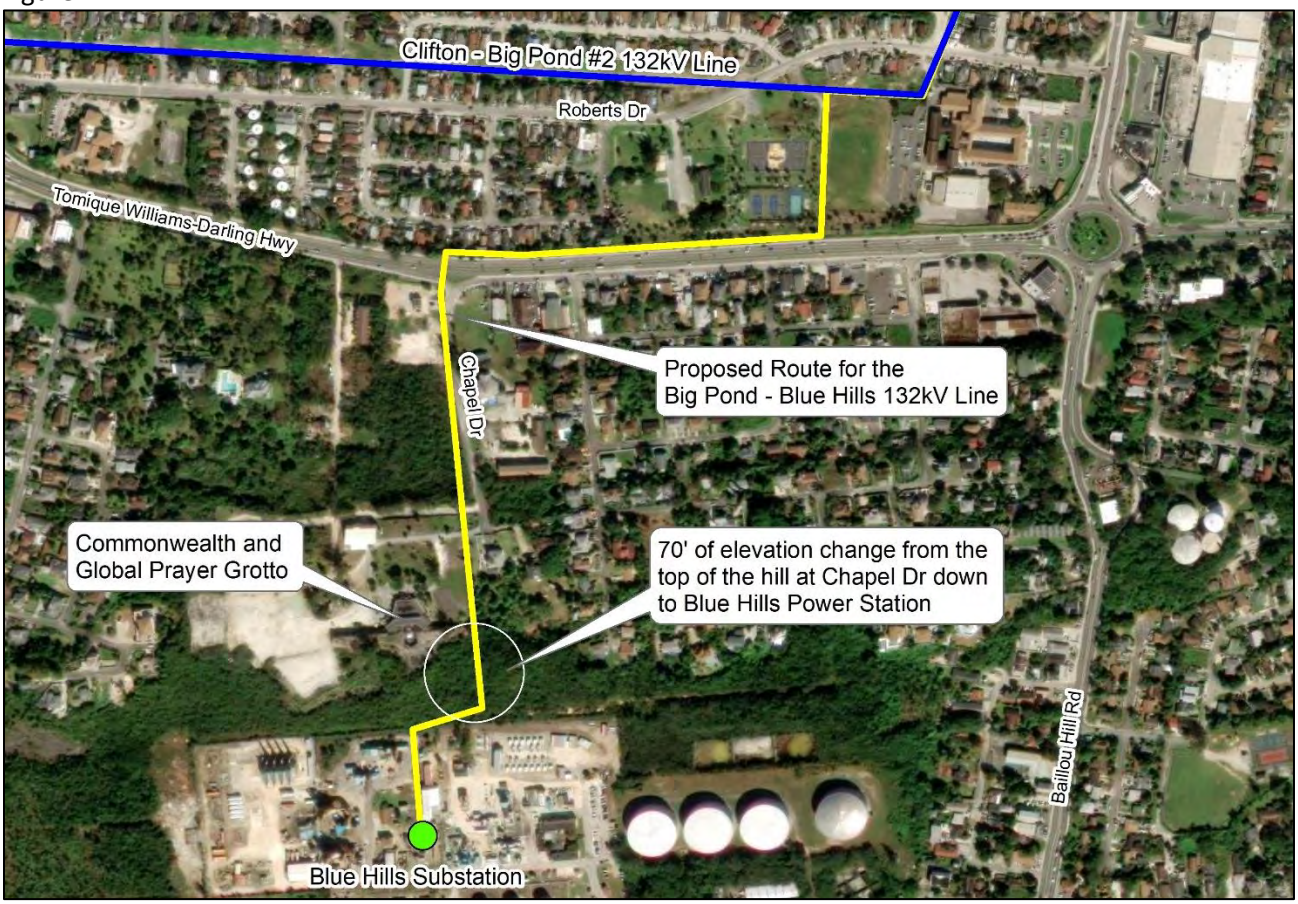


Table B

Table B: Substation Scopes of Work	
Clifton Switching Station	
Scope	Switching station at Clifton Pier. Fence dimensions are approximately 286' x 300'. Approximately 14,000 cubic yards of earthwork (import) are expected to be required, which is about 2' above existing grade.
Category of Activity	New construction.
Existing Land Conditions	The substation will site partially within an approximate 170'-wide transmission line corridor, and partially outside the corridor. The project site is mostly cleared with the only vegetation being scrub / shrub in nature. No mature trees are present. The project site shows evidence of previous grading and general land disturbing activities. No water features are visually apparent. No residences or public roads are within visual proximity of the proposed station.
Big Pond Switching Station	
Scope	Substation on a parcel adjacent to BPL headquarters between Tucker Rd and Cordeaux Ave. Fence dimensions are approximately 210' x 405'. Approximately 8,000 cubic yards of earthwork (cut pushed into fill) are expected to be required. A wall is proposed around the perimeter of the substation for security and aesthetic purposes.
Category of Activity	New construction.
Existing Land Conditions	Much of the existing parcel is encumbered by existing overhead electrical lines that originate at BPL's headquarters. The site is relatively flat and void of any trees or scrub/shrub vegetation. No water features are visually apparent. Adjacent land uses include the Mabel Walker Professional Development Institute & Virtual School Bahamas to the west, BPL headquarters to the north, a commercial use to the east, Big Pond to the southwest, and the National Insurance Board to the southeast.
Blue Hills Substation	
Scope	Substation to be constructed within the existing Blue Hills Power Station. The station dimensions are approximately 50' x 60'. No grading/leveling is anticipated other than to install structure foundations.
Category of Activity	Modification to an existing substation.
Existing Land Conditions	Existing electrical generation infrastructure. No vegetation or water features are present. No residences or public roads will have views of the proposed facility.

Sincerely,

Nathan V. Bass, PLA

Appendix B: Draft Environmental Monitoring Documents

Appendix B-1: Incident Report Form

Incident Report Form

Date of Incident:		**Time of Incident:**	
Type of Incident (mark 'X' next to appropriate option below)			
Chemical Spill	Excessive air emission	Sediment	Health & Safety
Sanitary Spill	Vegetation Damage	Flood	Excessive Noise
Excessive Odor	Waste Management	Fire	Fauna Injury
Details of Incident:			
Response to Incident:			
Measures to prevent reoccurrence:			
Name:		Position:	
Signature:		Date:	

Appendix B-2: Hazardous Waste Report Form

Hazardous Waste Report Form

Date of Incident:	**Time of Incident:**
Reporting's Party Name:	
Position:	
Address/Island:	
Phone:	
Description of Hazardous Material (including name and any unique formulas identifiers (UFI's for the containers):	
Weight or volume of material disposed of:	
Location where material was collected:	
Location where material was disposed of:	
Summary of disposal methods:	
Name of Licensed Contractor:	**Position of Licensed Contractor:**
Signature of Licensed Contractor:	**Date of Disposal:**

Appendix B-3: Environmental Monitoring Checklist

Environmental Monitoring Checklist

Site description:	Location:	Weather Conditions:
	GPS Coordinates:	

1	Site Safety and Health	YES	NO	Comments/ Prescribed Corrective Actions
a	Is personal protective equipment used appropriately?			
b	Are there proper safety requirements for work sites near water?			
c	Are there proper safety requirements for works at heights?			
d	Are open pits secured with caution tapes and or cones?			
e	Is there adequate fresh drinking water available? Shade provided			
2	**Waste Management**			
a	Are appropriate waste storage containers being used and properly labelled?			
b	Are litter bins conveniently placed throughout the site?			
c	Is waste collection needed?			
d	Is hazardous waste separated in laydown area?			

e	Are there solid waste ticket receipts for landfill disposal of onsite waste?				
3	**Air Quality Management**				
a	Are speed restrictions of 15mph adhered to?				
b	Are equipment properly maintained to reduce emissions?				
c	Are dust suppression mechanisms implemented?				
4	**Material Storage**		**YES**	**NO**	**Comments/ Prescribed Corrective Actions**
a	Are material in storage area secured to prevent airborne debris?				
b	Are fill stockpiles located more than 100 feet from open water?				
c	Is silt fencing installed around the perimeter of fill stockpiles?				
5	**Groundwater Management**				
a	Is refuelling on concrete apron or lined fuel pad in case of spillage?				
b	Are fuel and oil storage on concrete apron or lined containment pad in case of spillage?				
c	Are fuel and oil storage containers free from leaks or signs of corrosion?				
d	Is there adequate secondary containment for fuel and oil storage units?				

e	Are secondary containment covered to prevent ingress of rainwater?			
f	Are mobile machine repairs and maintenance on concrete apron or lined containment pad in case of spillage?			
g	Are all mobile machinery in use free from engine lubrication and oil leaks?			
	Is spill response equipment on site and easily accessible?			
h	Is cement storage on concrete apron or lined containment pad?			
i	Is concrete washout established and appropriate with liner installed?			
j	Are there any excavations with exposed groundwater?			
k	Is fuel and oil storage a minimum of 100 feet from any excavations with exposed groundwater?			
l	Are refuelling operations a minimum of 100 feet from any excavations with exposed groundwater?			
6	Portable Potties/Restroom facilities	YES	NO	Comments/ Prescribed Corrective Actions
a	Are facilities conveniently located?			
b	Are units clean and stocked with supplies?			
c	Are there proper disposal bins for feminine sanitary waste?			

d	Are the units on concrete apron or lined containment pad in case of spillage?			
e	Are units a minimum of 100 feet from any excavations with exposed groundwater?			
f	Are units a minimum of 100 feet from waterbody?			
7	Protection of Waterbodies & Sediment Control			
a	Is silt fencing adequately placed, properly installed and maintained?			
b	Are turbidity curtains adequately placed, properly installed and maintained?			
c	Is there any turbidity observed outside turbidity curtain containment area?			
d	Is there any oil or grease observed?			
e	Are there poor water quality indicators, i.e., algae growth, dead marine life?			
f	Is fuel and oil storage, a minimum of 100 feet from waterbody?			
g	Are refuelling operations a minimum of 100 feet from waterbody?			
h	Is there any plastic or other solid waste in water?			
i	Is marine organism spotter in place prior to marine work?			
8	**Vegetation**	**YES**	**NO**	**Comments/ Prescribed Corrective Actions**

a	Has protected trees been maintained or relocated?					
b	Are invasive species removed?					
c	Is native vegetation used in landscaping?					
d	Is there build-up of dust on vegetation?					
9	**Noise**					
a	Is there excessive noise on site? Complaints?					
b	Construction signs visible?					
c	Is there proper lighting available?					
d	Is access being controlled to ensure that only authorized persons are being allowed onsite?					

Inspected by:	**Signature:**
Date:	
I, the Contractor's Representative, have read, understood, and affirm to the conditions and remarks cited by the above Environmental Manager.	
Name:	**Signature:**

Date:	

Appendix B-4: Monthly Environmental Report Template

MONTHLY ENVIRONMENTAL REPORT TEMPLATE

1.0 OVERVIEW

Indicate report period and construction activities during period.

2.0 SITE INSPECTION

Summarize observations made during site inspections for each monitoring parameter indicatedon the site inspection sheet. Include site inspection sheets for the period as an appendix to this report.

3.0 REPORTS &COMMUNICATION

Provide details on reports submitted during this period including NCR, Incident Report, Fuel Spill Report, Turbidity and Grievance Monitoring Reports. Attach copies of reports as an appendixto this report.

Summarize communication with relevant agencies including Department of Environmental Planning & Protection, Department of Environmental Health, Department of Marine Resources and incidents logged into the BESTPROTECT242 APP.

4.0 MEETINGS

Record any meeting during this period where environmental management matters were discussed including construction progress meetings, meetings with the Contractor to address specific environmental matters and meetings with government officials. Minutes of meeting should be included as an appendix to this report.

5.0 TRAINING

Provide details on all training exercises conducted during this period including site inductions and toolbox talks. Register of individuals undergoing training should be included as an appendix tothis report.

6.0 STAKEHOLDER ENGAGEMENT

All stakeholder engagement activities during the period should be included and the update stakeholder engagement log attached as an appendix to this report.

Appendix B-5: Nonconformance Report Form

Nonconformance Report Form

SECTION 1: COMPLETED BY THE ENVIRONMENTAL MANAGER

NCR No.	**Specific:**
Contractor:	
Activity:	☐ Site Safety
Non-Compliance: ☐ Environment ☐ Health &Safety	☐ Groundwater Management
Details:	☐ Sediment Control
	☐ Vegetation
Details of Nonconformance observation (Attach photos on separate page)	☐ Marine Environment
	☐ Waste Management
	☐ Air Quality
	☐ Other

Recorded by:			
Signature:		Date:	

SECTION 2: COMPLETED BY THE CONTRACTOR (*returned to Environmental Manager)*

Contractor's response, intended method and date of repair

SECTION 3: CLOSE OUT

Correction Completed and Report Closed Out:

Environmental Manager		Date:	
Contractor's Representative		Date:	

Appendix C: Invasive Species Management Plan

1.0 Introduction

Removal of invasive species from the site is proposed as a mitigation for habitat loss. While this activity will have a positive impact on the terrestrial environment there are also risks associated with executing the task that should be managed.

2.0 Purpose

The purpose of this plan is to ensure that potential impacts associated with invasive species removal are addressed. Specifically, this plan aims to:

- Provide guidance on the removal of existing invasive plant species on site;
- Decrease the likelihood of invasive plant species re-emerging after removal; and
- Ensure that new and or additional alien invasive species are not introduced through the Project.

3.0 Applicable Legislation

The following National Legislations relevant to the physical and natural environment apply to activities with the potential to impact invasive species management.

- Environmental Health Services Act (Amended 2004).
- Wild Birds Protection Act (Amended 1994).
- Conservation and Protection of the Physical Landscape of The Bahamas Act (Amended 2000).
- The Bahamas National Trust Act (Amended 2010).
- The Forestry Act (2010).
- Forestry Act Declaration of Protected Trees Order 2021.
- Department of Planning and Protection Act 2019.

4.0 Definitions

The following definitions relating to invasive species management are listed in The Bahamas National Invasive Species Strategy (2013) as:

Alien species *– non-native, non-indigenous, foreign, exotic species occurring outside of their natural range and dispersal potential, and includes any part, such as seeds and larvae, that might survive and subsequently reproduce.*

Biodiversity *– The variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems. Short for biological diversity.*

Control *– Measures to eliminate or reduce the effects of invasive species, including eradicating infestations, reducing populations of invasive species, preventing their spread and mitigating their impact on the economy.*

Intentional introduction *– An introduction made deliberately by humans, involving the purposeful movement of a species outside of its natural range and dispersal potential. Such introductions may be done legally or illegally.*

Introduction *– The movement by human agency of a species, subspecies or lower taxon outside its natural range. This movement can be either within a country or between countries.*

Invasive alien species *- Alien species that become established in a new environment, then proliferate and spread in ways that are destructive to native ecosystems, human health, and ultimately human welfare.*

Native species *– A species occurring within its natural range and dispersal potential, i.e., within the range it occupies naturally or could occupy without direct or indirect introduction or by care of humans. Those plants and animals that occurred when Columbus arrived.*

Sanitary or phytosanitary measure *– Any measure applied: To protect animal or plant life or health within a country from the risks arising from the entry, establishment or spread of pests, diseases, disease-carrying organisms or disease-causing organisms.*

Unintentional introduction *– An unintended introduction made as a result of a species utilizing humans or human delivery systems as vectors for dispersal outside its natural range.*

5.0 Potential Impacts

Potential impacts associated with invasive species during development & operations include:

- Spread of invasive species from existing individuals on the site.
- Introduction of additional individuals of existing species.
- Introduction of new plant and animal invasive species.

Pathways for introduction and spread of invasive species during construction include:

- Regeneration of plants from improper removal.
- Transfer of seeds and other propagative parts from one location to the next.
- The introduction of invasive plants for landscaping.
- The introduction of invasive animals with the importation of plants for landscaping.

6.0 Removal Methodology

6.1 Upland Removal

To prevent damage to retained vegetation, invasive species within the interior of the site that are not within areas to be developed will be manually removed and the stumps treated with herbicide to prevent regrowth.

6.2 Herbicide Treatment Removal

Stumps of invasive species should be treated with the herbicide, Pathfinder II® Triclopyr. This product is comprised of 13.6% butoxy ethyl ester and 86.4% inert ingredients – nonpetroleum natural base oil solvent. While the use of herbicides can enhance native plant communities by removing undesirable species and increasing native species, there is the potential for exposure and impacts to human health, non-target organisms, and the environment. Herbicide applicators generally face the greatest risk and potential for exposure, particularly during mixing and loading. Non-users can be affected by direct contact through spray drift and accidental spills and indirect contact through consumption of contaminated food or water. As herbicides have been designed to target biochemical processes, such as photosynthesis, that are unique to plants they typically are not acutely toxic to animals, however, data indicates that some herbicides can have subtle, but significant, physiological effects on animals, including developmental effects.

Exposure can be from spills or leaks, improperly discarded herbicide containers, and disposal of rinsing water. Contamination can also occur due to surface runoff or leaching of herbicides. Spray drift and volatilization of herbicides can transport the chemical into the atmosphere during and after application, potentially allowing herbicides to reach surface water and groundwater via precipitation.

Improper use or misapplication can increase these risks. To minimize herbicide exposure, follow herbicide label instructions and established safety procedures for application including:

- The safest and easiest approach is to carefully paint the entire stump top with the herbicide after cutting.
- To increase effectiveness, ensure that herbicide is applied just inside the bark around the entire circumference.
- Cut stump treatments will not be applied when rain is expected within 4 to 6 hours.
- Follow the herbicide label and use the required Personal Protective Equipment (PPE) including eye protection and gloves.
- Avoid leather gloves and leather boots when applying herbicides as they will readily adsorb many herbicides.

7.0 Disposal

7.1 Debris Disposal

Proper disposal of debris from the invasive species removal exercise is critical in preventing the spread of invasive species to other areas of the site. Improper disposal of branches can spread

seeds to parts of the island that do not have invasive species. One of the reasons that invasive species are prolific is that many of them reproduce by more than one mechanism.

7.2 Disposal of products

Proper disposal of unused herbicide and cleaning of container for herbicide mixing is also essential. Containers with unused mix will not be left in the field. All unused portions of herbicide mix will be discarded in a container that is labelled and discarded as hazardous waste. Containers used for mixing will be designated for this task specifically, labelled to identified designated use and discarded as hazardous waste upon completion of the exercise (See Appendix B-2: Hazardous Waste Report Form).

8.0 Revegetation

Planting of native species will take place immediately after removal to prevent revegetation of invasives. Revegetation of the areas where invasives are removed will be done under the supervision of a revegetation specialist or professional that is well versed in the identification of native and invasive species at all stages of development.

9.0 Protocols to prevent introduction of new invasive species

In addition to removing existing invasive species and ensuring that there is no spread of invasives from the removal exercise, there will be no introduction of new invasive species to the site as a result of the Project.

Biosecurity protocols to prevent the introduction of invasive species to the site will involve the following preventive measures:

- Local procurement of plants will be a first option.
- Any invasive plant material will be disposed of by incineration.

10.0 Conclusion

This invasive species removal and control plan is intended to guide the process of invasive species removal from the site and outline measure to prevent reestablishment of new introductions. This document is to be used as a part of the overall landscape management of the site.

Appendix D: Fuel Spill Prevention Plan

The following Spill Prevention and Response measures will be implemented to prevent or mitigate escalation in the event of a possible spill.

SPILL PREVENTION MEASURES

The following proactive measures will be adopted to prevent the likelihood of spill event:

- The Health and Safety Officer (HSO) will provide training to construction staff and Contractors regarding proper methods for transporting, transferring, and handling substances that have the potential to impact human health or the environment.
- Preventative program including inspection and maintenance schedules to confirm and maintain the mechanical integrity and operability of equipment.
- Implementation of Standard Operation Procedures (SOPs) for handling materials including refueling vehicles, the use of diesel/oil absorption blankets, the use of diesel tanks, the use and handling of processing chemicals, and managing secondary containment areas.
- Fuel will be purchased locally and immediately transferred to vehicles on site using a fuel pump. No fuel will be stored on site.
- Provision of secondary containment, drip trays or other overflow and drip containment measures, for hazardous materials containers at connection points or other possible overflow points. Identification and provision of all equipment necessary to handle, transfer or transport materials properly.
- Use of transfer equipment that is compatible with and suitable for the characteristics of the materials transferred and designed to ensure safe transfer.
- Use of dripless hose connections for vehicle tank and fixed connections with storage tanks.
- Review of all potential pollutants' characteristics prior to introduction to site and establishment of proper storage, handling and transportation procedures and spill risk analysis.
- Material Safety Data Sheets (MSDS) for all contaminants on-site will be readily available. These will include the human health effects of chemicals handled and will be included in the required chemical environmental and safety training for all employees handling or otherwise exposed to the contaminants. All appropriate Personal Protective Equipment (PPE), handling and response procedures will also be identified in the MSDS or otherwise recommended by the suppliers/manufacturers and will be followed by the Project staff.
- Bulk transfers of chemicals during delivery will be observed by workers to identify preliminary hazards.
- SOPs will be adhered to for chemical transportation, unloading, transfer, storage (if required), and handling. Use and disposal shall be developed, kept current, effectively implemented.

- Adequate quantities of emergency spill response materials will be readily available in designated storage areas. Spill response equipment should include, but not limited to, hazmat suit, thermal protective clothing, thermal leather water resistant gloves, safety chemical goggles, absorbent materials, flocculating agents, hazardous waste disposal bags, brooms, and dustpans.
- Installation of hazard detection systems. All new facilities and new ships will use hazard detection systems (quick closing valves and dampers, fire mains and pumps, dry chemical and fixed CO2 systems, and water mist systems) to prevent potential leaks or spills from occurring.

SPILL CONTROL AND COUNTERMEASURES

The following spill control and countermeasures will be followed in the event of a spill incident:

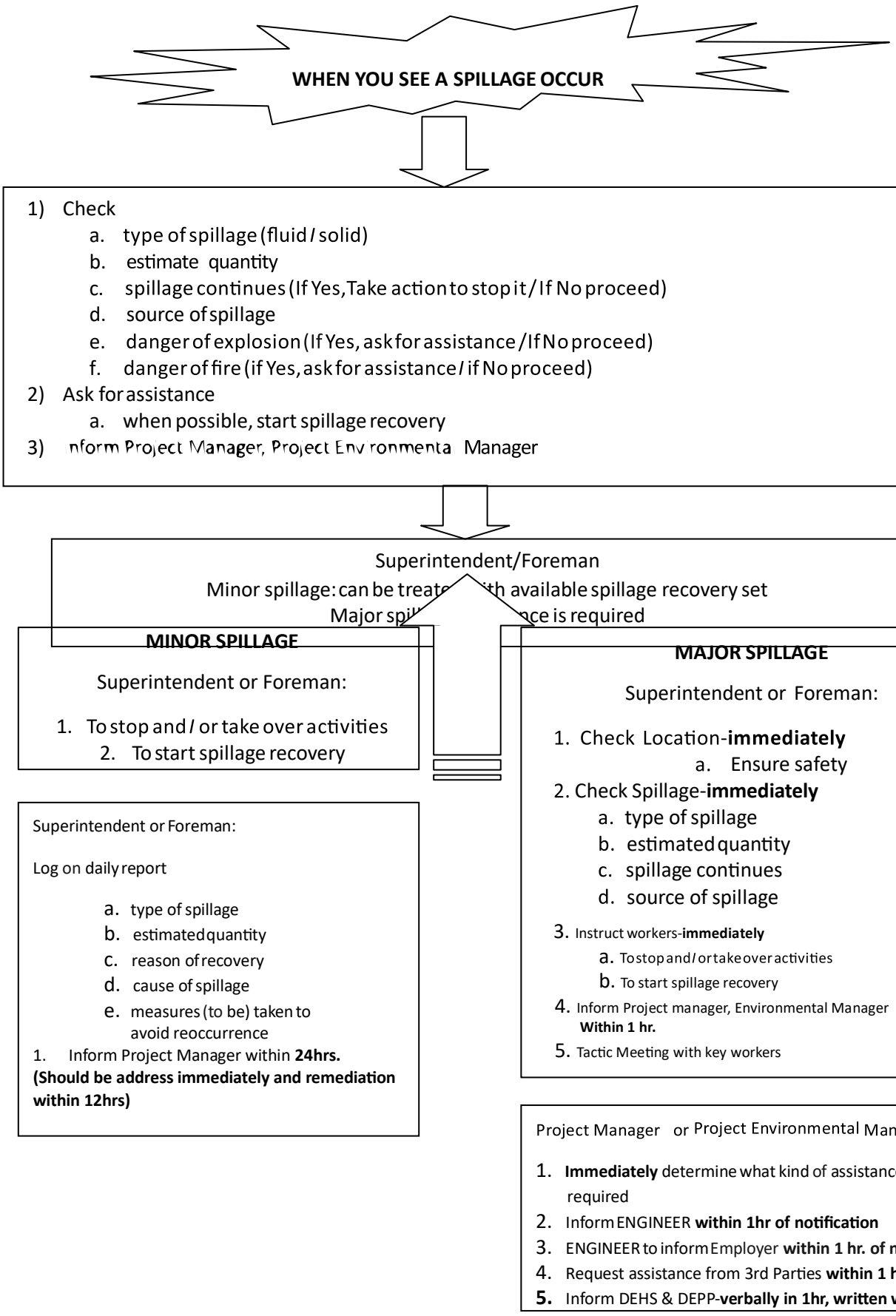
- Maintenance of updated emergency contact information list at all spill response kit's locations.
- Maintenance of spill route maps (perceived overland flow path [flow gradient] and likely contamination point [i.e., surface water features, potable boreholes etc.] of a given contaminant substance) at potential spill locations.
- Document availability of all spill response equipment that can handle a large spill (See Appendix D-1: Spill Report Form).
- Document availability of specific personal, protective equipment, and the necessary training needed to respond to different potential spills.
- Maintenance of spill response kits on all Project fuel and lubrication sites and vehicles.
- Maintenance of spill response guidelines at all spill response kit locations.
- Maintenance of an updated table of all contaminants on-site and recommended spill response procedures.
- Maintenance of extinguishers.
- Development, implementation, and regular training and testing of a facility-wide Spill Response Plan.
- First-aid trained workers on site.
- All spills will be reported to appropriate management workers.

SPILL RESPONSE PROCEDURE & COMMUNICATIONS

The Spill Response Procedure describes what to do when you see a spillage occur.

The Project Manager (PM) is responsible for notifying the Environmental Manager (EM) immediately on the discovery or notification of a spill, that Emergency arrangements are made, and communication lines are established with relevant agencies and authorities.

The PM is to ensure that employees on the Project are aware of the emergency telephone numbers, addresses, and response procedures. Furthermore, the PM ensures, either via the local agent or direct, that the Department of Environmental Planning and Protection (DEPP) and the local authorities are made aware of the existence of the Project. ALL spills are to be reported to DEPP.


WHEN YOU SEE A SPILLAGE OCCUR
1) Check
a. type of spillage (fluid / solid)
b. estimate quantity
c. spillage continues (If Yes, Take action to stop it / If No proceed)
d. source of spillage
e. danger of explosion (If Yes, ask for assistance / If No proceed)
f. danger of fire (if Yes, ask for assistance / if No proceed)
2) Ask for assistance
a. when possible, start spillage recovery
3) nform Project Manager, Project Env ronmenta Manager
Superintendent/Foreman
Minor spillage: can be treate ith available spillage recovery set
Major spil nce is required
MINOR SPILLAGE
Superintendent or Foreman:
1. To stop and / or take over activities
2. To start spillage recovery
MAJOR SPILLAGE
Superintendent or Foreman:
1. Check Location-immediately
a. Ensure safety
2. Check Spillage-immediately
a. type of spillage
b. estimated quantity
c. spillage continues
d. source of spillage
3. Instruct workers-immediately
a. To stop and / or take over activities
b. To start spillage recovery
4. Inform Project manager, Environmental Manager
Within 1 hr.
5. Tactic Meeting with key workers
Superintendent or Foreman:
Log on daily report
a. type of spillage
b. estimated quantity
c. reason of recovery
d. cause of spillage
e. measures (to be) taken to avoid reoccurrence
1. Inform Project Manager within 24hrs.
(Should be address immediately and remediation within 12hrs)
Project Manager or Project Environmental Manager:
1. Immediately determine what kind of assistance is required
2. Inform ENGINEER within 1hr of notification
3. ENGINEER to inform Employer within 1 hr. of notification
4. Request assistance from 3rd Parties within 1 hr.
5. Inform DEHS & DEPP-verbally in 1hr, written within

EMERGENCY RESPONSE EQUIPMENT

In the unlikely eventuality there is a spill, on the site there will be Environmental Emergency Response kits. These spill kits will consist of the following listed materials (or similar):

- Absorption pads (43 x 48 cm).
- Absorption rolls (96 cm x 40 m).
- Spill drum for contaminated materials.
- Absorption socks (7.6 cm x 1.2 m).
- Sack of absorption grit.
- Plastic foil.
- Hazmat Suit
- Thermal Leather Water Resistant Gloves
- Safety Goggles
- Hazardous Waste Disposal Bags
- Brooms
- Dustpans
- Fire Extinguishers

Once an eventual spill has been cleaned-up all contaminated materials will be packed in plastic sacks and / or foil and placed in the disposal drum. This drum will be transported to an eventual waste recycling / treatment facility or to a location approved by the DEHS and/or New Providence Ecology Park (NPEP).

EMERGENCY PREPAREDNESS

The Contractor should anticipate and prepare in general for the following scenarios:

- Serious personal injury/fatality.
- Road traffic accident.
- Fire or explosion.
- Spillage of fuel or hazardous substance.
- Severe weather conditions (Hurricanes, Tropical Storms, Tornadoes).
- Evacuation of work site; and
- Damage to Third party Property.

Priority for action of each scenario is as follows:

1. Saving lives and people safety.
2. Avoid or limit environmental damage.
3. Control of situation.

4. Establishing site safety; and
5. Salvage and repair.

SPILL REPORTING PROTOCOL

Step 1: All workers on the work site and assigned to the Project will be responsible for implementation with the PM and EM providing coordination of efforts. A report will be generated by the Contractor and disseminated to relevant parties including DEPP.

Emergency Contacts:

Project Manager
TBD
Environmental Manager
Janeen Bullard
1-242-357-9262

Director of DEPP
Rhianna Neely-Murphy,
1-242-322-4546

Department of Environmental Health Services
Anthony Ryan
1-242-557-0379

Step 2: When contact is made with the above individuals, report the following information (See Appendix D-1: Spill Report Form):

- Location of Spill.
- Source of Spill.
- Time of Spill.
- Volume of Spill.
- Potential Hazard of Spill.
- Has the spill been contained?
- Has the spill material reached a body of water?
- Responsible party's name, address, telephone, official to contact, etc.
- Weather conditions at the spill site.

Step 3: If the spill report is not made by the PM, the reporter will communicate the above information to him/her as soon as possible. From that point forward, the Project Engineer will coordinate all further activities in response to spill control.

SPILL CONTAINMENT AND CLEANUP

Upon discovering a spill, every effort will be made to contain the spill and stop it at its source (when this can be done without danger to the health and safety of those involved). Containment may involve blocking storm water drains, building berms/dikes, deploying booms/absorbent materials and other barriers to prevent the spread of the pollutant, and other measures to minimize health and environmental damage.

Clean-up and removal of spill material and spill contaminated materials will be undertaken after consultation with appropriate governmental agencies to determine the best method(s) for removal. The Contractor will contract with (or consult) a private company to conduct any clean-up. Disposal of the pollutant and/or pollutant contaminated material will be in a manner and location as approved by the DEHS and/or New Providence Ecology Park (NPEP).

Once LNG is discharged from its containment, the substance immediately forms a pool and begins to spread. The pooled LNG immediately is warmed by surrounding temperatures and begins to vaporize. Upon discovering a spill, the immediate stoppage of spill at its source will occur (if it is possible and safe to do so). Workers designated for spill response will be dressed in the necessary PPE, which include the use of thermal protective clothing, safety goggles, thermal leather water resistant gloves and respiratory protection. Ignition sources such as smoking, flares, sparks, or flames in the immediate area will be eliminated. If a spill occurs in open areas, ensure that all personnel remain at a safe distance and upwind from vapor to prevent asphyxiation. If a spill occurs in a confined space, vapor detection equipment should be used to monitor vapors. The spill should be monitored at a safe distance until no vapors remain in the flammable limits and all the LNG has evaporated. In the unlikely event of an LNG fire, the Emergency Response Plan should be implemented.

Appendix D-1: Spill Report Form

Spill Report Form

Reporting Party's Name			
Address/City/State:			
Phone:			
Responsible Party's Name:			
Address/City/State:			
Phone:			
Date of Spill		Time of Spill:	
Location:		Product spilled:	
Estimated Quantity		Discharge stopped or contained?	Y/N
Source or cause of Spill:			
Action Take:			
Injuries/fatalities/evacuation			
Environmental Damage:			
List of equipment used:			
Disposal site/facility for used absorben			

Spill Notifications

Organization	Phone Number	Time Contacted	Case Number
Fire Department			
Spill Response Contractor			
Department of Environmental Planning and Protection			
Department of Health Services			

Preventative actions taken

**Note: Please attach a map of spill location

Appendix E: Emergency Response Plan

This Plan is designed to address the most likely emergencies which will occur on site due to construction activities.

1.0 Purpose

The purpose of this plan is to coordinate the response of the workers to a situation that may risk the safety of workers, the general public, the community, and the environment. It should be noted that, where applicable, any National Emergency Response Plan will supersede this plan. The Contractor should anticipate and prepare in general for the following scenario:

- Serious personal injury/fatality,
- Road traffic accident,
- Fire or explosion,
- Bomb threats,
- Spillage of fuel or hazardous substance,
- Severe weather conditions (Hurricanes, Tropical Storms, Tornadoes, Floods),
- Loss of utilities,
- Evacuation of work site; and
- Damage to Third party Property.

Priority for action of each scenario is as follows:

1. Saving lives and people safety.
2. Avoid or limit environmental damage.
3. Control of situation.
4. Establishing site safety; and
5. Salvage and repair.

2.0 Roles and Responsibility

A select group of individuals will form an Incident Team, which will respond to all emergency and disaster situations. This team should comprise of the Project Manager (PM), Site Engineer (SE), Foreman, Health and Safety Officer (HSO), Environmental Manager (EM)/Environmental Monitor (EMO), and if necessary, relevant Government Agencies.

The Incident Commander (IC) is the highest-level administrator and will report to all emergencies. In the event of an emergency requiring the assistance of Government Agencies, the Government representatives will assume the responsibility of the IC. For situations which do not require Government Agency involvement, the IC will be the Contractor's representative for the Project or the PM. The IC is also responsible for authorizing reentry into a site after evacuation and for ensuring that an incident reporting form is completed for every incident on site as described in

this Emergency Response Plan. Copies of completed incident reporting forms should be kept on site and made available to government officers if requested during an inspection. Any incident reporting forms should be submitted along with monthly environmental and social monitoring reports submitted to the Department of Environmental Planning and Protection (DEPP).

Site managers/supervisors will maintain a current list of workers and their contact information. Site managers are responsible for evacuating staff of affected areas as necessary and to account for all staff.

3.0 Incident Procedures

The Contractor and all Sub-contractors shall maintain a current list of personnel and their contact information on site. This list will be made available to the IC upon request.

The following terms and corresponding emergency contact numbers must be used to report or declare an incident.

Emergency Agencies

Fire Department – Tel. 919
Ambulance Department – Tel. 919
Police Department – Tel. 919
Princess Margret Hospital (PMH) – Tel. (242) 322-2861
Doctor's Hospital – Tel. (242) 302-4600

Administrative Agencies

Bahamas Power and Light – Tel. (242) 302-1000 or (242) 323-5561 thru 4
Bahamas Power and Light – Tel. (242) 325-0505 or (242) 325-4504 (24 hours)
BTC Telephone Repairs – Tel. (242) 225-5282
Water and Sewage Corporation – Tel. (242) 302-5500
Department of Environmental Planning & Protection – Tel. (242) 322-4546
Department of Environmental Health Services – Tel. (242) 322-8037 or (242)322-2295
Department of Meteorology – Tel. (242) 356-3734 or (242) 356-3736
Hurricane Forecast Section – Tel. (242) 377-7178 or (242) 377-7040
Royal Bahamas Police Force – Tel. 919 or 911
Water and Sewerage Corporation – Tel. (242) 302-5599
Ministry of Works, Director – Tel. (242) 322-4830/1
Ministry of Health (COVID-19 Surveillance Unit) – Tel. (242) 502-7382

Incident Team will be comprised of the following:

- Incident Commander (IC): Project Manager – TBD

- Alternative Incident Commander: Site Engineer – TBD
- Health and Safety Officer – TBD
- Environmental Manager – Janeen Bullard Tel. (242) 357-9262

4.0 Hurricanes

Please follow the Hurricane Preparedness and Response Plan in section 12.4

5.0 Environmental Emergencies.

All environmental emergencies such as fuel spills and wildlife encounters should be brought to the attention of the EM/EMO. Environmental drills, including drills for spill response, will be planned and conducted with construction staff on site as needed. Any incident reporting forms should be submitted along with monthly environmental monitoring reports submitted to DEPP.

6.0 Fuel Spill

Spills and leaks that occur during vehicle and equipment fueling can contribute hydrocarbons, oil and grease, as well as heavy metals to stormwater runoff or into environmentally sensitive areas. Please follow the Fuel Spill Prevention Plan in Appendix D.

7.0 Fire Control Measures

There will be no burning on the construction site and fire extinguishers will be kept at the fueling location, in proximity to all generators, near all hot works and in the site managers' trailer. Signs will be posted identifying the location of all extinguishers. There will be no smoking on the construction site, particularly in or near the designated fueling area.

All employees will immediately report any fires occurring in or near the site. A phone will be available to all employees for emergencies which might occur on site. All emergency numbers will be posted in the office and near the fueling areas or other hazardous areas.

If there is a fire, call the **Fire Department at 911**.

8.0 Electrical Power Loss or Damage

All issues relating to loss or damage to power lines, poles or junction boxes whether in the ground or overhead must be deferred to BPL. The PM will ensure that all staff are removed from the area

and that the area is secured. BPL will be notified, and the Project site will await the arrival of the **BPL technicians (Telephone (242) 342-8001 or (242) 342-8002 thru 4.**

9.0 Water Line Damage

All issues relating to loss or damage to water lines or junction boxes will be the responsibility of the Contractor. The PM will ensure that all staff are removed from the area, that the area is secured and that the **Water and Sewerage Corporation is notified (Telephone 302-5500).**

10.0 Accident involving the General Public

In the event of an accident involving members of the public, whether by vehicle or pedestrian, the Police, Fire Department and/or Ambulance will be notified as required. The PM will ensure, as much as is possible, that the area is secured, and that the accident site poses no additional safety risk to the public or staff. Once the government agents have arrived on the scene, these agents will assume responsibility for the site of the accident.

11.0 Summary of Potential Emergencies and Responses

In the event of any emergency the Site Engineer must be contacted to ensure the appropriate action is taken. For each of the incidents outlined, an Incident Report (See Appendix B-1) should be filled out and included in the monthly report. A list of potential emergencies and responses are outlined in Table 5 below.

Table 6: Summary of Potential Emergencies and Responses.

Table 5 Key:

SE = Site Engineer
HSO = Health and Safety Officer
PM = Project Manager
EM = Environmental Manager
EMO = Environmental Monitor
DEHS = Department of Health Services
DEPP = Department of Environmental Planning and Protection

Potential Emergency	What To Do?	Relevant Authority and Persons
Injury caused by: Fire Explosion Machinery accidents	*For serious injuries call an ambulance. You should also have the contact details of the nearest doctor, Medical Center or Hospital.	• Foreman • SE • PM • HSO

Minor Injuries	*Immediately inform the site First Aid Officer. (All Foremen and the Project Engineer are First Aid Trained). *For major injuries contact 911, hospital, SE and PM.	• PM • SE • Police Station • Hospital
Fires: • Fire at the diesel tank. • Fire at any of the machineries. • Fire caused by vandalism.	*Evacuate all workers to a safe area immediately. *Call the Fire Department (Emergency Services). *If the fire is likely to damage neighboring property inform the adjacent residents. *For major fire emergencies, contact the SE or PM (Note: Fire Extinguishers are available).	• Foreman • SE • PM • Fire Department (911) • Adjacent resident
Explosion	*Evacuate all workers to a safe area immediately. *Call the Emergency Services immediately. *Contact the neighboring residents. *If utilities related, call the relevant service provider (e.g., BPL). *Contact the SE or PM	• Foreman • SE PM • Police Station and/or Fire Department (911) • Adjacent Residents
Spills Management, Contaminated Soils & Major Spills: • Spill or release of diesel fuel or oil. • Spill or release of other hazardous chemicals or material.	* For major spills, (defined as a spill that is likely to have direct environmental consequences.) refer to Fuel Spill Prevention Plan (Appendix D). *Immediately call the Fire Department and notify SE. *Identify the source of the spill. If the material is dangerous or unknown, evacuate the site immediately and notify all neighbors.	• EM/EMO • Foreman • SE • PM • Police station and/or Fire Department (911) • DEPP • DEHS

	*If it is safe, halt the source of the spill immediately. *Contain the spill and control its flow. Block storm water drains downstream of the spill. *DEHS and DEPP must be notified about any spills that are likely to threaten the environment.	• Adjacent Residents
Minor Spills	*Minor spills (defined as spills which can be contained and rectified correctly without the need of external services), shall be contained and rectified with the site spill kit and disposed of correctly. *PM to be notified via incident report. * See Appendix D: Fuel Spill Prevention Plan.	• Foreman • SE • PM • EM/EMO
Heavy Rainstorm, Flood and/or Hurricane	*Contain/minimize the flow of water. *Contact PM and/or SM immediately. *Investigate reasons for failure and prepare an incident report. *See the Hurricane Preparedness Plan in section 12.4.	• Foreman • SE • PM • Police Station (911) • Adjacent • residents
Rupture of Utility Pipelines (Telecommunication Lines, Water and Sewerage Pipes, Electrical Lines and Cable Lines)	* Contact Relevant Agency or Utility company. *Ensure all spilled materials are contained onsite or if running off site, are directed through sediment control measures (See section 11.1.1: Sediment Control Plan). *Block storm water drains downstream of the spill. Spills or ruptures that are likely to threaten the environment.	• Foreman • SE • PM • Police Station (911) • Adjacent • residents
Site security, breach or public safety issue	*Notify security and/or police immediately.	• SE • PM

	*Where public safety issue exists, barricade to restrict egress and address issue immediately.	• Foreman • Police Station (911)

Appendix F: Pike Health and Safety Plan

STAY SAFE MANUAL

Pike Stay Safe Gas Operations Manual Table of Contents

Pike Stay Safe Gas Operations Manual Figures

Pike Stay Safe Gas Operations Manual Tables

Section 1 Stay Safe Gas Operations Manual

101 Purpose

This manual has been prepared to provide employees a manual that contains instructions, safety rules, best practices, and regulations necessary to perform our work safely and productively. This manual supersedes previous manuals including all versions of the Safety and Work Methods Manual and Safety and Training Handbook.

102 Safety

Our aim is safe work and quality work. We believe that the two go together and that no job is so urgent than an employee cannot take the necessary time to perform it safely.

103 Effectiveness

This manual outlines required expectations, rules, regulations, work methods, and procedures. Additional rules and regulations may be in effect for a particular customer. Where customer rules conflict in any way with the information in this manual, the rule providing the safest or most stringent approach for the job being performed shall apply. If at any time any part of this manual is found to be in conflict with governmental laws or regulations, then that part in conflict and only that part is hereby declared null and void provided the governmental laws, rules, or regulations provide a higher margin of safety for the job being performed than existing Company rules.

104 Occupational Safety and Health Requirements

The Company must ensure that all employees comply with all aspects of the Occupational Safety and Health Act and associated rules and regulations and therefore employees may be subject to corrective actions for violations. As stated in the Occupational Safety and Health Act, "Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to the Act which are applicable to his own actions and conduct." Employee misconduct which violates or threatens to violate occupational safety and health rules is not tolerated by the Company.

105 Conditions Not Covered in this Manual

If an employee encounters a condition not covered in this manual, or if they do not completely understand the work to be done, they shall stop what they are doing and get instructions from their supervisor before proceeding.

106 Qualifications for Performing Work

Any foreman, supervisor, or employee in charge who suspects one of their employees is either mentally or physically unfit for the work assigned, shall not allow the employee to work until satisfactory medical or other evidence indicating their fitness is secured.

107 Safety Goal

Our goal is ZERO accidents and incidents and for each employee to safely return home at the end of each day.

108 Safety Vision

We will be the energy solutions provider of choice by our customers, the employer of choice by our employees, and recognized as a leader of health and safety excellence.

109 Safety Mission Statement

To create a culture that empowers each employee in the decision-making process about their safety, to ensure each employee has the knowledge, skills and abilities to do their job, and to improve their quality of life.

110 Training Vision

To create a culture that empowers each employee in the decision-making process about their safety, to ensure each employee has the knowledge, skills and abilities to do their job, and to improve their quality of life.

111 Guiding Principles for Safety

- You cannot outproduce safety.
- Safety is our most important value.
- Working safely is a condition of employment.
- Management leads the way by providing a safe work environment, creating a safety culture of zero tolerance, and fostering continuous safety behaviors and improvement.
- Each employee is responsible for their own safety, the safety of other employees, and the safety of the public.
- Any employee that observes an unsafe act or condition is responsible to take the necessary action to stop the act and/or eliminate the condition.
- All employees will receive the training necessary to safely perform their work.
- New ideas for safety improvement are encouraged and welcomed.
- Customer requirements and feedback will be incorporated in the safety plans for working on their property.

112 Definitions

Ability:	The capacity to do or act, physically and/or mentally
Abnormal Operating Condition (AOC)	A condition identified by the customers that may indicate a malfunction of a component or deviation from normal operations that may indicate a condition exceeding design limits or result in a hazard(s) to persons, property or the environment.
Approved:	Refers to the methods, tools, or equipment approved by Company through committee, departmental action, or in an established Safety Rule.
Authorized Person	One who has the authority to perform specific duties under certain conditions or who is carrying out orders from responsible authority.
Activity	A specific deed, action, function, or sphere of action
Assigned Covered Task	A covered task that has been assigned to a specific individual in order for the individual to perform this covered task as part of their job responsibilities. Because the covered task has been assigned to the individual, the individual must be evaluated and qualified prior to performing this specific covered task.
Barricade	A physical obstruction such as tapes, screens, or cones intended to warn and limit access to a hazardous area.
Communicate	To convey information about; make known; to reveal clearly.
Company	Pike Gas Services, LLC
Competent Person	One who 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 the authorization to take prompt corrective measures to eliminate them.
Compliance	Activity(ies) in accordance with a rule.
Covered Task	An activity, identified by Pike Gas Services, LLC or the customers we are performing work, that: • is performed on a pipeline facility; • is an operations or maintenance task; • is performed as a requirement of 49 CFR part 192; and • affects the operation or integrity of the pipeline.

Current	Belonging to the present time; now in progress.
Demonstrate	Provide tangible evidence.
Determine	To conclude after consideration, investigation, or calculation.
Direct	To take authoritative charge of or supervise; to control, order or command.
Direct Observation	Observation of an unqualified individual(s) during the performance of a covered task by an individual who is qualified to perform the task at hand. The observer must be in direct visual and verbal contact with the individual(s) and must be able to take immediate and effective corrective action if incorrect procedures or abnormal operating conditions are observed.
Document	Prepare a retrievable record.
Emergency	A serious condition or event that, if not immediately corrected or resolved, could result in an incident.
Emergency Response	OQ requirements for emergency response are limited to that portion of the response performed on the pipeline facility, rather than at offsite locations remote from the facility. Fire departments and other public responders are not required to be qualified and (if not qualified) must not perform covered operations or maintenance tasks on the pipeline facility All other individuals employed by Pike Gas Services, LLC shall be qualified to perform their assigned covered tasks or shall be under the direct observation of a qualified individual.
Employer	The operator or any contractors (companies) selected by the operator to perform services on their pipeline facilities. The first employer listed in this database is the owner of the application.
Evaluation	A documented process, established by ***Pike Gas Services, LLC*** or the customers we are performing work, to determine an individual's ability to perform a covered task and recognize and react to abnormal operating conditions (AOCs)
Evaluator	An individual selected or credentialed to perform evaluations should possess the required knowledge to ascertain an individual's ability to perform the covered tasks and to substantiate an individual's ability to recognize and react to abnormal operating conditions (AOCs) that might surface while performing those activities. This does not necessarily mean that the person performing the evaluations should be physically able to perform the covered tasks themselves.
Excavation	Any man-made cut, cavity, trench or depression in an earth surface formed by earth removal. A trench is defined as a narrow underground excavation that is deeper than it is wide, and no wider than 15 feet. Covered task(s) related to excavation address the following: • Verification of line location and depth • One-Call and underground facility owner/operator notifications • Proper techniques to avoid pipeline damage • Sloping/shoring • Water Removal • Inspection Third party excavations that take place on the operator's pipeline facility shall be handled in accordance with the operator's damage prevention program requirements.

Hazardous Atmosphere

An atmosphere that may expose employees to the risk of death, incapacitation and impairment of ability to self-rescue (that is, escape unaided from a permit space), injury, or acute illness from one or more of the following causes:

- Flammable gas, vapor or mist in excess of 10 percent of its lower flammable limit (LFL).
- Airborne combustible dust at a concentration that meets or exceeds its LEL. (This concentration may be approximated as a condition in which the dust obscures vision at a distance of 5 feet or less.)
- Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent.

Identify

To establish the identity of; to ascertain the origin, nature, or definitive characteristics of.

Individual

A person who, on behalf of the operator, may perform one or more covered tasks on a pipeline facility operated by the operator. This includes contractors, subcontractors, and operator employees.

Integrity

The ability of a pipeline or equipment to operate safely and to withstand the stresses imposed during operations.

Interval

The amount of time between two specified instants, events, or states.

Knowledge

Understanding gained through experience or study.

Maintain

To keep in a condition of good repair or efficiency.

Maintenance

The act of maintaining or the state of being maintained; the work of keeping something in proper condition; upkeep.

Observe

The act of watching; to watch or perceive. For purposes of conducting qualification evaluations using on the job (OTJ) performance, observations must include the interaction of the evaluator and qualification candidate to ensure that the candidate's knowledge of the specific task requirements and procedures (and the reasons for key task steps) is adequate to ensure the continued safe performance of the task.

Operate

Starting, stopping and/or monitoring a device or system.

Operations and Maintenance (O&M) Task

Activities performed by an individual, or group of individuals, (1) to perform a function on a pipeline facility, or (2) to provide upkeep of a pipeline facility. This includes in-kind replacement of an existing section of pipe necessitated by severe corrosion, where the capacity of the pipe segments is maintained and service is not expanded. It also includes maintenance and repair tasks performed on the right-of-way or within the confines of a "pipeline facility", as defined. This would include ordinary repairs to a pipeline, including replacement of one or more pipe joints or segments that have been severely damaged by threats such as corrosion or third party damage. Tasks performed away from a "pipeline facility", as at a vendor shop (such as rebuilding/refurbishment of meters and regulators, rebuilding of compressors or valves, etc.) are not considered to be O&M tasks for the purposes of the Operator Qualification (OQ) Rule. However, removal and replacement of such equipment is considered an O&M task. The tie-in of a new pipeline or segment to an existing pipeline is an O&M task; any task carried out on that new segment of pipeline thereafter is also an O&M task.

Operation

Actions taken to facilitate storage or movement of product through a regulated pipeline.

Operator

A person who engages in the transportation of gas (when referring to Operator Qualification).

Perform

To begin and carry through to completion; to demonstrate in accordance with the requirements of; to accomplish (a covered task) in the proper, customary or established manner.

Pipeline or Pipeline System

All parts of those physical facilities through which gas moves in transportation, including components such as pipe, valves, and other appurtenance attached to pipe, metering stations, delivery stations (meter sets), regulators, over pressure protection devices, regulator stations, and fabricated assemblies.

Process	A systematic series of actions directed to some end.
Program	A written description of processes to be followed, a clear delineation of authorities and responsibilities there under and the specific results expected to be achieved for the implementing organization.
Protocol	A set of instructions which guides how an activity is performed. As used by OPS, it is a standard methodology used to conduct inspections of regulated entities to determine conformance with the operator qualification rule.
Qualified Covered Task	A Covered Task where the individual 1) has demonstrated satisfactory performance using method(s) of evaluation listed in the operator's Written Qualification Plan and 2) can recognize and react to associated abnormal operating conditions
Qualified Individual	An individual who has successfully completed the evaluation process and can (a) perform assigned covered tasks and (b) recognize and react to abnormal operating conditions that may be reasonably expected to surface while performing those tasks.
Skill	A demonstrable competency to perform a given task well, arising from talent, training or practice.
Standard	A written document which is commonly used and accepted as a basis for judging acceptability of performance in the areas addressed.
Task	A piece of work assigned to or expected of an individual(s).
Training	An educational or instructional process (e.g., classroom, computer-based, or on-the-job) by which an individual's knowledge and skill level is improved. While not currently required by the OQ rule, training is nonetheless fundamental to implementing many of the OQ rule's requirements.
Worker/Individual	An employee of Pike Gas Services, LLC or an employee of its sub-contractors who, on behalf of Pike Gas Services, LLC performs one or more Covered Tasks on natural gas pipeline facilities.

113 How to Report Safety Incidents or Concerns

If you see something, say something.

- Contact your immediate supervisor and/or local safety department representative.
- Utilize Pike's safety email address at StaySafe@pike.com.
- If you feel that your concern has not been addressed, contact Pike's Vice President of Safety.

114 Post-Accident/Incident Procedures

To report non-emergency related incidents, contact the Corporate Risk Management Department while using the three C's: Check-Call-Care:

- The Foreman or Crew Leader should:
    - Check the area, and make sure it is safe to enter.
    - Contact the direct supervisor.
    - Contact Risk Management Department for reporting injuries, vehicle accidents or property damages.

In the event of an emergency, follow the steps below using the three C's: Check-Call-Care:

- The Foreman or Crew Leader should:
    - Check the area, and make sure it is safe to enter.
    - Appoint someone to call an ambulance or 911, then contact the direct supervisor.
    - Care for the injured person.

    - Contact Risk Management Department.
    - Contact the Vice President of Safety or Corporate Safety.
- The Supervisor should:
    - Contact their Operations Vice President and Sr. Vice President.

Corporate Phone Numbers:

- Corporate Office Main Phone Number: 336-789-2171
- Corporate Risk Management Department:
    - On-the-job injuries: 336-719-4674
    - Vehicle accidents/property damages: 336-719-4397
    - After business hours: 1-866-621-2512 (leave a message and your call will be returned timely)
- Corporate Safety Department: 336-719-4292

Section 2 Safety Rules and Corrective Actions

Pike Gas Services goal is to perform safe, quality work every day. No job is so urgent that an employee cannot take the necessary time to perform it safely. It is the **responsibility** of the **foreman** or **employee in charge** to see that employees under their supervision follow all Pike safety rules and correct any violations observed. It is the **responsibility** of each **employee** to perform their work safely!

Pike Gas Services Safety Rules are designed to protect our employees! Violation of these rules could result in death or serious injury and **will** result in corrective action. This list is not intended to be exclusive and employees remain subject to termination at any time with or without cause or advance notice.

Specific guidelines and work procedures are located in this manual. Additional rules and regulations may be in effect for a particular customer. Where these conflict in any way with the information in this manual, the rule providing the safest or most stringent approach for the job being performed at the time shall apply.

201 Drive With Five Rules

The Drive With Five safety rules have been established to prevent vehicle accidents. Due to exposure and the potentially serious or fatal nature of vehicle accidents involving Company vehicles, non-compliance with these rules will result in corrective action.

1. VEHICLES SHALL BE DRIVEN IN A SAFE MANNER

- In accordance with applicable rules and regulations.
- In a manner to prevent accidents, injuries, damage, and loss of property.
- Safe Parking Rules:
    - A 360˚ walk-around shall be performed by the driver to ensure awareness of the surroundings prior to driving a company vehicle.
    - When parking a Pike truck equipped with road cones, a cone shall be placed at all four corners of the vehicle to protect the equipment from the public and to allow the employee the opportunity to identify and mitigate hazards in the area.
    - When a Pike vehicle is parked in a parking lot or other congested area (i.e. show-up lot) and two crew members are present, the passenger must exit the vehicle, spot to avoid potential hazards and direct the vehicle from the parked location.
    - Upon exiting a Pike vehicle, all doors must be fully closed to avoid side-swipe accidents from other vehicles and potential caught-between injuries.

2. NO USE OF HANDHELD MOBILE DEVICES IN COMMERCIAL VEHICLES

- The use of handheld mobile devices is not allowed while driving a commercial vehicle.

3. SAFE BACKING

- Avoid the need to back through the use of route planning and methods such as pull through parking to the fullest extent possible.
- Use a spotter when backing vehicles with obstructed views. If no spotter is available, the driver must get out and view the area around the vehicle before backing.

4. FOLLOWING TOO CLOSE

- Maintain proper following distance using the Timed Interval Rule.
- Increase following distance for adverse driving and/or road conditions.

5. SECURE YOUR LOAD

- Equipment and materials shall be stored and secured to prevent accidents or property damages while the vehicle is in motion.

The Company reserves the right to immediately terminate a driver based upon a review of the totality of the circumstances of any incident or event, even if it is a first or second violation.

202 General Safety Rules

1. The following actions are not acceptable on a Pike job site:
   a. Careless Work.
   b. Poor Work Habits.
   c. Lack of Attention.
   d. Not Performing a Pre/Post Job Briefing. Pre-job briefings are required before beginning work, after extended breaks such as lunch, and as conditions change throughout the day. Post-job briefings are required at the end of each project and/or at the end of each day.
   e. Not Using Echo Protocol for Required Procedures including Raising or Lowering Outriggers, making a tap to a existing gas line or when purging a line.

2. Personal Protective Equipment is required on a Pike Gas Services job site:
   a. Hard hats and safety glasses will be worn at all times on the job unless traveling in a motor vehicle.
   b. Ear Protection is required when a normal conversation cannot be understood from two feet away.
   c. Leather work gloves should be worn when handling materials with sharp or jagged edges and are encouraged to be worn during all work procedures.
   d. Foot Protection
      i. Employee will wear a work boot that offers protection to the toes, feet and ankles.
   e. Clothing
      i. Pike Gas Services T-Shirt worn while on the job.
      ii. FR coveralls with a minimum rating of 12 cal/cm^2 will be worn as outer garment when working around escaping gas or when required by the customer. FR gloves shall be worn.
      iii. Clothing made of acetate, nylon, polyester, and rayon is not permitted.
      iv. A traffic vest shall be worn when working on or near any roadway and when exposed to any vehicular traffic.
      v. Chaps shall be worn while operating a chainsaw on the ground.
      vi. Carrying of cell phones and other electronic devices shall not be permitted when working in gaseous atmospheres.
   f. Fall Protection
      i. Harness and lanyard will be used while operating aerial lifts.

3. Excavations*
   a. Any excavation 5 feet or deeper or excavations deemed unsafe by a competent person must have protective systems in place prior to entry.
   b. All materials must be at least 2 feet from edge of any occupied excavation.
   c. A ladder is required within 25 feet of each employee in an excavation 4 feet or deeper.
   d. Before excavating in any area where any buried facilities are suspected, an effort will be made to determine if any underground lines or other equipment exist in the area.
   e. Whenever excavating is done in close proximity to buried facilities, it will be done only by use of hand-digging tools, vacuum excavation or air knife.

4. Confined Space*
   a. Tests will be conducted for oxygen deficiency or the presence of any other hazardous atmospheric condition prior to and during the work.

5. Vehicle Operation*
   a. Wheel chocks will be used at all times when a vehicle larger than a pickup is parked or prior to operation of derrick or boom.

b. Outriggers will be properly extended at all times on a derrick, crane, or aerial boom when it is in operation.
c. Seat belts will be used on all equipment that is equipped with them.
d. Do not text or email while driving a Company vehicle and / or on Company business (driver shall be familiar with and follow cell phone use laws for each state in which he or she is driving).

6. Work Area Protection*
   a. "Men Working" and other D.O.T. required warning signs and cones will be placed at each end of a job site.

7. Foreman or employee in charge will correct any employee observed in violation of these safety rules.

203 Basic Work Rules

In addition to our safety regulations, there are a few basic common rules of conduct that employees are expected to follow. They are not meant to cover everything, but they establish the Company's position.

Attendance and Promptness
Regular attendance and promptness in reporting to work is very important to the success of our business. Employees are expected to be at their job location at work and on time every day they are scheduled to work. All absences shall be arranged with your Supervisor in advance, where possible. When an emergency or sudden illness arises which will cause you to be late or keep you from work, you are still required to contact your supervisor. This contact should be made before you are scheduled to report and must be made EACH day you are absent. Absence without notification is considered a very serious matter.

CONDUCT

Rule 1 – Behavior Based
We expect our employees to treat everyone they meet through their jobs with courtesy and respect. Any other behavior disrupts the workplace and dampens the morale. Pike has invested a great deal of money in the property and equipment that our employees use to perform their job. It is a drain on the Company's bottom line when Company property is misused or damaged.
Because of these and other reasons, the following actions reflect behavior that cannot be permitted on the job if we are to work together as a team and may be cause for immediate termination.

- Willful destruction or unauthorized use of the Company's, a fellow employee's or the customer's property.
- Serious, preventable damage to Pike or customer equipment, tools, or property.
- Threatening or inappropriate language.
- Harassment.
- Fighting.
- Using intoxicants on the job or coming to work under the influence of alcohol or drugs is considered grounds for immediate termination.

Rule 2 - Courtesy, Representing the Company
Many of our jobs bring us in contact with customers, and each employee is a representative of the Company. Therefore, it is very important that each employee present the type of image the Company has outline in its policies and within the Code of Ethics. This means personal neatness, being attired in a proper manner and observing the highest standards of courtesy, not only with the public, but with each other.

Rule 3 - Trustworthiness & Honesty
Trustworthiness and honesty are expected by our fellow employees and by Pike Electric. The following actions as well as any actions of this type cannot be permitted on the job if we are to work together as a team and may be cause for immediate termination.

- Falsification of records or hours worked.
- Stealing.
- Sleeping on the job.

Rule 4 - Teamwork, Following Instructions
Teamwork is the key to our success, and teamwork requires coaching. Your Supervisor is your coach, and their instructions need to be followed. We must all do our assigned work and work together as a team if our efforts are to be successful. The following actions as well as any actions of this type cannot be permitted on the job if we are to work together as a team and may be cause for immediate termination.

- Insubordination.
- Lack of cooperation.
- Lack of job interest (including not obtaining a CDL license).

Rule 5- Possession of Firearms
Possession of firearms is prohibited while on the job, on Company or customer property, in Company vehicles or on Company equipment.

Figure 2a Corrective Action Form


Record of Corrective Action

204 Corrective Actions

For the Company to have an effective safety program, certain safety rules are necessary, along with their follow-up corrective actions.

- All supervisors and crew foremen or employees in charge will enforce the safety rules.
- Due to various working conditions it may be necessary to incorporate additional rules on certain jobs. The rules as listed are in effect at all times, except that while performing overhead transmission bare hand work the rules may be adjusted as necessary, with the knowledge of the safety department and an officer of the corporation under whose responsibility the work is being performed.
- Any employee discharged as a result of safety infractions may reapply for employment after one year and may be rehired with approval of an officer of the Company.
- Any employee found in violation of Pike Electric Safety Rules by any federal, state, or other governmental authority is subject to the corrective actions set forth in this manual.
- The Vice President of Safety has the responsibility and the authority necessary to enforce the rules and regulations in this manual. The Vice President of Safety may delegate the authority necessary to enforce the rules and regulations to other employees under their supervision.
- An employee who violates any safety or basic work rule shall receive training as part of the corrective action process.
  - Training shall be documented on the Record of Safety Training form and submitted to Pike's safety department to be placed in the employee's training file.
- An employee may appeal the corrective action decision for **at-fault vehicle accidents** to the Corrective Action Review Board by contacting their respective area Safety Supervisor or the Director of Safety.
- An Area Supervisor with support of the respective Operations Vice President and Region Vice President may propose an alteration from the required corrective action by documenting their proposal and conveying to the Vice President of HR or Vice President of Safety for potential review by the Corrective Action Review Board.
- Pike's Safety Department will review corrective actions to determine compliance with Corrective Action guidelines.
- A rule violation found through the use of technology (i.e. camera) or received from law enforcement (i.e. use of handheld mobile device in company vehicle) may be administered upon discovery of the incident.

Section 3 Responsibilities for Safety

301 General

Generally speaking, Pike has a responsibility to provide a workplace free of recognized hazards and employees have the responsibility to work safely and follow applicable rules, work methods, policies, and procedures. Specific responsibilities are outlined below.

302 Employee's Responsibility for Safety

- An employee should NEVER perform any task for which they are not appropriately trained or are undergoing on-the-job training.
- Every employee is responsible for their own safety and the safety of others and to plan and execute safe work.
- Proper PPE and work zone setup will be used as necessary at all work locations and specific procedures for each are located in this manual.
- Each employee must make sure that they have a good understanding of the site conditions and the tools, methods, and procedures to be used before beginning work.
- If at any time during the work an employee is unsure of site conditions or the tools, methods, or procedures to be used, the employee shall stop work or perform other work they can perform safely until the employee can obtain the appropriate information.
- Take proper care of all tools, equipment, and materials.
- Tools and equipment will be inspected before use.
- Materials and/or equipment being installed will be verified for correct size, voltage, rating, capacity, etc. for the application for which it will be used before being installed or put into service.
- Only Qualified Employees shall perform covered task.
- NEVER make or take personal calls on the job. Personal calls shall be reserved for breaks and lunch.
- Do not bypass or disable safety devices on any tools or equipment.
- Employees shall adhere to applicable rules, regulations, and work methods.
- Accidents, incidents, and near misses shall be reported timely and accurately.
- Employees can be held responsible for penalties associated with any citations they personally receive from regulatory or governmental agencies. Potential citations include but are not limited to speeding tickets, damage to underground facilities, red light citations, and failure to secure cargo.
- Employees are responsible for being fit for duty.
    - Fit for duty includes physically capable of performing their assigned tasks and properly clothed, rested,nourished, and hydrated.
    - Employees should report any physical, emotional, personal, or medical factors that may affect their ability to perform their work safely to their supervision.
        - Physical, emotional, personal, or medical factors include but are not limited to medications, exhaustion, and stress.
        - Any change in fitness for duty such as fatigue, exhaustion, or becoming too hot or cold should be immediately reported to supervision.

303 Foreman or Employee in Charge

The Foreman or Employee in Charge is responsible for leading the crew. It is of utmost importance that crew leadership be on the jobsite when critical tasks are being performed. If a foreman or crew leader is absent (vacation, sick, etc.), another employee can be designated to take their place with the same responsibilities.

Effective leaders do two things; they build trust and achieve results. Trust is built through character, competence, and connection. Results are achieved through clarity, accountability, and support. Specific actions leaders must take are as follows:

- Ensure employees are adequately trained and evaluated prior to allowing them to perform a task.
- Provide on-the-job training to employees.
- Ensure that pre/post-job briefings are conducted as required.

E + R = O

Event + Response = Outcome

- The event may not be within your control.
- Outcomes are influenced by responses to events.
- Each day the desired outcome is safe, quality, and productive work.
- Utilize the "pause button" to:

Plan and execute safe work.
Stop and regroup any time there are questions or conditions change.
Take time to identify and mitigate hazards.

- When two or more employees are on the job together, one will be designated as the employee in charge and noted on the pre/post-job briefing.
- Should the employee in charge have to leave the work location:
  - Another employee will be designated as the employee in charge.
    - Note this change on the pre-job briefing.
  - The pre-job briefing shall remain on site.
- Where one employee is at work alone, that employee is responsible to the Company for their safety.
- Set a good example and see that all employees know and follow all safety rules.
- Make certain that all the employees on the crew have the necessary information and work skills to work safely.
- Correct any employee in violation of Company rules, work methods, or policies.
- Be a Qualified Employee and competent person applicable to the work being performed.
- Orient visitors to the jobsite and ensure unqualified visitors remain a safe distance away from energized work.
- Maintain of copy of this manual on the jobsite.
- Ensure inspections (vehicles, equipment, first aid kits, fire extinguishers, cover up, PPE, etc.) are performed as required.

Field Leadership Applied		
Outcome	**Area**	**Action Items**
Build Trust	Character	Sets the example for desired attitude, behavior, and work methods.
	Competence	Be a qualified and competent person for the work being performed. Related to safety: • A **competent person** is one who 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. • A **qualified person** must have a recognized degree, certificate, etc., or extensive experience and ability to solve the subject problems at the worksite.
	Connection	Be personally invested in the success of each crew member.
		Foster an environment of open and honest communication in which each employee is comfortable reporting accidents, incidents, and near misses.
Achieve Results	Clarity	Plan and communicate safe, quality, and productive work.
		Utilize the pause button when changes in the work plan are merited by changing conditions.
		Make sure each crew member understands their specific task.
		Utilize Echo Protocol to ensure communication results in mutual understanding.
	Accountability	Provide immediate positive feedback for desired behaviors.
		Timely coach and correct any undesired behaviors.
		Escalate consequences for repeated behaviors (positive and negative).
	Support	Ensure each employee is adequately trained for the work they perform.
		Provide continuous on-the-job training to each crew member.
		Verify the crew has the knowledge, equipment, materials, and tools to perform their work and that equipment, materials, and tools are in safe working order.

Table 3a Leadership Applied

304 Work Planning

Requirement

Employees shall plan and execute safe work. At a minimum, work planning shall be documented through a pre/post-job briefing. Work plans shall be adjusted for changing conditions.

Pre/Post-Job Briefings

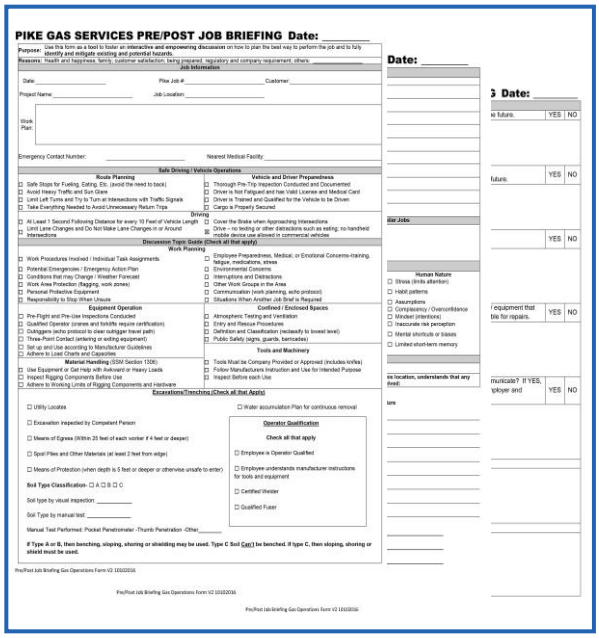
- A Pre/Post-Job Briefing is a documented conversation about job safety, scope, and specific plans to identify and control hazards specific to the job.
  - The person in charge must make certain a pre-job briefing is held before beginning work, after extended breaks such as lunch, and as needed by changing conditions.
  - At a minimum, a pre/post-job briefing should cover:
    - Hazards associated with the job.
    - Work procedures involved.
    - Special precautions.
    - Energy source controls.
    - Personal protective equipment requirements.
  - Guidelines for an effective pre/post-job briefing:
    - Every employee should participate in the hazard identification process.
    - Every employee should understand:
      1. The task to be performed.
      2. Hazards associated with each task.
      3. Protective measures that will be taken to mitigate each hazard.
    - Each employee should sign the pre/post-job briefing.
    - The pre/post-job briefing should be reviewed with each jobsite visitor and they should be given a chance to sign.
    - All members of the crew are required to give full attention and participate in the job briefing.
    - Employees will respond to the person conducting the briefing using Echo Protocol to confirm their understanding of the hazards, individual responsibilities, and steps necessary for safe and effective job task execution.
    - Any member of the crew may request to be re-briefed if at any time they become unsure of their job task.
  - An emergency plan should be in place before beginning work.
    - Where required by customers, in situations with little or no cellular service, and/or working in remote "off road" locations the pre/post-job briefing should be supplemented with an Emergency Action Plan.
    - Emergency action plan requirements:
      - An Emergency Action Plan must be completed prior to beginning work on any job as required by customers or in situations where the Pike pre/post-job form will not provide adequate information. The foreman or employee in charge is responsible for making this determination. They should ask themselves, "If an emergency arises, can we contact emergency personnel and will they be able to find our work location and provide timely assistance?" If the answer to this question is no, an emergency action plan is required. In addition, an Emergency Action Plan should be developed prior to beginning work for any customer requiring such a plan.
      - A good Emergency Action Plan will require the form be filled out completely. It is important that this information be written down so each employee can find it quickly in an emergency. Information that must be included is location of jobsite including address, and landmarks to help identify the work location, written directions to nearest medical facility, details of how the crew will ensure emergency personnel can find the jobsite, a plan to take the injured to emergency personnel if the site is not accessible by ambulance, a means of communication if cellular service is not available (nearest landline, radio, etc.), and any other pertinent information. A laminated map including driving directions to the nearest medical facility is recommended. Remember when using any driving directions or a map, it's a good idea to do a reality check and make sure the road still exists, watch out for construction, and follow all traffic safety precautions. It is highly recommended that someone from the crew drive the route indicated on the map to ensure there are no road closures or detours.
      - Each employee on the jobsite should sign the emergency action plan and it should be stored along with the pre/post-job briefing for that day. This ensures the plan will be changed if conditions or work locations change during the day and that each employee knows exactly where to look for the plan should an emergency situation arise.

Pre/Post-job briefings are *not forms* – they are *tools*.

Effective emergency planning will keep bad situations from becoming worse.

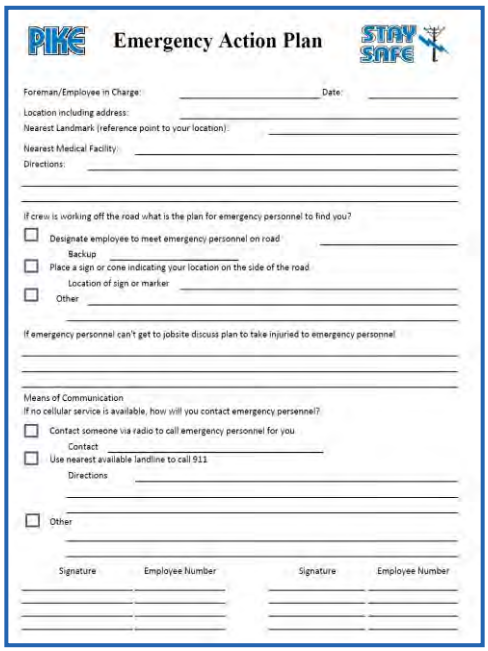
A well thought out, detailed, and written emergency plan will reduce time of response, which is a key factor in emergencies.

Remember this plan could mean life or death for you or one of your crew members.



PIKE GAS SERVICES PRE/POST JOB BRIEFING Date: _____

Figure 3a Pre/Post Job Briefing Form

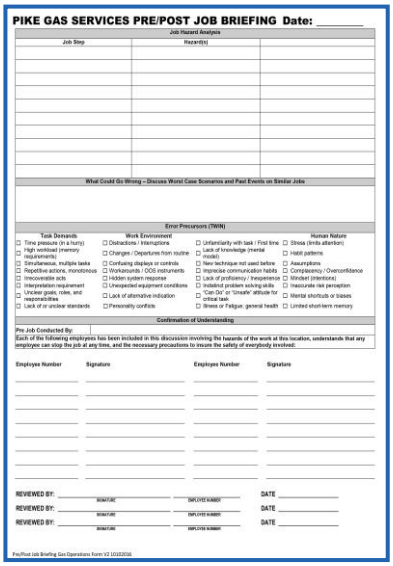


Emergency Action Plan

Figure 3b Emergency Action Plan Form

Job Hazard Analysis

- In addition to Pre/Post-Job Briefings, Job Hazard Analysis (JHAs) may be required based on customer and/or job specific requirements.
- A JHA is a tool used to break jobs down into steps, identify the hazards associated with each step, and determine appropriate controls for each hazard.
- JHA are useful tools to:
  - Preplan jobs.
  - Review existing jobs.
  - Identify training and re-training needs.
  - Consideration of procedures to be used.
  - Identify hazardous conditions before an incident/accident occurs.
  - Provide a safe work environment.
  - Increase quality and productivity.
- To complete a JHA:
  - Identify each step in a job.
  - Identify the hazards associated with each step.
  - Determine the controls needs for each hazard identified.
- When completing a JHA:
  - Evaluate all aspects of the job task, even if performed infrequently.
  - Observe more than one employee doing a specific job task.
  - Take enough time observing the job.
  - Observe a worker actually doing the job, not just describing the job.
  - Ask these questions:
    - What can go wrong?
    - What are the consequences?
    - How can it happen?
    - What are the contributing factors?
    - How likely is it to happen?



PIKE GAS SERVICES PRE/POST JOB BRIEFING Date: _____

Figure 3c Job Hazard Analysis Form

305 Echo Protocol

Requirement

- Echo Protocol is a communication tool in which all affected parties must verbally state and repeat what they have heard and understood. It is used to ensure:
  - Each employee involved in a task understands their role in the task and the next step that will ensue.
  - One employee has spoken and the other has responded by repeating what they heard.
- Echo Protocol shall be used anytime more than one employee is involved in a task and is required for the following procedures:
  - Raising or lowering outriggers.
  - Making a tap to a live gas line.

Examples of Echo Protocol	
Lowering Outriggers-4 man crew	**Making a Live Tap**
Employee at Equipment Controls –"Outriggers coming down" Employee 1 – "I understand. I am in the clear." Employee 2 – "I understand. I am in the clear." Employee 3 – "I understand. I am in the clear."  **Pictured: Employee operating controls has utilized Echo Protocol to ensure crew members are in the clear and is safely lowering the outriggers.**	Employee making tap-"I am making tap to gas line" Employee 1 – "I understand. I am in the clear." Employee 2 – "I understand. I am in the clear." Employee 3 – "I understand. I am in the clear."  **Pictured: Employee making a tap has utilized Echo Protocol to ensure crew members are in the clear and it is safe to make tap.**

Table 3b Echo Protocol Examples

Section 4 Personal Protective Equipment for Live Gas Operations

Hard Hat
Wear at all times on job site

FR Hood or Balaclava
Worn as directed by the customer

Work Gloves
Worn to protect hands from cuts and abrasions

Safety Glasses
Wear at all times on job site

FR Coveralls
Worn as outer garment when working around escaping gas or when required by the customer

Work Boots
Protect toes, feet and ankles and hazards associated with slips, trips and falls

Figure 4a Required PPE for Live Gas Operations

Note: PPE requirements may vary based on the work being performed and/or customer requirements. Entering or working in a gaseous atmosphere shall be the last option. Avoidance is the best practice. If life or property is not at risk, make area safe and call the local distribution company.

Personal Protective Equipment for Normal Gas Operations

Hard Hat
Wear at all times on job site

Safety Glasses
Wear at all times on job site

Gas Services T-Shirt
Worn on job

Work Gloves
Worn to protect hands from cuts and abrasions

Work Boots
Protect toes, feet and ankles and hazards associated with slips, trips and falls

Figure 4b Required PPE for Normal Gas Operations

Note: PPE requirements may vary based on the work being performed and/or customer requirements.

401 General

Safety is the most important aspect of every job at the Company. Working safely requires knowledge of how to do the work and how employees should protect themselves. One means of keeping safe is utilization of Personal Protective Equipment (PPE). It is essential to safety that each employee knows when and how to utilize PPE as well as how it should be handled, stored, and inspected. Remember that every job at Pike will require some form of PPE and that it must be protected so it can provide protection.

- The Company is responsible for:
  - Performing a "hazard assessment" of the workplace to identify and control physical and health hazards.
  - Identifying and providing appropriate PPE for employees.
  - Training employees in the use and care of the PPE.
  - Maintaining PPE, including replacing worn or damaged PPE.
  - Periodically reviewing, updating and evaluating the effectiveness of the PPE program.
- In general, employees should:
  - Properly wear PPE,
  - Attend training sessions on PPE,
  - Care for, clean, and maintain PPE,
  - Visually inspect PPE prior to each use, and
  - Inform a supervisor of the need to repair or replace PPE.
- PPE will be provided at no cost to employees.
- Employees will be trained on the following for any type of PPE they are required to utilize:
  - When PPE is necessary.
  - What PPE is necessary.
  - How to properly put on, take off, adjust, and wear PPE.
  - Limitations of PPE.
  - Proper care, maintenance, useful life, and disposal of PPE.

402 Head and Face Protection

- Hard hats:
  - Must be Company approved and worn at all times on the job site unless traveling in a motor vehicle.
  - Must have a hard outer shell and a shock absorbing lining that incorporates a headband and straps suspending the shell away from the head.
  - Must be inspected daily for damage such as cracks, perforation deformities, and indications of exposure to extreme heat or chemicals.
  - Can only be decorated with Pike approved Company or customer issued stickers.
- Face shields or balaclavas:
  - Worn as directed by the customer.
  - Must be inspected and worn according to manufacturer's instructions.

403 Eye Protection

- Must comply with ANSI Z87.1 standards and worn at all times on the job site unless traveling in a motor vehicle.
- Employees with corrective lenses must either wear eye protection that incorporates the prescription into the design or wear additional eye protection over their prescription lenses.

404 Hand Protection

Employees should wear leather work gloves when handling materials or doing general work tasks to reduce cuts, scrapes, skin contact with chemicals and treatments on poles, as well as other soft tissue related injuries.

- Leather work gloves:
  - Should be worn when handling objects with sharp or jagged edges.
  - Should be worn when handling ropes to avoid burns.
  - Should be worn when working with hand tools to avoid splinters, contact with fiberglass, and blisters.
  - Should be worn when handling wire ropes to avoid cuts, punctures, and abrasions.
  - Should be worn when working on tools or equipment.
  - Should be worn when loading and unloading materials.
  - Should be worn during all work procedures.
    - Note some of our customers require that work gloves are to be worn at all times.
- Inspect work gloves each day before beginning work.
- Replace if there are holes or the glove is worn thin.

405 Clothing

Figure 4c Pike Gas Sevices T-Shirt

- Pike Gas T-shirt must be worn on the job.
  - The Pike gas T-shirt is considered a uniform and must be worn at all times after it is issued.
- FR coveralls with a minimum rating of 12 cal/cm2 will be worn as outer garment when working around release of gas or when required by the customer.
- FR clothing shall be layered as needed to achieve appropriate protection based on arc flash hazards specific to the work.
- Clothing and underclothing made of acetate, nylon, polyester, and rayon is not permitted to be worn.
  - These materials will not provide protection in the event they are exposed to an arc or flame. They will melt and burn causing the burn injuries to be more severe.
- When working in view of the public a traffic vest must be worn.
  - A traffic vest will be worn when working on or near any roadway.
  - A traffic vest must be worn any time employees are involved in any type of traffic flagging operations or where the hazard of being struck by oncoming traffic may exist.
  - Must be an appropriate traffic vest that meets all regulations (may vary state to state).
- Inspect traffic vest before use and do not modify traffic vests in any way.

Figure 4d Traffic Vest

406 Jewelry

- Conductive articles of jewelry or clothing shall be removed when working around energized lines or equipment and must be secured underneath properly rated FR clothing and protective equipment if it is worn.
- Loose, dangling watch chains, key chains, and/or unncecessary metal of any kind shall not be worn when working around machinery or energized lines and equipment.

407 Fall Protection


General

- A harness and shock absorbing lanyard must be worn when operating aerial lifts.
  - Shock absorbing lanyards must:
    - Be removed from service when subjected at a fall and inspected by a competent person even if the lanyard does not fully deploy.
    - Have a minimum breaking strength of 5,000 pounds.
    - Be made of synthetic fibers.
    - Be attached to approved attachment points on the boom.
- Employees must be trained in and familiar with the fall protection device they are using.
  - Training must be documented and conducted by a competent person.
  - Retraining is required under the following conditions:
    - When deficiencies in an employee's knowledge and skill are identified through supervision and inspection.
    - When changes in the workplace or types of fall protection equipment that is used render training obsolete.
- Falls and serious incidents or near misses related to falls will be investigated.
- Personal fall arrest equipment shall meet applicable regulations.
- Body belts and safety straps for work positioning shall meet applicable regulations.
- Body belts, safety straps, lanyards, lifelines, and body harnesses shall be inspected before use each day to determine that the equipment is in safe working condition.
  - Defective equipment may not be used.
- Lifelines shall be protected against being cut or abraded.
- Fall arrest equipment, work positioning equipment, or travel restricting equipment shall be used by employees working at elevated locations more than 4 feet (1.2 m) above the ground on poles, towers, or similar structures if other fall protection has not been provided.
  - Note: Site specific fall protection plans are not utilized.
- The following requirements apply to personal fall arrest systems:
  - If vertical lifelines or droplines are used, not more than one employee may be attached to any one lifeline.
  - Snaphooks may not be engaged directly to webbing.
  - Snaphooks may not be connected to each other.

408 Ear Protection

- Required depending on the noise level and time of exposure.
- As a general rule, ear protection must be worn when a normal conversation cannot be heard from two feet away.
- Employees required to wear hearing protection based on permissable noise exposures will placed in a hearing conservation program.

PERMISSABLE NOISE EXPOSURES	
Duration per Day (Hours)	Sound Level (dBA Slow Response)
8	90
6	92
4	95
3	97
2	100
1 ½	102
1	105
1/2	110
1/4 or less	115

Table 4a Permissible Noise Exposures

409 Foot Protection

Work Boots

- Employees must wear work boots that provide protection to the feet and ankles to help prevent ankle sprains, strains, and soft tissue injuries to the feet.
- Work boots that cover the feet and ankles must be worn at all times on the job.
  - Tennis shoes, sandals, flip flops, dress shoes, or other types of foot wear that do not offer appropriate foot and ankle protection are not allowed to be worn at Pike.
- A quality work boot designed for line work will offer the most protection, and be more comfortable and easy to wear throughout the work day.
- Inspect work boots each day before putting them on.
- Look for:
  - Cracks or tears in the leather.
    - Neets Foot Oil or other leather treatments will lengthen the use life of leather boots.

- Broken eyes or laces and broken or frayed strings which might snag on equipment and cause a tripping hazard.
- Other signs of damage.

- Replace damaged work boots as needed.

410 Respiratory Protection

Requirements

- In the control of those occupational diseases caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors, the primary objective shall be to prevent atmospheric contamination. This shall be accomplished as far as feasible by accepted engineering control measures (for example, enclosure or confinement of the operation, general or local ventilation, and substitution of less toxic materials). When effective engineering controls are not feasible, or while they are being instituted, appropriate respirators shall be used.
- Respirators shall be provided in a clean and sanitary condition in good working order when such equipment is necessary to protect the health of the employee.
- Selection of appropriate respirators shall be based on the respiratory hazard(s) to which the employee is exposed and workplace and user factors that affect respirator performance and reliability.
- A NIOSH-certified respirator must be selected. Respirators shall be used in compliance with certification conditions.
- Employees will be medically evaluated, fit tested, and trained before respirator use.
- All respirators must be stored so they are protected from damage, contamination, harmful environmental conditions and damaging chemicals, and deformation of the facepiece and exhalation valve.
- Regular inspections to ensure the continued reliability of respiratory equipment must be made.
- Employees who voluntarily use respirators must:
  - Use an approved respirator they maintain in good working order.
  - Be fit tested for anything more than a dust mask.
  - Receive Voluntary Respirator training.
- All filters, cartridges, and canisters used in the workplace shall be labeled and color-coded with the NIOSH approval label. The label must remain legible and affixed to the cartridge, filter, or canister while in service.

Medical Evaluation

- Medical evaluations associated with the use of respiratory protection equipment shall be coordinated by Pike and conducted by a physician or other licensed health care professional (PLHCP).
- A medical evaluation, to determine the employee's ability to use a respirator before the employee is fit tested or required to use the respirator in the workplace, shall be provided.
- The medical questionnaire and evaluation shall be administered confidentially during the employee's normal working hours or at a time and place convenient to the employee.
- The employee shall be given the opportunity to discuss results with the PLHCP.
- The following information must be provided to the PLHCP before the PLHCP makes a recommendation:
  - The type and weight of the respirator to be used by the employee;
  - The duration and frequency of respirator use (including use for rescue and escape);
  - The expected physical work effort;
  - Additional protective clothing and equipment to be worn; and
  - Temperature and humidity extremes that may be encountered.

Fit Testing

- Before an employee is required to use any respirator with a negative or positive pressure tight-fitting facepiece, the employee must be fit tested with the same make, model, style, and size of respirator that will be used.
- All employees who are required to use a tight-fitting respirator must pass an appropriate qualitative fit test (QLFT) or quantitative fit test (QNFT).
- Appropriate fit tests shall be performed as follows:
  - Prior to initial use of the respirator;
  - Whenever a different respirator face piece (size, style, model, or make) is used;
  - Whenever an employee reports physical condition changes that could affect respirator fit;
  - Whenever the employee is observed to have undergone physical changes that could affect respirator fit; and
  - At least annually.

Training

- Effective training must be provided to all employees who are required to wear respirators. Employees must be trained sufficiently to:
  - Show a knowledge of why the respirator is necessary;
  - How improper fit, usage, or maintenance can compromise the protective effect of the respirator;
  - Know the limitations and capabilities of the selected respirator;
  - Deal with emergency situations involving the use of respirators or with respirator malfunction;
  - Inspect, don, remove, and check the respirator seal;
  - Understand procedures for respirator maintenance and storage;
  - Know the medical symptoms and signs that may limit or prevent the effective use of respirators; and
  - Understand the general requirements of the regulatory requirements.
- Training must be understandable and be given to an employee prior to using a respirator, and annually thereafter. Additionally, if there is reason to believe that any employee who has already been trained does not have sufficient understanding and skill to use the respirator, the employee must be retrained.

Respiratory Equipment Selection Chart

Hazard	Respirator (see note)
1. Oxygen deficiency	Self-contained breathing apparatus. Hose mask with blower. Combination air-line respirator with auxiliary self-contained air supply or an air-storage receiver with alarm.
2A. Gas and vapor contaminants immediately dangerous to life and health	Self-contained breathing apparatus. Hose mask with blower. Self-rescue mouthpiece respirator (for escape only). Combination air-line respirator with auxiliary self-contained air supply or an air-storage receiver with alarm.
2B. Not immediately dangerous to life and health	Air-line respirator. Air-purifying, half-mask or mouthpiece respirator with chemical cartridge.
3A. Particulate contaminants immediately dangerous to life and health	Self-contained breathing apparatus. Hose mask with blower. Self-rescue mouthpiece respirator (for escape only). Combination air-liner respirator with auxiliary self-contained air supply or an air-storage receiver with alarm.
3B. Not immediately dangerous to life and health	Air-purifying, half-mask or mouthpiece respirator with filter pad or cartridge. Air-liner respirator with auxiliary self-contained air supply or an air-storage receiver with alarm.
4A. Combination gas, vapor, and particulate contaminants immediately dangerous to life and health	Self-contained breathing apparatus. Hose mask with blower. Self-rescue mouthpiece respirator (for escape only). Combination air-line respirator with auxiliary self-contained air supply or an air-storage receiver with alarm.
4B. Not immediately dangerous to life and health	Air-line respirator. Air-purifying, half-mask or mouthpiece respirator with chemical cartridge and appropriate filter.

Note: For the purpose of this chart, "immediately dangerous to life and health" is defined as a condition that poses either an immediate threat to life and health or an immediate threat of severe exposure to contaminants, such as radioactive materials and asbestos, which are likely to have an adverse delayed effect on health.

Table 4b Respiratory Selection

Pike has a written respiratory protection that must be reviewed with any employee that uses a respirator. Contact the Regulatory Compliance Department for additional information.

Section 5 Gas Safety

501 Natural Gas

Composition:

- Natural gas is a mixture of naturally occurring gaseous hydrocarbons. In general, natural gas found in utility pipelines contains over 90% methane; some ethane, propane and traces of other hydrocarbons; and may also contain small amounts of water vapor, nitrogen, carbon dioxide and oxygen.

Specific Gravity (Vapor Density):

- Natural gas is lighter than air and will rise when released into the atmosphere.

Combustion Limits:

- Natural gas is only flammable when mixed with air in certain concentrations. Natural gas is combustible and flammable in mixtures of approximately 4 to 15% gas in air.
- Note: Flammability limits vary depending on the amount of methane, ethane, propane and other gases in the natural gas.

Odor:

- Natural gas is odorless in its natural state. Odorants are added to natural gas at various points in the delivery system so that leaks can be detected by smell even in very small quantities.

Toxicity:

- Natural gas and the odorants added to it are not toxic but can cause suffocation due to lack of oxygen if the natural gas is present in sufficient quantities to displace enough air in a breathing space.

Natural Gas Hazards:

- There are four hazards of which employees must be aware when working with natural gas:
  - **Fire**: due to burning gas.
  - **Flammability**: due to igniting gas mixed with air. When uncontrolled gas is ignited in a confined space, an explosion can occur.
  - **Asphyxiation or Suffocation**: due to an excess of gas or lack of oxygen.
  - **Pressure**: due to sudden and unexpected release of gas under pressure. Blowing dirt and debris can be harmful to anyone in close proximity.

502 Propane

Propane is a liquefied gas that is stored and transported under pressure. Some gas utilities add mixtures of propane and air to natural gas to meet peak demands periods. Propane requires more air than natural gas to burn properly so propane cannot be used to fuel an appliance adjusted to burn natural gas.

Specific Gravity (Vapor Density):

- Propane is heavier than air and when released into the atmosphere will settle in low spots or ground depressions. Therefore, it must be displaced with moving air.

Combustion Limits:

- Propane is only flammable when mixed with air in certain concentrations. Its combustible or flammable range is approximately 2 to 10% propane in air.

Odor:

- As with natural gas, propane is practically odorless. Odorants are added to liquefied propane so that leaks can be detected by smell even in very small quantities.

Toxicity:

- Propane and the odorants added to it are not toxic but can cause suffocation due to lack of oxygen if it is present in sufficient quantities to displace enough air in a breathing space.

Propane Hazards:

- There are three hazards of which employees must be aware when working with propane:
  - **Fire**: Due to burning gas.
  - **Flammability**: Due to igniting gas mixed with air. When uncontrolled gas is ignited in a confined space, an explosion can occur.
  - **Asphyxiation or Suffocation**: Due to an excess of gas or lack of oxygen.

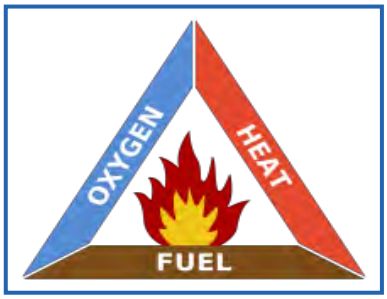
503 Odorants

- Odorants are chemicals added to natural gas and propane to impart the characteristic "rotten egg" smell; otherwise, natural gas and propane would be odorless.
- Odorants are non-toxic at the low levels required to odorize gas; however, in the liquid state, odorants are flammable and must be handled with proper care.
- Odorants are about as flammable as gasoline so they should be handled with the same care one would use when handling gasoline.

504 Gas Fire Prevention

- The primary hazard posed by natural gas or propane is fire. Other common workplace materials will also burn under the right conditions. For a fire to occur, three things must be present.

  1. Fuel (natural gas, propane, paper, wood, cloth, oils, sol- vents, grease, etc.)
  2. Air
  3. Heat (or a source of ignition)



- Remove any one of these three components and the fire goes out.

Preventing Fires

To prevent a fire, ensure that all three of the fire triangle do not exist at the same place and time. Eliminating any one of the three prevents fire from occurring.

505 Training

- Pike Gas Employees completing covered tasks will be trained and qualified according to Pike's Operator Qualification Plan or the customers Operator Qualificaiton Plan.
- All individuals authorized by Pike Gas Services to perform covered tasks will be qualified prior to performing covered tasks or the individual will be directed and directly observed by someone who is qualified to perform the covered tasks.
- Pike Gas Services will provide training, as appropriate, to ensure that individuals performing covered tasks have the necessary knowledge, skills and abilities to perform the tasks in a manner that ensures the safe operation of pipeline facilities.

Section 6 Safe Work Practices

601 Welding, Cutting, Brazing, Grinding

Note: Prior to welding, each welder must be qualified in accordance section 5 of API (American Petroleum Institute) 1104. Refer to the Gas customer's welding procedures, certifications/ qualifications.

Requirement

- Before performing welding, cutting, or grinding, evaluate and safeguard the work area for combustible items.
- When welding, cutting, or grinding in elevated areas, cover the grating as much as possible and post a fire watch below as needed.
- Before applying heat, thoroughly clean, decontaminate, and/or purge machinery, tanks, drums, etc. that could contain explosives or combustible/flammable materials.
- Use welding screens whenever possible when other persons could be exposed to welding, cutting, or grinding operations.
- Keep welding, cutting, and grinding areas clean and free from accumulations of trash, rags, and other combustible items.
- For all hot-work processes in congested areas, (e.g., boilers, preheaters, feed-water heaters, moisture-separator reheaters) wear clothing appropriate for welding.
- Clothing that is not appropriate for welding includes:
  - Synthetics such as nylon, polyester, acetate, and rayon.
  - Blends of these synthetics such as polyester/cotton.
  - Flame-resistant clothing intended for electrical work.
- When working on gas pipelines that have open ends of pipe that are controlled by tapping and stopping machines or valves when not in the same excavation, welders should wear a Kevlar suit.
- When working on gas pipelines that have open ends of pipe that are controlled by tapping and stopping machines or valves when appurtenances are in the same excavation, welders shall wear a Kevlar suit.
  - When welding in excavations under the above conditions, an upwind observer on firewatch must have a 20 lb. fire extinguisher present with an appropriate extinguishing agent.
- When extreme conditions exist, wear leather sleeves, aprons, and welding coats.
- While performing any hot-work operation, dress appropriately to protect exposed skin from sparks, radiant heat, and hot surfaces.
- When performing welding/cutting operations, eliminate the possibility of sparks being caught in cuffed pants.
- When coveralls are worn for body protection, ensure that either a zip-front type is worn or that the flaps of button-type coveralls are secured with no openings.
- When welding on a crane or suspended load, establish an independent ground.
- Where air contaminants exceed permissible exposure limits, use proper ventilation/ respiratory protection.
- For stationary manifold systems, follow manufacturer system design criteria.

Grinding

- Inspect grinders before use to ensure the grinder is in good repair and all safety guard devices are properly attached.
- Ensure guards on 90-degree grinders are between the user and the wheel.
- Before operating a grinder, ensure guards are in place.
- Before installing a grinding wheel, check the grinder to ensure the spindle speed does not exceed the maximum operating speed indicated on the wheel.
- Before changing wheels or rocks, disconnect grinders from energy source.
- Keep hand-held grinders in control until the wheel or rock comes to a complete stop.
- Operate and control grinders according to manufacturer's recommendations.
- Do not make adjustments to tool rests while the wheel is in motion.
- Where tool rests are required, adjust them to a maximum of 1/8 inches from the wheel. Ensure the distance between the wheel periphery and the adjustable tongue on the end of the peripheral member at the top never exceeds 1/4 inches.
- Before installing wheels on stationary grinders, ring-test them to ensure integrity.
- On pedestal or bench grinders, ensure wheel or rock comes to a complete stop before leaving the area.
- Assemble air grinders according to the manufacturer's recommendations.

Arc and Tig Welding

- The ground lead should be electrically connected to the piece to be welded and connected as close to the weld as possible.
- Both work lead and electrode lead must be properly insulated and follow the same route to the work area.
- Always protect personnel by using appropriate personal protective grounding on equipment within extended reach of the work area.
- Inspect electrical welding equipment before and after each use. Immediately remove defective electrical welding equipment from service, identify it, and do not use it until repaired.
- Use manufacturer's approved methods to repair damaged welding cables.
- Do not use cables with splices within 10 feet of the electrode holder.
- When electrode holders are not in use, place them so that they cannot make electrical contact with persons or conducting objects.
- When filler wire is not in use, remove it from the electrode holder.
- When tungsten is not in use, push it inside the cup, or remove it.
- Dispose of all used filler material in a designated container.
- When tig welding in a confined or congested area, wear clothing appropriate for welding.
- When arc welding in an overhead position or in a confined area, wear clothing appropriate for welding.
- When air arcing, wear hearing protection and clothing appropriate for welding.
- When ventilation does not reduce airborne contaminants below the permissible exposure limits, wear respiratory protection.
- Wear welding gloves in all welding operations.
- Wear full-face welding hoods. (Other shields may be used if the work cannot be performed with a full-face hood.)

Oxy/Acetylene Safety

- Inspect oxy/acetylene equipment before use. Immediately remove defective equipment from service, identify it, and do not use it until repaired.
- Do not permit oil or grease to come in contact with regulators, fittings, valves, gauges, and the torch assembly.
- Ensure the pressure of the oxygen and the acetylene does not exceed manufacturer’s recommendation for the particular cutting or brazing operation being performed.
- When opening the valves on a regulator, always stand to one side and away from the valve opening.
- Before installing a regulator, crack the valve to remove any dirt or trash that could damage the regulator.
- When installing regulators, use the proper tool and do not over-tighten connections.
- Before opening the cylinder valve, back out the regulator handle. Then slowly adjust the regulator pressure.
- Before removing a regulator, close the cylinder valve and release all gas from the hose and regulator.
- When oxy/acetylene equipment is not in use, close cylinder valves and release the pressure in the hose.
- Always open the oxygen cylinder valve slowly, allowing it to backseat.
- Do not use acetylene at pressure exceeding 15 psig (pounds per square inch gauge).
- Always use and store acetylene cylinders in an upright position.
- Do not store cylinders near combustible materials (e.g. waste, rags, oil, grease).
- Use a friction or stationary striker to light a torch. Do not light torches with matches, cigarette lighters, or hot work.
- To protect against flashback, ensure all oxy/acetylene equipment is equipped with flashback arresters at the regulator outlet and at the torch for both gases. A check value alone does not satisfy this requirement.
- Remove gauges and replace caps on oxy/acetylene cylinders when they are not in use if the valve may be damaged by being bumped or knocked over.
- Ensure valve handles and/or wrenches are in place and use.
- When ventilation does not reduce airborne contaminants below the permissible exposure limits, wear respiratory protection.
- Do not use acetylene at a rate exceeding 1/7 of the contents of the cylinder per hour.
- Remove oxygen and acetylene cylinders from a standard dolly cart and return to storage if it can be reasonably anticipated that the cylinders will not be used in the next 24 hours.

Compressed Gas Cylinders

- Compressed Gas Cylinder Storage
  - All compressed gas cylinders shall be stored in an upright position.
  - Cylinders shall be secured by a chain to ensure that they will not be accidentally knocked over.
  - Storage locations shall be well ventilated and ambient room storage temperatures shall not be allowed to exceed 125°F.

- Cylinder storage locations shall be distinctly marked with the names of each compressed gas maintained at the location. NO SMOKING - FLAMMABLE GAS signs shall be posted at all entrances to locations where flammable gases are stored.
- Each compressed gas cylinder maintained at a storage location shall be labeled with proper identification of its contents.
- All cylinders in storage shall require valve protection caps at all times except when the cylinder contents are being dispensed.
- Storage locations for oxidizing gas (i.e., oxygen) and flammable gas (e.g., acetylene) cylinders shall maintain a minimum distance of 20 ft. to separate the oxidizing and flammable gas cylinders or by a noncombustible barrier at least 5 feet high having a fire resistance rating of at least one-half hour.
- Cylinder storage areas containing flammable gases shall be stored to avoid contact with a possible ignition source. Walls of the storage area shall have a fire rating resistance of at least 1 hour, and doors shall be in accordance with NFPA 80.
- Flammable gas storage areas shall be heated by indirect means (i.e., steam or hot water).
- Electrical equipment within a flammable storage area shall be in accordance with NFPA 70.
- Portable fire extinguishers consisting of carbon dioxide and/or dry chemical shall be available at the storage locations.

- Handling Compressed Gas Cylinders
  - Compressed gas cylinders shall not be used in areas where the cylinder tank may come in contact with any sparks or flames.
  - Compressed gases contained within a cylinder are under extremely high pressure. Therefore, whenever gas is to be withdrawn from a cylinder, pressure-reducing valves shall be used. Under no circumstances is gas to be removed from a cylinder without the use of a pressure reducing valve.
  - All cylinder connections, hoses, valves, etc., shall be inspected prior to using the compressed gas cylinder. All connections shall be tight with no leaks. The damaged and/or deteriorated cylinder, valves, couplings, hoses, etc., shall not be used.
  - When opening cylinder valves, gas outlets shall always be pointed away from the user and any other facility personnel standing in the immediate usage area.
  - All cylinder valves shall be opened slowly using only approved wrenches for the cylinder as provided by the supplier.
    - NOTE: When using a compressed gas cylinder, the operating wrench shall remain on the cylinder valve at all times.
  - All compressed gas-cylinder valves, couplings, hoses, etc., shall not be lubricated or allowed to come in contact with oil and/or grease.
  - Torch handles can be purchased with flashback arrestors built-in, or flashback arrestors shall be added if not equipped.
  - Separate flashback arrestors must be added to the regulators.
  - Only experienced and properly trained persons shall use compressed gases.
  - Cylinders of compressed gases shall not be placed in areas where there may be oil and/or grease nor handled with oily and/or greasy hands.
  - After each use of a compressed gas, the cylinder valve shall be fully closed and all gas remaining in the regulator valve shall be slowly purged. The regulator valve shall be removed, the cylinder valve cap shall be installed, and the cylinder tank shall be removed from the work area and returned to its proper storage location.
  - If the contents of a compressed gas cylinder are depleted, the cylinder valve shall be fully closed, and the valve protection cap shall be reinstalled. The cylinder tank shall be appropriately marked with an EMPTY TANK, sign and the tank shall be stored in a secured upright position.
- Secure cylinders upright, using substantial means suitable for the conditions. Ensure securing devices are capable of supporting the weight of the secured cylinders. Tape, string, ribbons, or rope less than 0.25 inches in diameter are not acceptable. If two devices are used, the cylinder must be secured between the top half and the bottom half of the cylinders.
- Identify, tag, and remove from service damaged cylinders and notify supplier.
- When cylinders are not in use and are designed to accept a cap, ensure valve-protection caps are in place and hand-tight.
- Do not store cylinders near combustible materials (e.g. waste, rags, oil, grease).
- Ensure compressed gas cylinders are properly identified and labeled.
- Do not store or set up cylinders near heat-producing devices or open flames.
- Do not store oxygen and flammable gas cylinders such as acetylene together. Separate them by 20 feet or a 1/2-hour flame-resistant barrier 5 feet high.
- When transporting cylinders:

    - Keep them upright.
    - Compressed gas cylinders shall never be rolled, slid, or dragged from one location to another.
    - To transport cylinders, only a weight approved dolly (i.e., hand truck) shall be used to allow the cylinder to be moved in a secured upright position.
    - All pressure regulators shall be removed, and valve protection caps shall be installed prior to moving any cylinders.
- Do not use valve-protection caps for lifting cylinders.
- Before lifting or moving cylinders, ensure valve-protection caps are in place.
- Compressed gas cylinders may be stored in the sun, but storage area temperatures must not exceed 125°F.
- Compressed gas cylinders having residual product must be considered full and stored appropriately.
- Tag empty cylinders EMPTY, and keep valves closed and protective caps in place.
- Do not smoke, weld, or use open flames near compressed gases that are flammable, oxidizing, or reactive.
- When using compressed gas cylinders for welding operations, keep them far enough away from actual welding or cutting operations to prevent hot slag or flames from reaching the cylinder.

602 Blasting / Explosives

Requirement

- All federal, state, and local laws must be followed when storing, possessing, transporting, and using explosives.
- Only those individuals listed as Responsible Persons and Employee Possessors with a background clearance status of "Cleared" or "Pending" are authorized to transport, ship, receive, or possess explosive materials in the course of employment with Pike.
- General Precautions:
    - Use the utmost care to prevent danger to life and to prevent damage to property beyond the blast area. Failure to observe necessary precautions shall be grounds for suspending the work. Take necessary measures such as blasting mats to prevent rocks and debris from being thrown onto cultivated pasture lands, recreational areas, and other sensitive areas.
    - All exploders, fuses, and explosives shall be transported, stored, and used in compliance with applicable laws and regulations, including those prescribed by local agencies.

Security

- Unusual or suspicious activity should be reported immediately to appropriate authorities.
- When explosives are missing from inventory, contact the Safety Department immediately.

Blaster Qualifications

- A blaster shall be able to understand and give written and oral orders.
- A blaster shall be in good physical condition and not be addicted to narcotics, intoxicants, or similar types of drugs.
- A blaster shall be qualified, by reason of training, knowledge, or experience, in the field of transporting, storing, handling, and use of explosives, and have a working knowledge of state and local laws and regulations which pertain to explosives.
- Blasters shall be required to furnish satisfactory evidence of competency in handling explosives and performing in a safe manner the type of blasting that will be required.
- Blasters shall be certified by the state in which blasting is being performed.
- Blasters shall have complete authority over the blasting operation.

Transportation of Explosives

- Transportation of explosives shall meet the provisions of Department of Transportation regulations contained in 46 CFR Parts 146-149, Water Carriers; 49 CFR Parts 171-179, Highways and Railways; 49 CFR Part 195, Pipelines: and 49 CFR Parts 390-397, Motor Carriers.
- No person shall smoke, or carry matches or any other flame-producing device, nor shall firearms or loaded cartridges be carried while in or near a motor vehicle or conveyance transporting explosives.
- Blasting caps (including electric) shall not be transported in the same magazine with other explosives.
- Motor vehicles or conveyances carrying explosives, blasting agents, or blasting supplies, shall not be taken inside a garage or shop for repairs or servicing.
- Placarding:
    - A Pike vehicle does not require placarding when carrying blasting caps in quantities of 1,000 pounds or less.

- A Pike vehicle does not require placarding when carrying 1,000 pounds or less of unmixed components of binary explosives (Kinepak).
- If hauling a placardable amount of explosives is necessary, contact the Safety Department prior to transporting for guidance on the regulations.

Storage of Explosives and Blasting Agents

- Detonators may not be stored in the same magazine with explosives or unmixed binary components (Kinepak).
- Service Vehicles:
  - No more than 50 detonators are to be stored in any vehicle at any time in a type 2 detonator box.
  - The vehicle must be locked and equipped with a lockout switch to prevent starting the engine when not in use.
  - The vehicle is situated, when not in use, to comply with the requirements of separation from inhabited buildings, public roads, or passenger railroads, as specified in 27 CFR 555.218.
  - When the service vehicle is not in use for 3 business days, all detonators must be removed from the vehicle and kept in a magazine that meets applicable requirements.
  - Magazines must have sides, bottoms, and doors constructed of not less than number 12-guage metal and lines with a non-sparking material. Hinges and hasps must be attached so they cannot be removed from the outside. One steel padlock (does not require protection from a steel hood) having at least five tumblers and a case-hardened shackle of at least 3/8" diameter is sufficient for locking purposes.
- Indoor Magazines:
  - Must be fire-resistant and theft-resistant.
  - Metal indoor magazines are to have sides, bottoms, and doors constructed of not less than number 12-guage metal and be lined inside with a non-sparking material. Edges of metal covers must overlap sides at least one inch.
  - Hinges and hasps are to be attached to doors by welding, riveting, or bolting (nuts inside of door). Hinges and hasps must be installed so that they cannot be removed when the doors are closed and locked.
  - Each door is to be equipped with two padlocks each containing at least five tumblers and a case-hardened shackle of at least 3/8" diameter. Padlocks must be protected with not less than 1/4" steel hoods to prevent sawing or lever action on the locks.
  - Should an outdoor magazine be needed, contact the Safety Manager for guidance on the regulations.
- All explosive materials must be kept in locked magazines unless they are:
  - In the process of manufacture;
  - Being physically handled in the operating process of a licensee;
  - Being used; or
  - Being transported to a place of storage.

Loading of Explosives or Blasting Agents

- Procedures that permit safe and efficient loading shall be established before loading is started.
- All drill holes shall be sufficiently large to admit freely the insertion of the cartridges of explosives.
- Tamping shall be done only with wood rods or plastic tamping poles without exposed metal parts, but non-sparking metal connectors may be used for jointed poles. Violent tamping shall be avoided. The primer shall never be tamped.
- No holes shall be loaded except those to be fired in the next round of blasting. After loading, all remaining explosives and detonators shall be immediately returned to an authorized magazine.
- Drilling shall not be started until all remaining butts of old holes are examined for unexploded charges, and if any are found, they shall be re-fired before work proceeds.
- No person shall be allowed to deepen drill holes which have contained explosives or blasting agents.
- No explosives or blasting agents shall be left unattended at the blast site.
- Machines and all tools not used for loading explosives into bore holes shall be removed from the immediate location of holes before explosives are delivered. Equipment shall not be operated within 50 feet of loaded holes.
- No activity of any nature other than that which is required for loading holes with explosives shall be permitted in a blast area.
- Power lines or portable electric cables for equipment being used shall be kept a safe distance from explosives or blasting agents being loaded into drill holes. Cables in the proximity of the blast area shall be de-energized and locked out by the blaster.
- Holes shall be checked prior to loading to determine depth and conditions. Where a hole has been loaded with explosives but the explosives have failed to detonate, there shall be no drilling within 50 feet of the hole.
- When loading a long line of holes with more than one loading crew, the crews shall be separated by practical distance consistent with efficient operation and supervision of crews.
- No explosive shall be loaded or used underground in the presence of combustible gases or combustible dusts.

- No explosives other than those in Fume Class 1, as set forth by the Institute of Makers of Explosives, shall be used; however, explosives complying with the requirements of Fume Class 2 and Fume Class 3 may be used if adequate ventilation has been provided.
- All blast holes in open work shall be stemmed to the collar or to a point which will confine the charge.
- A bore hole shall never be sprung when it is adjacent to or near a hole that is loaded. Flashlight batteries shall not be used for springing holes.
- Drill holes which have been sprung or chambered, and which are not water-filled, shall be allowed to cool before explosives are loaded.
- No loaded holes shall be left unattended or unprotected.
- The blaster shall keep an accurate, up-to-date record of explosives, blasting agents, and blasting supplies used in a blast and shall keep an accurate running inventory of all explosives and blasting agents stored on the operation.
- When loading blasting agents pneumatically over electric blasting caps, semi-conductive delivery hose shall be used and the equipment shall be bonded and grounded.

Initiation of Explosive Charges-Electric Blasting

- Electric blasting caps shall not be used where sources of extraneous electricity make the use of electric blasting caps dangerous. Blasting cap leg wires shall be kept short-circuited (shunted) until they are connected into the circuit for firing.

Use of Detonating Cord

- Care shall be taken to select a detonating cord consistent with the type and physical condition of the bore hole and stemming and the type of explosive used.
- Detonating cord shall be handled and used with the same respect and care given other explosives.
- The line of detonating cord extending out of a bore hole or from a charge shall be cut from the supply spool before loading the remainder of the bore hole or placing additional charges.
- Detonating cord shall be handled and used with care to avoid damaging or severing the cord during and after loading and hooking-up.
- Detonating cord connections shall be competent and positive in accordance with approved and recommended methods. Knot-type or other cord-to-cord connections shall be made only with detonating cord in which the explosive core is dry.
- All detonating cord trunklines and branchlines shall be free of loops, sharp kinks, or angles that direct the cord back toward the oncoming line of detonation.
- All detonating cord connections shall be inspected before firing the blast.
- When detonating cord millisecond-delay connectors or short-interval-delay electric blasting caps are used with detonating cord, the practice shall conform strictly to the manufacturer's recommendations.
- When connecting a blasting cap to detonating cord, the cap shall be taped or otherwise attached securely along the side of the end of the detonating cord, with the end of the cap containing the explosive charge pointed in the direction in which the detonation is to proceed.
- Detonators for firing the trunkline shall not be brought to the loading area nor attached to the detonating cord until everything else is in readiness for the blast.

Firing the Blast

- Before a blast is fired, a loud warning signal shall be given by the blaster in charge, who has made certain that all surplus explosives are in a safe place and all employees, vehicles, and equipment are at a safe distance, or under sufficient cover.
- Flagmen shall be safely stationed on highways which pass through the danger zone so as to stop traffic during blasting operations.
- It shall be the duty of the blaster to fix the time of blasting.
- Before firing an underground blast, warning shall be given, and all possible entries into the blasting area, and any entrances to any working place where a drift, raise, or other opening is about to hole through, shall be carefully guarded. The blaster shall make sure that all employees are out of the blast area before firing a blast.
- Cell phones and two way radios shall be turned off during blasting operations.

Misfires

- If a misfire is found, the blaster shall provide proper safeguards for excluding all employees from the danger zone.
- No other work shall be done except that necessary to remove the hazard of the misfire and only those employees necessary to do the work shall remain in the danger zone.

- No attempt shall be made to extract explosives from any charged or misfired hole; a new primer shall be put in and the hole re-blasted. If re-firing of the misfired hole presents a hazard, the explosives may be removed by washing out with water or, where the misfire is under water, blown out with air.
- If there are any misfires while using cap and fuse, all employees shall remain away from the charge for at least 1 hour. Misfires shall be handled under the direction of the person in charge of the blasting. All wires shall be carefully traced and a search made for unexploded charges.
- No drilling, digging, or picking shall be permitted until all missed holes have been detonated or the authorized representative has approved that work can proceed.

Recordkeeping

- Keep permanent records of the acquisition, disposition, and inventory of explosive materials.
- Make accurate and timely entries into records.
- When blasting books and records are complete they must be sent to the Safety Department for retention.

603 Confined Spaces

Requirement

- When unsafe conditions are detected, the work area shall be ventilated until safety has been assured by additional tests.
  - Employees shall ensure there is adequate continuous supply of air.
- Emergency entry may be made into confined spaces when an unsafe atmospheric condition exists if a fresh air breathing apparatus is used (e.g., air line respirator, supplied air unit, oxygen generating apparatus, etc.).
- When working in an unsafe or unknown atmosphere, a safety life line and the "buddy system" must be used.
- Smoking is not allowed in manholes. Under no circumstances shall gasoline or similar fuels be allowed in manholes.
- When manholes are open, signs and guards shall be in place to alert vehicles and pedestrians.
- Proper entry and rescue procedures shall be utilized.

Confined Space Entry Procedure

(Each step is explained in greater detail below.)

1. Determine if there is a confined space.
2. Determine the type of confined space.
3. Reclassify the confined space to the lowest possible level.
4. Enter the confined space using proper procedures.

Figure 6a Confined Space Air Monitoring

- Determine if there is a confined space.
  - Space must be large enough for full body entry and;
  - Entry or exit must be restricted or limited and;
  - Space must NOT be designed for continuous occupancy.
- Determine the type of confined space.
  - Permit Required Confined Space (PRCS)
    - A confined space with hazards in addition to atmospheric associated with it.
    - Any of the hazards below would constitute a PRCS.
      - Hazardous Atmosphere
        - An atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue, injury or acute illness from one or more of the following:
          - Flammable gas, vapor, or mist in excess of 10 percent of its Lower Explosive Limit (LEL).
          - Airborne combustible dust at a concentration that meets or exceeds its LEL.
          - Note: This concentration may be approximated as a condition in which the dust obscures vision at a distance of 5 feet or less.
          - Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent.
          - Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published in Subpart C, Occupational Health and Environmental Control, or in Subpart Z, Toxic and Hazardous Substances.
          - Note: An atmospheric concentration of any substance that is not capable of causing death, incapacitation, and impairment of ability to self-rescue, injury, or acute illness due to its health effects is not covered by this provision.
          - Any other atmospheric condition that is immediately dangerous to life or health.

        - Engulfment
            - The surrounding and effective capture of a person by a liquid or finely divided (flowing) solid material that can be breathed in to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, or crushing.
        - Taper Surfaces That May Trap Employees
            - A space with a tapering configuration in which an employee should become jammed, could become trapped and not be able to initiate a self-rescue, or be constricted in such a way as not to be able to breathe and thus be subject to suffocation. Examples are coal hoppers, dust collectors, duct work, etc.
    - Enclosed Space
        - A confined space in which the only hazard or potential hazard associated with that space is atmospheric and that atmospheric hazard can be made safe and maintained safe for entry by means of continuous forced air ventilation.
    - Non-Permit Required Confined Space
        - A space that meets the three conditions for a confined space but has no physical or atmospheric hazard.
- Reclassify the confined space to the lowest possible level.
    - Permit Required to Non Permit Required
        - Can be accomplished by eliminating ALL hazards, including atmospheric, from the space and demonstrating the hazardous atmosphere has been eliminated and cannot recur during entry.
        - Every effort should be made to do this from outside the space so as to eliminate the need for any permit entry.
        - Elimination of atmospheric hazards can be accomplished by purging the space with fresh air, cooling a unit down, providing natural ventilation, etc.
    - Permit Required to Enclosed Space
        - Accomplished by eliminating all of the hazards except atmospheric.
        - Lockout/tagout, blanking/binding of lines, and guarding are considered means of eliminating hazards.
            - Controlling atmospheric hazards with forced air ventilation is NOT considered elimination.
        - Should be done from outside the space to eliminate a permit entry.
    - Enclosed Space to Non Permit Required
        - Same reclassification procedure as Permit Required to Non Permit Required.
- Enter the confined space using proper entry procedures.
    - Permit Required Confined Space
        - Requirements
            - Must have authorized entrants, attendants, and an authorizing person trained in permit required confined space entry procedures.
            - Attendants can only monitor a single permit required confined space. Monitoring of multiple confined spaces by a single attendant is not allowed.
            - Prevent unauthorized entry.
            - Initial and periodic air monitoring.
            - An entry permit.
            - Rescue procedures (on site team or outside services) in place.
            - Note: Pike employees are not allowed in confined spaces where IDLH (immediately dangerous to life and health) conditions are present.
            - Equipment Requirements:
                - Testing, monitoring, ventilating, communications, and lighting equipment.
                - Barriers and shields.
                - Rescue and emergency equipment except when provided by offsite rescue service.
                - Ladders and equipment needed for safe entry and exit.
                - Retrieval equipment, unless its use would produce more of a hazard than not using it.
                - PPE (respirator equipment, protective clothing, fall protection).
    - Enclosed Space
        - Demonstrate that the only hazard associated with the space is atmospheric.
        - Demonstrate (with air monitoring) that continuous forced air ventilation is sufficient to maintain the space for entry.
- Provide written certification to the entrants documenting that the above conditions are true (Enclosed space certification shall be executed and maintained at the site).

Program Review

The confined space program will be reviewed on at least an annual basis utilizing applicable incident data, audit reports, canceled permits, and reported near misses.

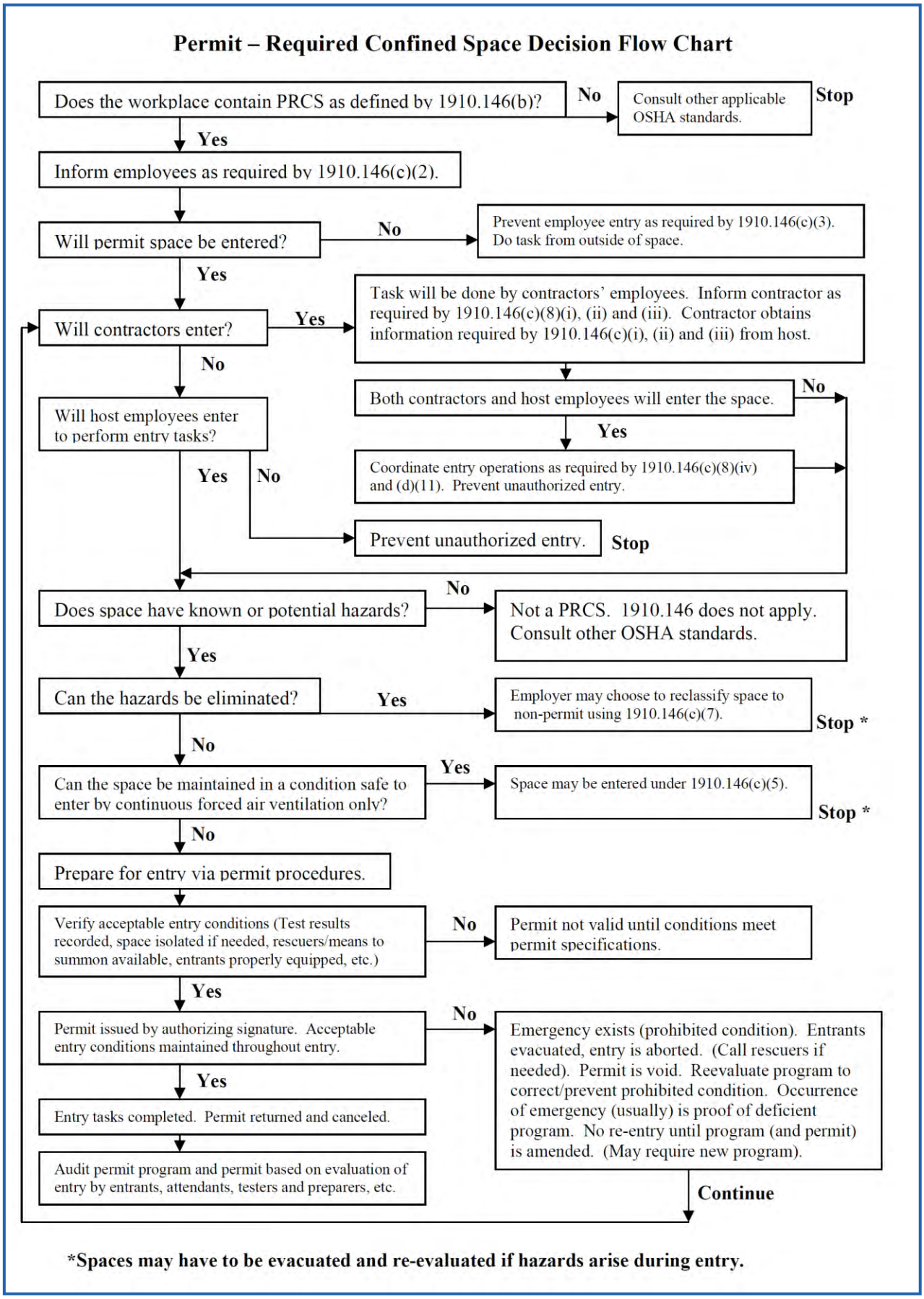


Table 6a Confined Space Decision Flowchart

604 Excavations

Requirement

- Underground facilities shall be identified before digging and precautions shall be taken when digging near underground facilities.
    - Have a valid locate ticket before excavating and comply with all applicable digging laws.
- Excavations must be either made by or under the direction of and inspected by a competent person.
- A ladder or other means of exit is required within 25 feet of each worker in excavations 4 feet or deeper.
- Occupied excavations 5 feet or deeper need protective systems based on proper soil classification.
- All materials must be at least 2 feet away from the edge of an occupied excavation.
- Atmospheric testing must be conducted before employees enter excavations deeper than 4 feet when the potential for oxygen deficient or hazardous atmospheres exists, such as around landfills or areas where hazardous materials are stored nearby.

Underground Installations

- Before excavating in any area where any buried facilities are suspected, an effort shall be made to determine if any underground lines or other equipment exist in the area. If in doubt as to the location of equipment, call the utility involved (gas, telephone, sewer, water, etc.). In larger service areas Locate Centers are available and shall be contacted when excavations are to take place in that area.
    - Whenever excavating is done in close proximity to buried facilities, it shall be done only by use of hand-digging tools or air knife. Employees shall not dig in a negligent or reckless manner under any circumstances.
    - If electric cables are damaged, the following steps shall be taken:
        - The owner shall be notified at once.
        - The area shall be barricaded and the public kept out until hazardous conditions can be eliminated.
    - If gas lines are damaged, the following steps shall be taken as soon as possible:
        - The hole shall be left open to allow the gas to dissipate into the atmosphere. All possible sources of igniting the gas shall be removed or eliminated. (It is extremely important that no attempt be made to plug or crimp the line for purpose of stopping gas flow as this could create a spark igniting the gas.)
        - Residents of the area shall be warned when necessary and the public kept out of the area.
        - Call local 911 Emergency Management Center
        - The gas company shall be notified at once.
    - If communication cables are damaged, the communication company shall be notified at once.

Figure 6b Water Accumulation

- Access and egress: When employees are required to be in trenches 4 feet deep or more, an adequate means of exit, such as a ladder or steps shall be provided and located so as to require no more than 25 feet of lateral travel.
- Warning system for mobile equipment: When mobile equipment is operated adjacent to an excavation, or when such equipment is required to approach the edge of an excavation, and the operator does not have a clear and direct view of the edge of the excavation, a warning system shall be utilized such as barricades, hand or mechanical signals, or stop logs. If possible, the grade should be away from the excavation.

Figure 6c Spoil Piles

- Protection for hazards associated with water accumulation
    - Employees shall not work in excavations in which there is accumulated water, or in excavations in which water is accumulating, unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation.
- Stability of adjacent structures

- Where the stability of adjoining buildings, walls, or other structures is endangered by excavation operations, support systems such as shoring, bracing, or underpinning shall be provided to ensure the stability of such structures for the protection of employees.
- Sidewalks, pavements, and branch structures shall not be undermined unless a support system or another method of protection is provided to protect employees from the possible collapse of such structures.

- In excavations which employees may be required to enter, excavated soil or other material or equipment shall be effectively stored and retained at least 2 feet or more from the edge of the excavation.
  - Sides of trenches 5 feet or more in depth shall be shored, sloped, benched, or otherwise supported by means of sufficient strength to protect employees working within them.
  - Excavations less than 5 feet in depth shall be examined by a competent person* to determine if shoring, sloping or ladder may be required.
- When trenches are left open, warning devices, barriers, barricades or guard rails shall be placed to adequately protect the public and employees.
- At the end of each day's work, as much of the trench as practical shall be closed.
- No more trenches shall be opened at one time than necessary.

Inspections

- 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 be made after every rainstorm or other hazard-increasing occurrence.

Note: Above inspections are only required when employee exposure can be reasonably anticipated.

- A "COMPETENT PERSON" (as related to excavations):
  - Must be able to identify existing and predictable hazards in the surroundings.
  - Must be able to identify working conditions which are hazardous or dangerous to employees.
  - Must be able to take prompt corrective measures to eliminate hazardous working conditions.
  - Must have had specific training in and be knowledgeable about:
    - Soil analysis.
    - Use of protective systems.
    - Requirements of the excavation standard.
- Fall protection: Where employees or equipment are required or permitted to cross over excavations; walkways, bridges, or standard guard rails shall be provided.

Maximum Allowable Slopes

Soil or Rock Type	Maximum Slope (H:V)
Stable Rock	Vertical (90º)
Type A	¾ :1 (53º)
Type B	1:1 (45º)
Type C	1 ½:1 (34º)

Numbers shown in parentheses next to maximum allowable slopes are angles expressed in degrees from the horizontal. Angles have been rounded off.

A short-term maximum allowable slope of 1/2H:1V (63º) is allowed in excavations in Type A soil that are 12 feed (3.67 m) or less in depth. Short-term maximum allowable slopes for excavations greater than 12 feet (3.67 m) in depth shall be 3/4H:1V (53º).

Sloping or benching for excavations greater than 20 feet deep shall be designed by a registered professional engineer.

Table 6b Maximum Allowable Slopes

Protective Systems

- Requirements for Protective Systems
  - Each employee in an excavation shall be protected from cave-ins by one of the adequate protective systems described in this section except when:
    - Excavations are made entirely in stable rock.
    - Excavations are less than 5 feet in depth and examination of the ground by a competent person provides no indication of a potential cave-in.
- Type of protective systems.
  - Sloping and Benching.
    - Excavations shall be sloped at an angle not steeper than one and one-half horizontal to one vertical (34 degrees measured from the horizontal) unless soil classification allows steeper slope.

- Employees shall not be permitted to work on the faces of sloped or benched excavations at levels above other employees except when employees at the lower levels are adequately protected from the hazard of falling, rolling, or sliding material or equipment.
- Type C soil cannot be benched.

o Shoring.
- A pre-engineered shoring system comprised of aluminum hydraulic cylinders (cross braces) used in conjunction with vertical rails (uprights) or horizontal rails (wales). Such a system is designed specifically to support the sidewalls of an excavation and prevent cave-ins.
- When shoring is used as a trench cave-in protective system, employees shall remain within the confines of the shored area at all times.

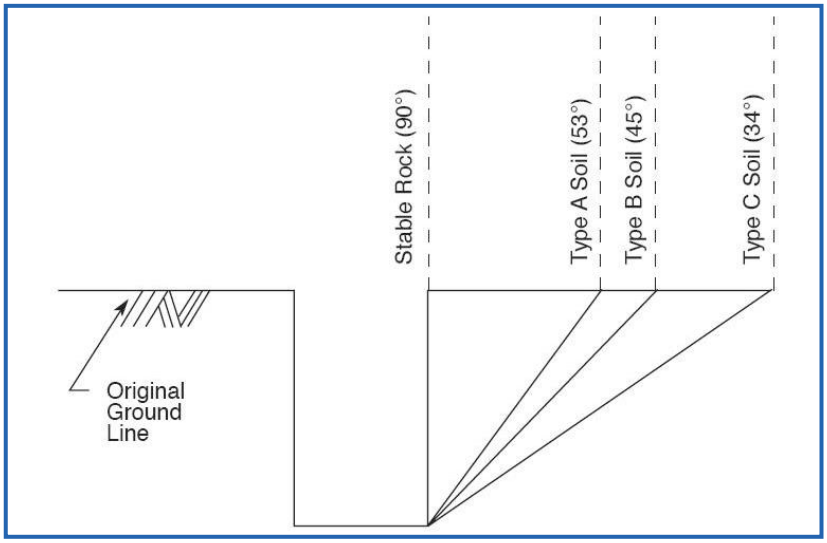


Table 6c Angles of Repose for Sloping Sides of Excavations

Figure 6d Shoring Protective System

ALUMINUM HYDRUALIC SHORING – VERTICAL SHORES FOR SOIL TYPE A					
DEPTH OF TRENCH (FEET)	HYDRAULIC CYLINDERS				
	MAXIMUM HORIZONTAL SPACING (FEET)	MAXIMUM VERTICAL SPACING (FEET)	WIDTH OF TRENCH (FEET)		
			UP TO 8	OVER 8 UP TO 12	OVER 12 UP TO 15
OVER 5 UP TO 10	8	4	2 INCH DIAMETER	2 INCH DIAMETER	3 INCH DIAMETER
OVER 10 UP TO 15	8				
OVER 15 UP TO 20	7				
OVER 20	SEE OSHA STANDARDS 1926.652 (C)(2) AND 1926.652 (C)(3)				

*FOR APPLICATIONS OTHER THAN THOSE LISTED REFER TO 1926.652(C)(2) FOR USE OF MANUFACTURERS TABLULATED DATA

Table 6d Aluminum Hydraulic Shoring Soil Type A

ALUMINUM HYDRUALIC SHORING – VERTICAL SHORES FOR SOIL TYPE B					
DEPTH OF TRENCH (FEET)	HYDRAULIC CYLINDERS				
	MAXIMUM HORIZONTAL SPACING (FEET)	MAXIMUM VERTICAL SPACING (FEET)	WIDTH OF TRENCH (FEET)		
			UP TO 8	OVER 8 UP TO 12	OVER 12 UP TO 15
OVER 5 UP TO 10	8	4	2 INCH DIAMETER	2 INCH DIAMETER	3 INCH DIAMETER
OVER 10 UP TO 15	6.5				
OVER 15 UP TO 20	5.5				
OVER 20	SEE OSHA STANDARDS 1926.652 (C)(2) AND 1926.652 (C)(3)				

*FOR APPLICATIONS OTHER THAN THOSE LISTED REFER TO 1926.652(C)(2) FOR USE OF MANUFACTURERS TABLULATED DATA

Table 6e Aluminum Hydraulic Shoring Soil Type B

Selection of Protective Systems (Appendix F of 1926 Subpart P

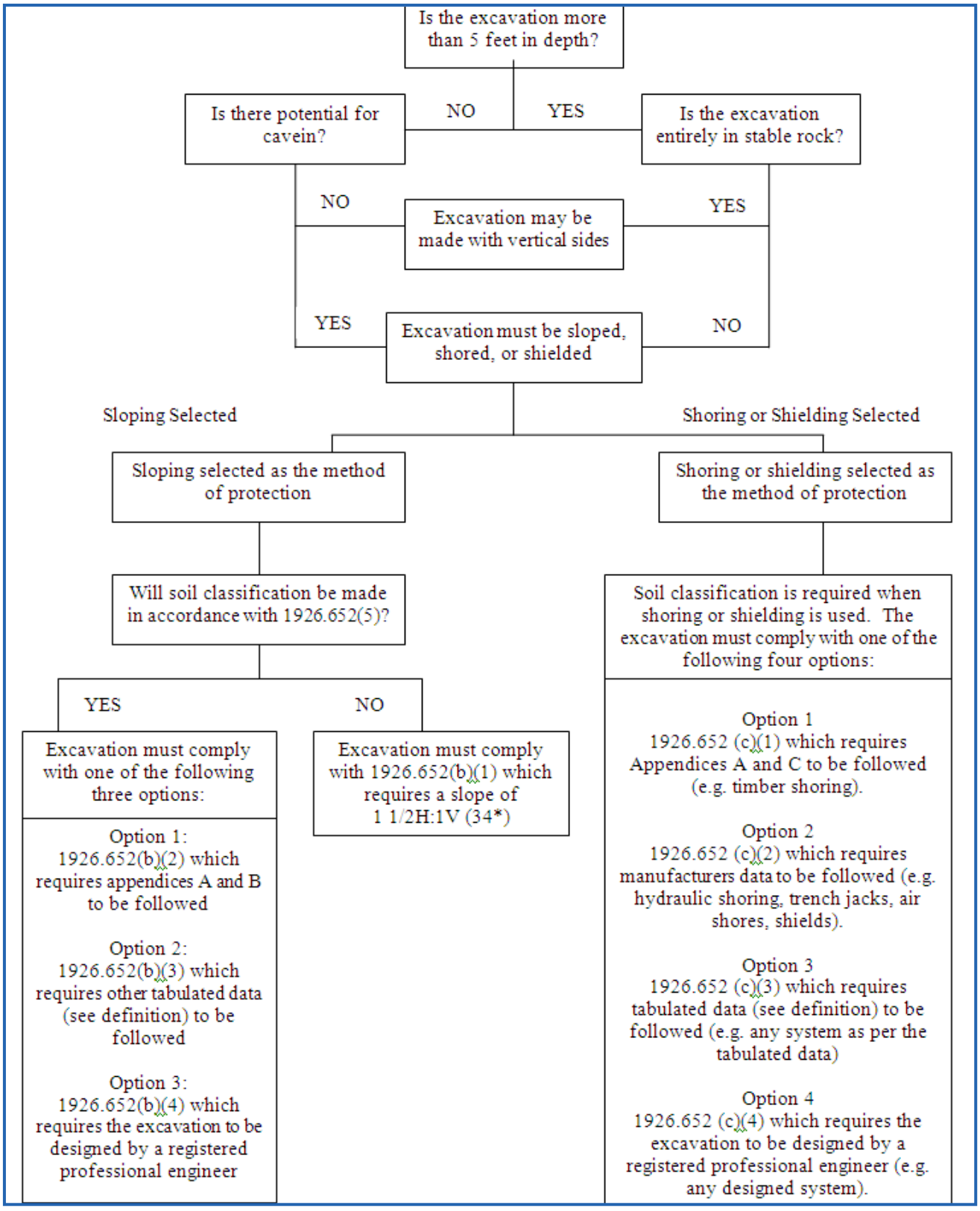


Figure 6e Selection of Protective Systems for Excavations

605 Shoveling and Hand Digging

General

- Use the correct tool for the task.
  - Shovel for digging or moving loose granular materials from one spot to another.
  - Spade for digging straight edged holes, slicing, and lifting sod or edging.
- Prepare the Body.
  - Maintain good physical health.
  - Do flexing and stretching exercises to loosen muscles and prevent injury.
- Recommended Rate.
  - 18-21 scoops a minutes for shoveling tasks of short duration.
  - 15 scoops per minute for continuous shoveling tasks.
- Recommended Weight per Scoop.
  - At a rate of 15 scoops per minutes 10 to 15 pounds per scoop is the maximum.
  - Load should not exceed 25 pounds regardless of shoveling rate.
- Recommended Throw Height.
  - Throw height should not exceed 4 feet from the ground.
- Recommended Throw Distance.
  - Optimal throw distance is around 3 feet.

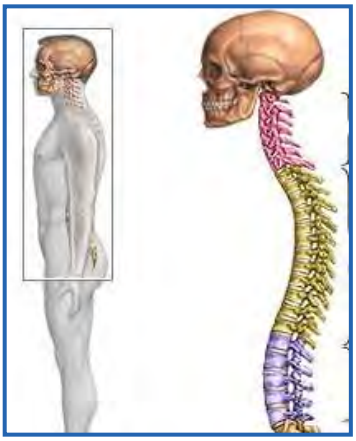


Figure 6f Natural Curvature of Spine

Shoveling

- Keep feet wide apart (slightly wider than shoulder width).
- Place front foot close to shovel.
- Put weight on front foot and use legs to push the shovel.
- When the load is on the shovel shift weight to rear foot.
- Keep the load close to the body.
- Turn feet in the direction of the throw and use legs to help throw the material.

Digging

- Stand slightly behind the area where digging will occur.
- Place the shovel at a slight angle on the ground.
- Put foot on the spade and use leg muscles to push down.
- Ensure the load is free from the ground.
- Slide the load close to the body as it is picked up and keep it close.
- Turn feet in the direction the load will be thrown.
- Shift weight to the rear and use legs to help with the throw.

USE THE ENTIRE BODY WHEN SHOVELING OR DIGGING.

DO NOT SHOVEL OR DIG WITH JUST ARMS, AND MAINTAIN THE NATURAL CURVATURE OF THE SPINE.

606 Trenchless Technology (Guided Boring Systems)

Strike Alert System

- Follow all instructions as indicated in the manufacturer's operator manual.
- Spectators and unauthorized workers must be kept away from the machine and work areas by barricading equipment while in operation.

Strike Alert Systems

Guided boring systems are equipped with Strike Alert systems. The Strike Alert system detects electrical strikes by sensing the following:

- Voltage differences between the high voltage of the machine and the low voltage at the voltage stake.
- A current flow through the sensing coil.
- For the system to function properly, the voltage stake must be located in soil through which a current can pass. To improve the conductivity of dry and loose sand, dry soil, or asphalt: ensure that the stake is fully inserted into the ground 6 feet or more away from the machine but not over the boring path.
- The Strike Alert alarm will only sound after the drill has contacted an energized power line or source. The Strike Alert is only a warning device, not a protective device. If the Strike Alert horn sounds, the drill may have contacted an energized electrical line or source. Other indications of an electrical strike are electrical arcing, explosion, smoke, or popping noises.
- Remain seated on the machine with feet on the foot platform when operating the machine. Do not touch the ground during operation. If a strike occurs while touching the ground, electrocution is possbile when the body becomes a direct current path to the ground.
- When an electrical strike occurs:
  1. Large voltage differences may exist on the surface of the ground near the machine and along the drill string. Standing or walking in these areas may cause electrical shock from the difference in voltage between the feet. Anyone in the work area, including the locator must wear overshoes.
  2. If on the machine, stay on the machine. If standing on the ground, do not move and do not touch the equipment.
  3. Warn other people in the area that a strike has occurred and they should stay away from any equipment and the immediate area.
  4. While remaining on the seat with feet on the platform, retract the down hole tool to the limit of the stroke of the machine to attempt to interrupt electrical contact. Do not attempt to disconnect a drill pipe or rod joint.
  5. The operator is not required to wear electrically insulated gloves while seated on this self-contained directional boring machine. However, the operator must wear overshoes to provide protection against electrical shock in case of inadvertently stepping off the machine during an electrical strike.

Warnings

- Removing and reinstalling boring rods when contact has been made with energized lines may cause electrocution.
- Maintain a safe distance from the rotating drill rod and cutting tool.
- Do not wear loose clothing that could catch on rotating equipment.

Section 7 Ergonomic, Environmental, and Health Hazards

701 Asbestos

Requirement

- Documented awareness training is required for employees who work in areas that contain or may contain asbestos.
- In the event asbestos are suspected or encountered:
  - Asbestos containing materials (ACM) and presumed asbestos containing material (PACM) shall not be disturbed.
  - Stop work immediately and contact a supervisor and the safety department who will work with the host employer to arrange for asbestos removal.
  - Adhere to warning signs and labels that identify asbestos containing materials present, the location of such materials, and work practices to ensure ACM or PACM are not disturbed.
  - Employees will be protected from exposure on multi-employer worksites. This protection includes removal of employees working near any operation which makes asbestos friable (airborne) with inadequate containment.
- Specialized training is required for any employee that will remove or disturb ACM or PACM.

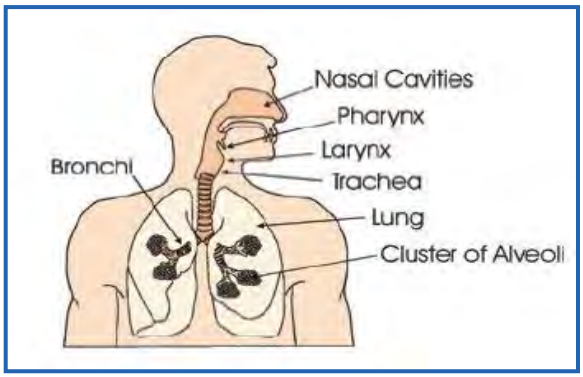
General

- Asbestos is a mineral mined from the earth known to cause health problems in humans.
- Exhibits substantial resistance to heat/chemicals.
- Asbestos used as insulation during 1870-1900.
- After 1900, common use as boiler/pipe insulation in ships.
- After 1940s, amosite widely used in insulation.
- 1950-1970: Estimates indicate more than half of the large multi-story buildings constructed in this time period contain some form of spray-applied asbestos.

Types of Asbestos

- Serpentine Group.
  - Chrysotile - white asbestos.
- Amphibole Group.
  - Amosite - brown asbestos.
  - Crocidolite - blue asbestos.
  - Anthophyllite.
  - Tremolite.
  - Actinolite.

Figure 7a Asbestos



Likely Occurrences

- Surfacing material such as:
  - Acoustical plaster.
  - Fireproofing.
  - Decorative plaster with a honeycombed structure and loosely bound fibers.
- Other materials:
  - Floor tiles.
  - Ceiling tiles.
  - Transite/cement products.
  - Caulking.
  - Wiring.

Health Effects

- Routes of entry:
  - Inhalation.
  - Oral Exposure – ingestion.
  - Dermal - through skin.
- Asbestos is known to cause:
  - Asbestosis (fibrotic scarring of lung tissue).
  - Lung Cancer.
  - Mesothelioma and other cancers.
  - Pleural Plaque and Pleural Effusion.

Considerations When Working Inside Facilities

- The age of the facility;
- Whether any facility records exist documenting the known presence and location of ACM and PACM;
- Whether any signs or labels are posted at the facility identifying the presence and location of ACM and PACM; and
- A description of general types and locations of ACM and PACM present, if any.

Remember: Pike employees are generally qualified to work around but not to remove or disturb asbestos. DO NOT take any chances if asbestos are encountered.

702 Bloodborne Pathogens

Requirement

- Employees will follow Universal Precautions any time they are potentially exposed to Bloodborne Pathogens (BBPs).
- Employees exposed to BBPs must undergo medical evaluation or sign a waiver.
- Proper PPE will be utilized when administering First Aid / CPR or handing potentially infected substances.

Definition of Exposure

- 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.

Exposure Determination

- Listed below are job classifications that are not expected to be exposed to human blood or other potentially infectious materials in their normal work duties, but could be called on to provide "first aid" or "CPR" to an injured co-worker. These employees have minimal risk to exposure of bloodborne pathogens.
  - Clerical and Administrative.
  - Groundman, Truck Driver, Equipment Operator, Lineman, Foreman, Mechanic, General Foreman, Substation Technician, Laborer, Engineer, and Area Supervisor.

Figure 7b Universal Precautions

Universal Precautions

- Universal precautions shall be observed to prevent contact with blood or other potentially infectious materials. Under circumstances in which differentiation between body fluid types is difficult or impossible, all body fluids shall be considered potentially infectious materials.
- The following are universal precaustions and required work practices for BBP:
  - Employees must wash their hands immediately or as soon as possible after removing gloves or other personal protective equipment.
  - Employees must wash their hands and any other skin immediately or as soon as possible following contact with blood or other potentially infectious materials.
  - Eating, drinking, smoking, applying cosmetics or lip balm, and handling contact lenses are prohibited in work areas where there is a reasonable likelihood of occupational exposure.
  - Place contaminated materials in labeled plastic bags.
  - Any equipment (machines involved in an accident where an employee has been injured) which may be contaminated must be decontaminated with disinfectant prior to handling, if feasible.
  - Broken glassware which may be contaminated must be cleaned up with a dust pan and brush, shovel, tongs, or other means. Employees may not clean up broken glassware directly with their hands.

Figure 7c Biohazard Labeling

Personal Protective Equipment

- When administering first aid or CPR, the following personal protective equipment should be used to guard against exposure:
  - Latex gloves, protective eye wear or face shield, jacket, and mask.
- Protective equipment work practices:
  - Employee shall immediately, or as soon as possible, remove garments soiled by blood or other potentially infectious materials.
  - Once removed, employees must place protective equipment in a designated area or container for storage, washing, decontamination, or disposal.
    - Containers of potentially infectious materials must be labeled as biohazards. The biohazard symbol must:
      - Be printed in fluorescent orange or orange-red have lettering of a contrasting color.
      - Red bags or containers may be used as a substitute for labels.

BBP Exposures

- After an exposure:
  - Immediately report the exposure incident to an Area Supervisor or the Safety Department.
  - Confidential medical evaluation and follow up.
  - Blood test for the source individual.
  - Blood test for exposed employee.
  - Hepatitis B vaccination.
  - Counseling.

703 Fire Prevention and Protection

Fire Prevention

- Gasoline-powered equipment shall be refueled only after it has been stopped. Any spilled fuel shall be removed from the equipment before restarting.
- Gasoline-powered equipment shall not be operated within 10 feet of any refueling operation or any area in which refueling has recently taken place.
- Flammable liquids shall be stored, handled, and dispensed only from metal containers or approved safety cans.
- Transfer flammable liquids from one container to another only in properly ventilated spaces free from ignition sources.
- "No Smoking" and "Stop Your Motor" signs at fuel dispensing locations shall be followed.
- Employees shall not enter confined spaces after using CO2 extinguishers until the area has been thoroughly ventilated.

Flammable and combustible materials

- Do not accumulate combustible materials in the work area.
- Do not store combustible materials in and around exits.
- Unless suitable protected, do not store combustible material around any open flame or heat producing process.
- Store all combustible in closed and labeled containers.
- Any combustible or flammable liquids that have been spilled shall be clean up properly.
- Gasoline and other flammable fuels shall be dispensed from UL (Underwriter Laboratory) or FM (Factory Mutual) approved safety containers only.
- Flammable and compressed gases shall be stored and used in well ventilated areas.
- Keep oily rags in a covered, metal container.
- Keep all combustible materials stored in approved areas or cabinets.

Cord Sets, GFCI's

- Extension cord sets used with portable electric tools and appliances shall be of three-wire type and shall be designed for hard or extra-hard usage.
- No homemade cords are allowed.
- Flexible cords used with temporary and portable lights shall be designed for hard or extra-hard usage.
  - Flat Cords are not acceptable.
- Flexible cords & cables must be protected from damage.
- Cords may not run through pinch points.
- Extension cords may not be suspended by nails, staples, or wires.
- Portable cord and plug connected equipment and flexible cord sets (extension cords) shall be visually inspected before use on any shift for external defects (such as loose parts, deformed and missing pins, or damage to outer jacket or insulation) and for evidence of possible internal damage (such as pinched or crushed outer jacket). Cord and plug connected equipment and flexible cord sets (extension cords) which remain connected once they are put in place and are not exposed to damage need not be visually inspected until they are relocated.
- Flexible cords shall be used only in continuous lengths without splice or tape. Hard service flexible cords No. 12 or larger may be repaired if spliced so that the splice retains the insulation, outer sheath properties, and usage characteristics of the cord being spliced.

Ignition Sources

- Smoke only in areas that are designated to do so.
- Dispose of smoking products in appropriate receptacles.
- Control open flames/and or heat producing processes to minimize the potential for fire.
- In potentially explosive atmospheres, use electric devices (e.g., motors, lights) classified for the location.

- When using hand tools where sparks could be produced, ensure an explosive atmosphere does not develop. Use isolation, ventilation, purging, and monitoring to ensure a safe working atmosphere.

Fire Extinguishers

- Employees shall be trained in the classes of fires, their burning charecteristics, proper extiniguishing agents to be used, and hazards associated with incipient stage fire fighting.
  - This training shall be conducted prior to initial assignment and at least annually thereafter.
- Fire protection equipment shall be properly located at all times. Except for actual use or inspection, employees shall not move or remove such equipment without proper authority.
- Extinguishers shall be available within 100 ft of work areas, within 30 ft of heat producing work, and adjacent to hazardous areas such as fuel storage, insulation storage, racks, and where unpacking and uncrating takes place in large quantities.
  - A fire extinguisher, rated not less than 2A, shall be provided for each 3,000 square feet of the protected building area, or major fraction thereof. Travel distance from any point of the protected area to the nearest fire extinguisher shall not exceed 100 feet.
  - Report any damaged or spent portable fire extinguishers to local supervisor for replacement.
  - Keep all access to fire extinguishers or other fire protection equipment easily accessible or unrestricted.
    - Do not use a fire extinguisher or other fire protection equipment unless trained to do so.
- Class BC Extinguishers are installed for use on most Company vehicles.
- Employees should always check the extinguisher labels before using extinguishers, making sure the proper extinguishing agent is being used to extinguish the proper class of fire.
  - Class "A" fires involve normal combustibles such as wood and paper. Extinguishing agents include water, soda-acid and multipurpose dry chemicals.
  - Class "B" fires involve oils and flammable liquids. Extinguishing agents include CO2 and dry chemicals.
  - Class "C" fires involve electrical equipment.
- Fire extinguishers shall be mounted between 3.5 and 5 feet (recommended height is 42 inches or less) unless used in motor vehicles.
- Do not mount in areas that could exceed 120ºF.
- Mount fire protection equipment on trucks at an accessible location.
- Extinguishing agents include CO2 and dry chemicals.
- Halon 1301 (Freon) and Halon 1211 are gaseous extinguishing agents suitable for combating both Class "B" and Class "C" fires, especially at indoor locations. Both agents are slightly toxic in low concentrations (less than 5 percent) and will cause unconsciousness in a short period of time when the concentration is above 15 percent.
  - When the extinguishing agent is released, precautionary measures similar to those for toxic, confined spaces should be employed.

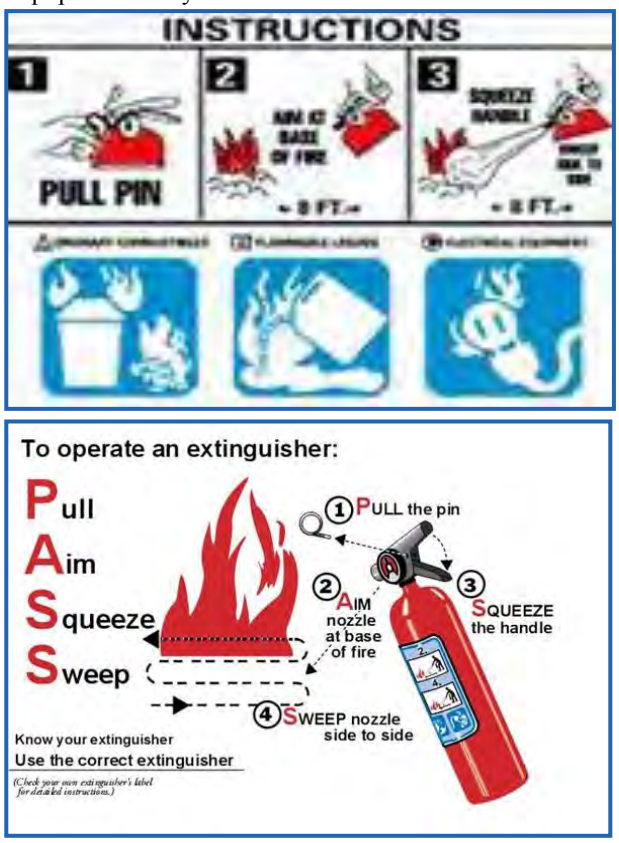


Figure 7d Fire Extinguisher Operation

- In the event of a fire:
  1. Call the fire department.
  2. Get everyone out.
  3. Plan a retreat.
  4. Stay low to avoid smoke inhalation.
  5. If the fire can be safely extinguished, utilize the PASS method to put it out.
  6. Keep a minimum of 6 feet away from the fire.
  7. Monitor the area to ensure the fire does not reignite.
- Any fire extinguisher that has been discharged, even partially, shall be immediately recharged by a qualified fire extinguisher service agency or replaced.
- Inspect fire extinguishers at regular intervals to determine that:
  - A monthly visual and annual maintenance check are conducted and documented on extinguisher tag.

- The extinguisher is up to date on inspections (part of commercial vehicle pre-trip inspection).
- The pointer on the pressure gauge is in the green operable area.
- The nozzle opening is free of foreign objects.
- The pull pin is intact to prevent accidental discharge.

704 Hazardous Chemicals

Requirement

- Employees shall be trained on hazardous chemicals, container labeling, and Safety Data Sheets.
- Containers will be properly labeled.
- Safety Data Sheets will be readily available for each hazardous chemical on a jobsite.

General

- Before starting work, identify ALL hazardous substances involved with the work task. (Hazardous substances can be chemicals involved in the work process, materials used, or coatings and insulation to be installed or removed.)
- Observe the following work practices where hazardous substances (materials and chemicals) are present:
  - Do not eat or drink; do not use tobacco products.
  - Wash hands and face at breaks. (When appropriate, shower at the end of work task or shift.)
  - Never blow on or shake off contaminated clothing, and never use compressed air to clean contaminated clothes.
  - Place contaminated clothing in plastic bags and label.
  - Using approved methods to reduce/eliminate the spread of contamination and clean contaminated work areas.
  - To prevent unnecessary personnel exposure, mark off the work area as necessary with ribbons, tapes, signs, or barriers.
  - When a splash hazard exists, verify availability and location of eye-wash and shower before performing tasks.
- When working with hazardous materials/chemicals, be able to perform the following in an emergency situation:
  - Identify an emergency situation.
  - Know how and when to report the chemical emergency.
  - Know local places of refuge/how to evacuate the area.
  - Know appropriate decontamination procedures.
  - Conduct atmospheric monitoring as necessary to ensure a safe work environment.
- Where hazardous chemicals/materials are used, stored, or disposed of in the work place, use engineering controls (e.g., natural, forced, or local exhaust ventilation) to eliminate or reduce airborne concentrations of hazardous substances.
- Ensure protective equipment (including clothing) is specified by work procedures or trained and qualified persons based on an evaluation of the hazard and the exposure levels.
- Ensure individuals are trained and have demonstrated appropriate knowledge of:
  - Key elements of hazard communication.
  - Specific hazards of substances (e.g., chemicals/materials) to which individuals may be exposed.
- Before using hazardous substances be aware of the following:
  - Exposure effects.
  - Physical hazards (e.g., flammable, explosives).
  - Health hazards.
  - Routes of entry.
  - Emergency procedures (e.g., first aid, spills, releases).
  - Personal protective equipment requirements.
- Use only materials/chemicals that are appropriately labeled, and follow the label instructions for chemical use and storage.
- Ensure individuals know how and where to obtain Safety Data Sheets (SDS). SDS were formerally called Material Safety Data Sheets (MSDS).
- Use (e.g., handle/transport/store/dispose of) hazardous substances according to SDS or specific work practices.
- If a real or suspected exposure to hazardous substances exists:
  - Evacuate and isolate area and notify appropriate location personnel.

Figure 7e Hazard Pictograms for Container Labels

Container Labeling

- Do not remove, cover, or deface original labeling of containers with hazardous materials.
- Manufacturers labels must include Product Identifier, Supplier Identification, Precautionary Statements, Hazard Pictogram(s), Signal Word, Hazard Statement, and Supplemental Information.
- Replace labels that become unreadable.
- Portable containers into which hazardous materials are transferred for immediate use by the person performing the transfer do not have to be labeled.
- Any container other than the original that will be used to store or transport hazardous materials must be labeled in English and include the name and manufacturer of the product.
- NFPA 704 Fire Diamond Labeling System:
  - Red – Flammability.
  - Yellow – Instability.
  - Blue – Health.
  - White – Special Information.
  - Each quadrant will contain a number from 0 – 4.
  - 0 or blank represents no hazard and 4 represents highest hazard.
- Hazardous Material Information System (HMIS) Labeling:
  - Similar to NFPA Fire Diamond but not in diamond format.

Figure 7f NFPA Fire Diamond

Safety Data Sheets

- Pike stores SDS electronically through Infotrac.
- SDS can be obtained via telephone or Internet.
- To access SDS information via telephone.
  1. Call 1-800-535-5053.
  2. Identify yourself as an employee of the Company.
  3. Provide the Product Name.
  4. Provide the Manufacturer.
  5. Provide the method the SDS will be received (fax, email or read over the phone).
- To access SDS information the Internet:
  1. Go to http://secureweb.infotrac.net/msds/pike.aspx.
  2. Determine the search criteria-either Product Name or Manufacturer.
  3. Enter search criteria and click on the binoculars.
  4. Click the icon to the left of the product name in the list displayed.
- Make sure to be aware of the following for each chemical in your workplace. This information can be obtained from supervision or SDS.
  - Methods and observations to detect presence or release.
  - Physical and health hazards.
  - Protective measures.

Figure 7h SDS Contact Information

Case Study – High Pressure Hydraulic Injection Injury

A mechanic was injured when his finger was injected with hydraulic fluid as he was attempting to locate a leak in a hydraulic hose with his hand. Hydraulic and diesel systems operate at high pressures – often 3,000 psi and above – which will penetrate human skin like a hypodermic needle. These injuries are very serious and can result in amputations. Use a thin piece of cardboard or similar material to locate leaks.

Chemicals on Jobsites

- In field operations, there is potential exposure to creosote on poles, diesel fuel, hydraulic fluid, gasoline, two-cycle oil mix and bar lube for chainsaws.
  - There is a minimal chance of exposure to PCB oil in older transformers and similar equipment.
  - There may be other exposures specific to a job. Identify all chemicals on a jobsite.

Protection Measures

- Inspect all tools and equipment, and contact fleet for repairs if any leaks are found.
- Keep liquids stored in approved and labeled containers.
- Know that chemicals typically found in field operations have similar health hazards.
  - They are skin irritants – if contact with skin occurs, wash immediately with soap and water and remove any contaminated clothing.
  - Thoroughly rinse eyes with water if contact occurs.

        - If any of these chemicals are ingested orally or injected into or under the skin seek medical treatment immediately.
    - Small land spills can be recovered by pumping or with suitable absorbents.
    - Water spills should be contained if possible and reported to Pike's Regulatory Compliance Department.
    - Report any chemical contact or spillage to supervision immediately.
- Other chemicals may be found on jobsites. Ask the foreman for a list of chemicals specific to a jobsite.
- Pike has a written Hazard Communication policy.

Information Required on a Safety Data Sheet	
Identification	This section identifies the hazards of the chemical presented on the SDS and the appropriate warning information associated with those hazards. The required information consists of: • Product identifier used on the label and any other common names or synonyms by which the substance is known. • Name, address, phone number of the manufacturer, importer, or other responsible party, and emergency phone number. • Recommended use of the chemical (e.g., a brief description of what it actually does, such as flame retardant) and any restrictions on use (including recommendations given by the supplier).
Hazard(s) Identification	This section identifies the hazards of the chemical presented on the SDS and the appropriate warning information associated with those hazards.
Composition/Information on Ingredients	This section identifies the ingredient(s) contained in the product indicated on the SDS, including impurities and stabilizing additives. This section includes information on substances, mixtures, and all chemicals where a trade secret is claimed.
First-Aid Measures	This section describes the initial care that should be given by untrained responders to an individual who has been exposed to the chemical.
Fire-Fighting Measures	This section provides recommendations for fighting a fire caused by the chemical.
Accidental Release Measures	This section provides recommendations on the appropriate response to spills, leaks, or releases, including containment and cleanup practices to prevent or minimize exposure to people, properties, or the environment. It may also include recommendations distinguishing between responses for large and small spills where the spill volume has a significant impact on the hazard.
Handling and Storage	This section provides guidance on the safe handling practices and conditions for safe storage of chemicals. The required information consists of: • Precautions for safe handling, including recommendations for handling incompatible chemicals, minimizing the release of the chemical into the environment, and providing advice on general hygiene practices (e.g., eating, drinking, and smoking in work areas is prohibited). • Recommendations on the conditions for safe storage, including any incompatibilities. Provide advice on specific storage requirements (e.g., ventilation requirements).
Exposure Controls / Personal Protection	This section indicates the exposure limits, engineering controls, and personal protective measures that can be used to minimize worker exposure.
Physical and Chemical Properties	This section identifies physical and chemical properties associated with the substance or mixture.
Stability and Reactivity	This section describes the reactivity hazards of the chemical and the chemical stability information. This section is broken into three parts: reactivity, chemical stability, and other.
Toxicological Information	This section identifies toxicological and health effects information or indicates that such data are not available.
Ecological Information	This section provides information to evaluate the environmental impact of the chemical(s) if it were released to the environment.
Disposal Considerations	This section provides guidance on proper disposal practices, recycling or reclamation of the chemical(s) or its container, and safe handling practices. To minimize exposure, this section should also refer the reader to Section 8 (Exposure Controls/Personal Protection) of the SDS.
Transport Information	This section provides guidance on classification information for shipping and transporting of hazardous chemical(s) by road, air, rail, or sea.
Regulatory Information	This section identifies the safety, health, and environmental regulations specific for the product that is not indicated anywhere else on the SDS.
Other Information	This section indicates when the SDS was prepared or when the last known revision was made. The SDS may also state where the changes have been made to the previous version. Other useful information also may be included here.

Table 7a SDS Required Information

Always ask supervision if ever in doubt when working with any chemical….it is an employee's right to know!

705 Oil Spill Handling, Disposal, and Response

- Spill prevention begins by taking steps to prevent and contain the spill before it occurs.
- Employees will attempt to stop small spills at the source. Employees will act to prevent any unsuspecting personnel from coming in contact with spilled materials.
- Any oil discharged from transformers, regulators, capacitors, mechanical equipment, etc. which meets any of the criteria listed below must be reported immediately to a supervisor, Risk Management, the Safety Department, and/or customer representative as required:
  - Spills (regardless of PCB level) which reach or may reach surface waters including drainage ditches, ground water, storm sewer systems, or sanitary sewer systems.
  - Spills of any size from a piece of equipment which may contain PCBs at any concentration.
  - Large spills (generally considered 3 gallons or more) from PCB-free equipment requiring significant clean-up efforts.
- Clean Up, Documenting, and Reporting:
  - Evaluate extent of spill.
  - Check equipment for PCB and non-PCB labeling.
  - Check condition of equipment.
  - De-energize equipment if necessary.
  - Contain oil spill and take care of clean up.
  - Restrict flow of spill using most appropriate method (i.e. shovel dirt, apply oil-absorbent pads, apply straw bales, install oil booms, etc.).
  - Secure area of spill.
  - Repair equipment or stop leakage if possible.
- Restore service - concurrently with spill clean-up when possible.
- Initiate documentation of spill such as:
  - Location of the spill.
  - Time and cause of spill.
  - Type and quantity of fluid discharged.
  - Cleanup effort and estimated time cleanup will be completed.
  - Any personal injury or property damage caused by the spill.

706 Material Handling and Lifting

Requirement

Crossarms, pole tops, pole pullers, wire, and other tools and equipment utilized in powerline construction are very heavy. It is essential to properly handle materials and use proper lifting procedures. ***Know what is being lifted, and get help when needed.***

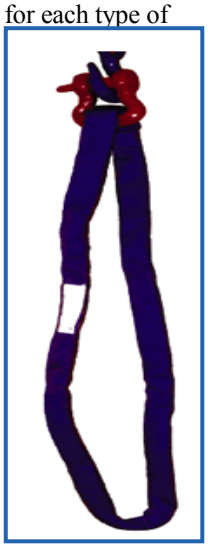
General

- Obtain assistance from another person or utilize lifting equipment if a load is too heavy to lift manually.
- Do not attempt to lift beyond individual capability and avoid twisting or turning during the lifting process.
- Take caution when lifting or pulling in an awkward position.
- When two or more persons are carrying a load, each employee, if possible, should face the direction in which the load is being carried.
- When two or more persons are carrying a heavy load that is to be lowered or dropped, there shall be a prearranged signal for releasing the load.
- Maintain a clean and safe work environment to eliminate slip, trip, and fall hazards while lifting and carrying.
- No employee shall be permitted underneath loads handled by lifting or digging equipment.
- Employees must stand away from any vehicle being loaded or unloaded to avoid being struck by spillage or falling materials.
- Keeping physically fit will reduce the chances of a back injury.
- Lift the load mentally before physically picking it up.
  - Size it up – How much does it weigh? How is it shaped and packaged? Is help needed or is there equipment that could be utilized?

The right way to lift is easiest and safest. Crouch or squat with the feet close to the load; secure good footing; take a firm grip; bend the knees; keep the back vertical; and lift by using the knees, the legs and thigh muscles.

Slings

- **Never** exceed the rated capacity.
- **Never** use a damaged sling.
- **Never** shorten with knots, bolts, or other devices.
- **Always** protect slings from sharp edges of the load.
- **Always** keep hands and fingers clear of slings under tension.
- **Always** be aware of down strain at dead-end poles and take that into account when calculating sling capacity.
- Sling Inspection.
  - All slings (synthetic or steel) should be inspected before use.
  - All slings must be labeled.
    - Synthetic web slings must be marked with name or trademark of manufacturer, rate capacities for each type of hitch to be used, and type of material.
  - Any sling that does not pass inspection should be immediately removed from service.
  - Inspect synthetic web slings for:
    - Acid or caustic burns.
    - Melting or charring to any part of the sling surface.
    - Snags, punctures, tears, or cuts.
    - Broken or worn stitches.
    - Other signs of damage.
  - Inspect steel slings for:
    - Excessive broken wires.
    - Kinking or bird caging.
    - Crushing.
    - Deformation.



- Sling Storage.
  - Store in a dry environment out of sunlight.
  - Store off the floor or ground to prevent corrosion.
  - Hang from hook to prevent tangling.
  - Store away from electrical sources.
  - Store by sling type (don't mix steel slings with synthetics, etc.).

Hooks

- Hooks should have safety latches installed.
- When a piece of equipment or tool has a safety latch on a hook, adhere to the following:
  - Ensure safety latches are installed and operable.
  - Never attempt to use a damaged hook.
  - Use only original equipment and do not modify.
  - Do not place hands or fingers between hook and load.
  - Do not tip load hooks.

Figure 7i Hook with Safety Latch

Chain Hoists

- Inspect before each use. Look for:
  - Deformations, chemical damage, and cracks.
  - Check that both hooks swivel freely.
  - Check hook latches for damage.
  - Check all operating mechanisms (control lever, lifting lever, thumb latch, and safety pin) for proper functioning.
  - Check load chain and connecting links for wear, twist, spread side plates, presence of foreign material, and adequate lubrication.
- Operator shall be aware of and stay within rated capacity.
  - Overloading not only causes damage to the hoist, but presents serious threats to persons around the hoist.
- Never use a handle extender (cheater bar). The hoist is designed to lift or pull its rated capacity when a reasonable effort is exerted by one person.

- If effort is excessive recheck the load and use a larger capacity hoist if necessary.
- Avoid side loading. Always pull in a straight line between hooks. Side loading over a sharp corner may damage the hoist and its components.
- Be sure there are no twists in the load chain.
- Do not wrap the chain around the load. Use a sling.

Alloy Steel Chains

- Must have permanent affixed durable identification stating size, grade, rated capacity, and reach.
- Coupling links or attachments must have rated capacities equal to or greater than the chain.
- Alloy steel chains must be inspected before each use.
- In addition, they must be inspected at least annually. A documented record of inspection must be maintained for each chain.

707 Housekeeping/Storage

Requirement

- Jobsites, materials, and equipment shall be maintained in a clean and orderly manner.
- Spills, trip hazards, hazards from falling objects, and any condition that causes a hazard shall be immediately corrected.
- Materials shall be stored and jobsites maintained to eliminate safety hazards, faciliate material handling, provide safe working surfaces, and allow for movement of personnel, materials, and equipment.
- Housekeeping
  - Work locations, vehicles, buildings, and grounds shall be kept clean and orderly to the extent that the nature of the work allows.
  - Keep individual/team work areas orderly, clean, and free of housekeeping hazards.
  - Properly dispose of scrap and waste materials at frequent and regular intervals or at the end of each shift.
  - A clean and orderly work environment can be achieved and maintained through ongoing housekeeping efforts undertaken by personnel at all levels. Supervisors shall initiate participation in housekeeping activities and good work habits, not only at the end of a work assignment, but throughout the evolution of the task.
  - Containers shall be provided for the collection of waste, trash, and other refuse generated at the facility.
  - For trash, recyclables, and other waste materials, do the following:
    - Project wastes, scrap material, etc. should be taken into consideration before work begins so a proper means of waste disposal can be established.
    - Separate, dispose of, and keep waste in approved and properly labeled containers.
    - Recycle and/or reuse materials as feasible to minimize environmental impact.
    - Keep oily rags in a covered, metal container.
    - Safeguard sharp objects before disposal (e.g., broken glass disposed of in a cardboard box).
    - Load trash containers to protect material handlers from personal injury from contents. (e.g., heavy objects)
  - Overcrowding is an impediment to proper housekeeping and a deterrent to safety and health. Blocked or restricted aisles, stairwells, and travel ways inhibit the safe movement of equipment and materials.
  - Planning the location of equipment and storage facilities shall take into consideration the flow of personnel, equipment, materials, fire hazards, and the prevention or obstruction of evacuation, firefighting, or rescue activities.
  - Eliminate tripping hazards or restrict access to the area.
  - Identify, cover, or mark temporary cables or cords passing through work areas.
  - Use adequate lighting to perform work safely.
  - All spills that could lead to slips or falls should be cleaned up immediately.
- Storage
  - Materials shall be stored in a manner that facilitates access of material handling equipment and personnel handling limitations. Lack of sufficient workspace and storage capacity leads to the potential for accidents and decreases efficiency.
  - Storage of any material and supplies shall be planned with consideration given to the flow of personnel, equipment, materials, fire hazards, and the prevention or obstruction of evacuation, firefighting, or rescue activities.
  - Storage of flammable liquids, paints, and thinners shall be prohibited unless required for maintenance and operation of building or equipment. Such storage shall be within a metal storage cabinet that has been labeled and approved for the storage of flammable liquids.
  - Store pipes, poles, rods, and similar materials in racks to prevent rolling and facilitate safe handling.

- Materials with protruding nails, staples, or similar hazards should be immediately removed from walkways and stored in a manner to prevent injuries.
- Sharp or jagged materials (broken porcelain) should be protected before they are stored and stored in a manner to prevent cuts and punctures with the sharp or jagged edge facing away from the point of access.

A clean workplace is a safe workplace!

708 Office Safety

General

- The office is not generally thought of as a hazardous environment but potential safety hazards exist in the office. Common types of office injuries include:
  - Falls are the most common source of office related injuries. They result in the most severe and highest percentage of lost workdays. Office falls are caused by:
    - Leaning back too far in a chair, placing feet on a desk while sitting, and sitting down without looking.
    - Poor housekeeping such as wet floors, improperly placed electrical cords and walkways obstructed by trash.
    - Uncarpeted floor surfaces should have a slip resistant finish and no-slip mats should be used as necessary.
    - Standing on chairs or other surfaces to reach elevated objects.
  - Strain and overexertion type injuries caused by attempting to lift heavy or awkward objects and improper lifting techniques.
    - It is essential to your safety to properly handle materials and use proper lifting procedures. **Know what is being lifted and get help if needed**.
      - Obtain assistance from another person or utilize lifting equipment if a load is too heavy to lift alone.
      - Do not attempt to lift beyond individual capability and avoid twisting or turning during the lifting process.
      - Take caution when lifting or pulling in an awkward position.
      - When two or more persons are carrying a load, each employee, if possible, should face the direction in which the load is being carried.
      - When two or more persons are carrying a heavy load that is to be lowered or dropped, there shall be a prearranged signal for releasing the load.
      - Maintain a clean and safe work environment to eliminate slip, trip, and fall hazards while lifting and carrying.
      - Keeping physically fit will reduce the chances of a back injury.
      - Lift the load mentally before physically picking it up.
        - Size it up – How much does it weigh? How is it shaped and packaged? Is help needed or is there equipment that could be utilized?
  - Cuts from sharp objects common in the office environment such as letter openers, staples, pens, and paper cutters.
    - Use the correct tool for the task being performed.
    - Only such tools such as letter openers for the purpose for which they were designed.
    - When cutting or using sharp objects, cut away from the body.
    - Store sharp objects such as pencil ends, scissors, or knives with the point facing down.
  - Struck by injuries that occur when office workers are hit by objects such as opening doors, rolling tables, or file cabinet drawers.
    - Supplies should be stored in a designated area with heaviest objects on the bottom.
    - Office supplies and equipment should not be placed on the edge of a table or desk.
- The layout of an office should incorporate the principles of work flow, safety and health considerations, efficiency, and convenience.
  - Store the most commonly used files in readily accessible drawers or cabinets and lesser used files away from the work area.
  - Keep clear paths through offices including routes to cabinets, closets, and drawers.
- Keep your office adequately illuminated.
  - Illumination levels should not create visual fatigue caused by moving from bright surroundings into dark ones.
  - Office layout should not require employees to face windows, unshielded lamps or other sources of glare.

File Cabinet Safety

- Close all file drawers immediately after use.
- Close the file drawer with the drawer handle and not using the feet.

- Open only one file drawer at a time to avoid toppling the cabinet.
- Never leave an open drawer unattended and never open a drawer if someone is underneath it.
- Never climb on open file drawers or on file cabinets.

Ergonomics

- Ergonomics is the study of how people, their equipment, tools, and the environment work together. In an office environment, the goal of ergonomics is an environment set up to foster safety, productivity, and comfort.
- Unlike other types of injuries that occur as the result of acute or sudden trauma, ergonomics related injuries are often musculoskeletal disorders (MSD) that are developed over time from long term exposure to certain risk factors.
- The risk of office related MSDs can be lessened by:
  - Maintaining proper posture while sitting.
    - Awkward or extreme posture can lead to injury especially if combined with force on the body such as lifting or overextension.
  - Avoiding static positions for long periods of time.
  - Avoiding repetitive motion as much as possible.
    - Change positions frequently to lessen stress on the body.
  - Maintaining good physical conditioning.
  - Taking occasional mini-breaks and stretching or walking to avoid static position and long term repetitive motion.

Computer and Work Station Set Up

Screen	• Top of screen at or just below eye level. • 16-22 inches away. • Positioned at a right angle to windows if possible.
Chair	• Back should be fully supported. • Feet flat on the floor or a footrest. • Knees should be close to a 90º angle while seated.
Keyboard	• Positioned at height so wrists are straight and elbows are at 90°. • Wrist rest may be used for additional wrist support. • Maintain a light touch on the keyboard.
Work Station	• Frequently used items such as telephone should be readily accessible. • If a document holder is used while typing, it should be at the same height and distance as the computer screen.

Electrical Safety

- Use only UL-listed equipment.
- Arrange extension cords to avoid tripping hazards.
  - Electrical extension cords should never be used as a substitute for permanent wiring.
  - When extension cords are necessary, they should be taped down, clipped to the back of a desk, or covered with rubber protectors.
- Install and maintain proper receptacles.
- Appliances such as lamps, coffee makers and radios should be equipped with electrical plugs that have a ground prong or the appliance should be marked double insulated by the manufacturer.

Environmental Considerations

- Maintain a temperature range between 68°F and 79ºF.
- Relative humidity should be between 30% and 60%.
  - Note – temperature and humidity preferences may vary from employee to employee.

Emergency Planning

- Be familiar with all posted exit routes.
- Know designated gathering area in the event of an evacuation.
- Be familiar with the location of fire extinguishers and other emergency related supplies in the work area.

709 Poisonous Plants

Poison Oak	Poison Ivy	Poison Sumac
		
• Found below 5,000 feet in moist areas without much sunlight. • Shrub with 3 leaves. • Hair found on fruit, trunk, and leaves of the shrub. • Most common in western and southern US.	• 3 pointed leaflets on a vine. • Middle leaflet will have a much longer stalk. • Reddish in spring, green in summer, and yellow, orange, or red in the fall. • Most common in eastern US.	• Grows in moist and marsh-like environments and in standing water. • Leaves have groups of 7 to 13 leaflets • Grows on bush or shrub. • Less common but equally problematic.

Table 7b Identification of Poisonous Plants

Leaves of Three…..Let Them Be!

These plants contain urushiol oil, which is what causes the rash and irritation.

- Urushiol oil adheres to almost any surface (skin, clothing, towels, etc) so:
- Avoid Contact.
  - Be able to identify the plants.
  - Wear long sleeve Pike FR shirt and keep as much of the body covered as possible.
- In the event of contact with poisonous plants:
  - Wash the affected area with soap and water within ten minutes of exposure.
  - Contact a supervisor who will provide an ointment that will help alleviate the symptoms.
    - It is important that to follow the directions provided on the tube for maximum relief.

710 Pesticides

- Ensure applicators follow label and Safety Data Sheet (SDS) directions to identify proper safety equipment and to note health concerns of pesticides.
- Ensure applicators have appropriate SDS readily available and are knowledgeable of the product they are applying.
- As appropriate or as recommended on the label, wear the following personal protective equipment when handling, mixing, or applying pesticides:
  - Long-sleeved shirt and full-length trousers or long-sleeved coveralls.
  - Non-canvas or nonporous shoes or boots.
  - Safety glasses or face shield.
  - Neoprene gloves.
  - Respirator if necessary.
- Ensure respiratory protection is based upon SDS, exposure assessment, and work practices.
- Ensure applicators required to wear any form of respiratory protection have medical clearance, training, fit testing, and approved respirators.

- Do not use single-use dust masks; they do not protect against pesticides.
- Ensure applicators adhere to the following guidelines for caring for personal protective equipment:
  - After each day's use, launder reusable clothing. Do not launder contaminated clothing with normal household clothing.
  - After each day's use, discard disposable clothing.
- For several scheduled applications at different locations in a single day, disposable clothing may be reused, providing the garment is in reasonable good condition (e.g., no heavily soiled, saturated, or torn areas).
- Place contaminated disposable clothing in impervious waste bags, and label as to the type of pesticide contamination.
  - Do not handle contaminated clothing with unprotected hands.
  - At the end of each day, wash reusable personal protective equipment with detergent and clean water. Dry this equipment in a clean, dry place.
  - Replace pesticide respirator cartridges after 8 hours of use or more if the odor of the pesticide can be detected while wearing the device.
- To minimize or eliminate potential personal exposure to pesticides through inhalation, ingestion, and/or skin absorption:
  - Never eat, drink, or smoke when handling pesticides.
  - Remove all jewelry before handling pesticides.
  - Wash hands with soap and water after handling, mixing, or applying pesticides.
- Determine what pesticide application equipment is necessary for the task.
  - Check to make sure all the equipment needed is available and that it is clean and in good operating condition.
  - Ensure that anyone who will use the equipment knows how to operate it safely and correctly.
- Pesticides may easily be transferred to other people or objects from clothing, gloves, shoes or PPE.
- Spills should be cleaned immediately, reported as required, and PPE should be worn when cleaning after a spill.
- Ensure people and animals are out of the area prior to applying pesticides.

711 Potable (Drinking) Water

Requirement

- Drinking water shall be provided for each employee.
- Drinking water dispensers shall be designed, constructed, and serviced so that sanitary conditions are maintained, shall be capable of being closed, and shall be equipped with a tap.
- A common drinking cup (used by more than one employee) and other common utensils are prohibited.

712 Insects

Requirement

Working outside brings the potential for insect bites. Take precautions to avoid insect bites and know what to do in the event of an insect bite.

- Tips to avoid insect bites:
  - Wear work gloves.
  - Shake out clothes and PPE (especially gloves) before putting them on.
  - Use an insect repellent.
  - DEET Free repellent should be used on FR clothing.
  - Do not roll up sleeves.
  - Check entire body after being in an area where insects are likely to be found.
  - Keep open drinks and uneaten food well-guarded.
- If bitten by a tick:
  - To remove an attached tick:
  - Use fine-tipped tweezers. If they are not available, use fingers.
    1. Grasp the tick as close to the skin surface as possible and pull upward with steady, even pressure. Do not twist or jerk the tick; this may cause the mouthparts to break off and remain in the skin.
    2. After removing the tick, thoroughly disinfect the bite site and wash hands with soap and water.
    3. Do not squeeze, crush, or puncture the body of the tick because its fluids may contain infectious organisms.
  - Save the tick for identification in case of illness.
  - Clean the bite site thoroughly.

- Closely monitor overall health and the bitten area.
- Any of the symptoms below could be signs of infection and a doctor should be consulted immediately.
  - Pain, swelling, redness, or warmth around the bitten area.
  - Red streaks leading from bitten area.
  - Swollen lymph nodes in neck, armpit, or groin.
  - Fever or chills.
  - Rash, headache, joint pain, or flu-like symptoms.

- Tips to avoid bee stings:
  - Avoid wearing fragrances including hair spray, scented soaps, lotions, and oils.
  - Don't wear brightly colored clothing, especially floral designs.
  - Keep open drinks and uneaten food well guarded.
  - Wash hands immediately after eating sugary or sticky foods.
  - If a bee lands on they body:
    - Hold still and gently blow on the bee.
  - If a bee comes inside a vehicle, remain calm and stop the vehicle as safely as possible and open the windows to let the bee out.
- In the event of a bee sting:
  - Gently attempt to scrape out the stinger with a blunt-edged object such as a credit card or dull knife.
  - Wash the area with soap and water several times a day.
  - Apply a cold ice pack for a few minutes after the sting.
  - Apply a paste of baking soda and water for 15-20 minutes.
  - Take acetaminophen if needed for pain.
  - Contact medical personnel if:
    - The victim of the sting is allergic to bee stings.
    - The victim was stung in the mouth or nose.
    - The sting results in swelling, abnormal breathing, tightness in throat or chest, dizziness, hives, fainting, nausea, and/or persistent pain or swelling.
- If an employee is allergic to bees:
  - They should obtain a sticker for their hard hat.
  - Carry epipen (if prescribed) or other medication.
  - Make sure the crew knows what to do in the event of a sting.

Figure 7j Allergic to Bees Hardhat Sticker

713 Dog Bites

Case Study
A meter reader was bitten by a dog chained on a front porch. When asked about the bite, the meter reader responded, "I didn't think he would bite."

Requirement

- Observe the work area at all times. Look for dog trails, food or water bowls, dog houses, fences, chains, dumped garbage cans, behind bushes, under cars, and houses.
- Employees should be wary of dogs behind them. Almost all attacks occur this way.
- When entering a property, rattle the gate or make a noise. If there is a dog, this may give provide a chance to meet the dog before entering the property.
- Never think that a dog that is tied up cannot attack. Chains can break and may be longer than they appear. Dogs are also more aggressive when tied up.
- Fight or Flight. Almost all bites occur out of fear. If approaching a doorstep where a dog is resting, give the dog plenty of room to escape. A frightened, cornered dog will come out fighting when its "chase response" is triggered. If the dog is the nervous type (runs away barking), ensure that there is an escape route for the dog.
- Do not reach toward a dog's head. This is a dominant gesture and some dogs are punished by being hit in the head area.
- Never lean over a dog or hold direct eye contact with it. This is a dominant stance and may prompt an attack.
- Always assume that a strange dog may see a stranger as an intruder or a threat.
- If there is evidence of a dog in the yard, employees should always knock on the door and request that the customer confine the dog so that they may enter the yard.
- Following a thorough hazard assessment, if an employee feels that the chained dog is not completely secured, the employee should refuse to access the yard.

How to tell when a dog might bite:

- The dog may stand stiff and still, maybe with its hair up.

- It may stare.
- The dog may hold its tail stiff and up in the air. Very important – a dog that is friendly will wag its tail, and the wagging will be very relaxed. If a dog's tail is up, stiff, and wagging very fast, watch out! That can be a danger signal.

If a dog may attack or its actions are uncertain:

- Stand very still, and try to be calm. Do not scream, kick, or run. Standing to the side of a dog is much less threatening than standing head-on.
- Be aware of where the dog is located. Employees should not turn their back to a dog or stare into its eyes.
- Look for an escape route, on or under a car, behind a fence, or anywhere out of their territory.
- If the dog comes up to sniff, let it. In most cases, the dog will go away when it decides there is no threat.
- Speak calmly and firmly.
- Try to stay still until the dog leaves, then back away slowly until it is out of sight. Smooth and slow movements are less likely to threaten a dog. Walk backward out of the area and do not turn away from the dog. If possible, employees should put something between themselves and the dog.
- If a dog does attack suddenly, "feed" it a clipboard, jacket or anything that may distract it, giving it something to bite.
- Should an employee fall or be knocked down, they should curl into a ball with their hands over their head, ears and neck. Try not to scream or roll around.
- If multiple dogs attempt to surround an employee, they should back themsevles against a wall, tree, car or fence. Keep an eye on the "alpha" dog, he/she will be 6"-12" ahead of the others and is not necessarily the largest in the group.

In the event of a dog bite:

- If an employee is bitten by a dog, try not to panic.
  - Immediately wash the wound thoroughly with soap and warm water.
  - Contact a physician for additional care and advice.
- Report the bite to local animal care and control agency. Tell the animal control official everything known about the dog, including its owner's name and address. If the dog is a stray, tell the animal control official what the dog looks like, where it was seen, whether it has been seen before, and in which direction it went.

714 Radio Frequency / Electromagnetic Energy

The FCC standard divides exposure into two groups, Occupational/ Controlled Environments and General Population/Uncontrolled Environments.

- General Population/Uncontrolled Environment limits apply to individuals assumed to have no knowledge of or control over their possible exposure to RF energy.
- Occupational/Controlled Environment limits apply to individuals who should know that there is a potential for exposure as a requirement of employment, may exceed exposure levels beyond the General Population/Uncontrolled environment

Exposure levels greater than the General Population Limit

- Work environments do not automatically fall into the less restrictive Occupational limit.
  - General Population limits could apply if employees are not aware of the exposure, or cannot exercise control over the exposure.
  - OSHA requires training for all employees who are exposed to **more than** the General Population limit must receive RF training.
- When workers do fall into the occupational limit, the following applies:
  - Awareness Training is required for all workers.
    - All personnel who have occasion to work in a controlled area, where power densities could exceed the general public MPE limits, should be aware of the potential for their exposure to RF fields and should be informed as to the steps they can take to ensure they will not be exposed to RF fields in excess of the MPE limits.
  - All personnel entering a RF EME exposure site must be authorized.
    - Only personnel who have been EME awareness trained and understand the EME situation and other safety requirements associated with site work should be allowed access without escorts. When untrained individuals access the sites, trained escorts are required.
  - Obey all posted signs.
    - This guideline emphasizes the importance of observing and understanding the instructions on posted signs at a transmitter site.
    - For example, certain areas may be designated “NO ACCESS” unless certain antennas are shut down. It is important that these signs be understood and obeyed, to assure EME exposure below the FCC guidelines.
    - The requirement for RF protective clothing for workers is another precaution that could be identified on signs designating areas of potential exposure in excess of FCC limits.
  - Personnel should assume all antennas are active and energized.
    - Unless a worker has direct knowledge that an antenna is either a receive antenna or has been deactivated, the worker should consider antennas to be active and energized.
    - No different from OHD or URD procedures, even when knowledge has been given or received the antenna is de-activated; it must still be considered energized until tested.
    - A testing monitor is an RF threshold detector that alarms when RF exceeds the threshold of the device, normally 50% of the Occupational/Controlled MPE.
  - Personnel should habitually maintain a minimum distance of three (3) feet from all activated antennas.
    - In some cases, antennas should be given more than 3 feet clearance (in such instances, appropriate signs and other warning must be posted to indicate the necessary clearance).
    - FCC studies have shown that a three foot clearance is a practical approach to assure that exposure remains within FCC limits. This insures a distance is always maintained unless work is required on an antenna. Work on a specific antenna should only be accomplished after the attached transmitters have been turned off. A small increase in distance from an antenna can have a substantial effect on reducing the EME exposure.

Just like with an arc flash, distance is your friend.

- Do not stop in front of antennas.
  - While climbing, resting, or changing locations personnel should not stop near Omni-directional antennas or in front of (within the transmit zone) directional antennas, and should keep below elevated antennas if possible.
- Before working on antennas notify owners and disable appropriate transmitters.
  - Before working on an antenna, workers must insure that all attached transmitters are deactivated.
  - When possible Lockout/Tagout tags should be used to make sure someone else does not inadvertently turn on the transmitter while work on the antenna is being performed.
  - Remember, antenna/transmitters must be tested and verified deactivated before work can begin.
- Continually use RF monitors to determine antennas being worked on are deactivated, and while working adjacent to energized antennas.
  - Special care must be exercised when working on or very near energized antennas. Although the EME fields cannot be sensed directly, transmitter activity can be detected close to an antenna with a RF monitor.
  - Use of a monitor will allow workers to ensure that all connected transmitters have been turned off before they begin maintenance or are outside the distance needed to exceed MPE thresholds. If the monitor alarms, they should move away from the antenna, determine which transmitters are still on, (or too close to their location) and disable the identified transmitters.
- Reduce power of nearby activated antennas when needed.
  - By lowering power to the antenna, cumulative RF fields at the site may be lowered. This may facilitate overall site-wide compliance.
  - Powering down may enable some facilities to qualify for a categorical exclusion which would allow keeping the antenna energized while work is performed on an adjacent antenna.
  - A monitor must be used to ensure levels are kept low enough to facilitate this compliance.
- Never operate transmitters without shields during normal operation.
  - Some work at antenna sites involves trouble-shooting and repair of the radio transmitters. The shields within transmitter power amplifiers are there to prevent strong RF fields from radiating out of the transmitter cabinet.
  - Operating the transmitter without shields could cause interference and exposure of the technician performing the service to EME levels in excess of the FCC guidelines.
  - While shields must be removed for many maintenance tasks, they should always be properly reinstalled before returning the transmitter to normal operation.
- Do not operate base station antennas in equipment room.
  - Transmitting antennas should never be operated inside the equipment rooms, even for short term testing. This includes mobile magnet mount antennas attached to the top of transmitter cabinets as temporary installations.
  - Using transmit antennas inside equipment rooms can increase the exposure to EME levels above FCC guidelines and create undesirable radiofrequency interference.

The procedures described here are intended to provide a safe work environment for those who have to work near RF transmission equipment.

If unsure of the group, Occupational/ Controlled Environment or General Population/Uncontrolled Environments, contact a supervisor or the Safety Department for clarification, and to schedule Radio Frequency/Electromagnetic Energy awareness training if needed.

715 Thermal Exposure – Cold

- Workers should realize that almost all of their work is outdoors and should dress accordingly.
- Clothing should be warm but not bulky enough to retard movement. A suit of insulated underwear is recommended.
  - Outer clothing should be a type that can be easily removed if the workman gets too warm.
- Sturdy weatherproof boots or shoes should be worn in cold weather. Two pairs of medium-weight socks are usually better than one pair of heavy socks. During the winter months, workers should expect snow, mud, and slushy conditions. Rubber boots (4 buckle) worn as required will help protect against wet feet.
- Hard hats with winter liners provide protection against weather and accidents.
- The best way to warm excessively cold portions of the body is to remove the covering from those parts and apply heat.
  - For example, remove gloves and apply heat to gloves and hands and remove shoes and apply heat to shoes and feet, making sure socks are dry.
- Drink warm, sweet beverages (sugar water, sports-type drinks.) Avoid drinks with caffeine (coffee, tea, or hot chocolate) and alcohol.
- Sitting or standing for prolonged periods of time shall be avoided in cold environments.
- Rest periods in warm environments shall be frequent to prevent cold stress disorders.
- An employee who becomes fatigued while working shall be removed to a warm environment and shall rest. As exhaustion approaches, the body experiences rapid loss of heat and the cooling process begins.
- Alcoholic products, including cough medication containing alcohol, should not be taken prior to work in cold environments. Alcohol dilates blood vessels near the skin surface which increases heat loss and lowers body temperature.

Windchill Index

- Air temperature alone is not sufficient to assess the cold hazard in certain environments. Therefore, the windchill index along with the air temperature shall be used. Heat loss from convection is the greatest and most deceptive factor in loss of body heat.
- The windchill index is the cooling effect of any combination of temperature and wind velocity or air movement.
- The windchill index takes into account the wind velocity. If there is no anemometer (measures wind speed), the following is a suggested guide for estimating wind speed:
  - 5 mph: light flag moves.
  - 10 mph: light flag fully extended.
  - 15 mph: raises newspaper sheet.
  - 20 mph: causes blowing and drifting snow.
- The windchill index shall be used to evaluate the cold hazard.
- The windchill index does not take into account the body part exposed to cold, the level of activity effect on the body's heat production, and the amount of clothing worn.

Increased Risk

- Workers are at increased risk when:
  - They have predisposing health conditions such as cardiovascular disease, diabetes, and hypertension.
  - They take certain medications. Check with a doctor, nurse, or pharmacy and ask if any medicines being taken could present problems while working in cold environments.
  - They are in poor physical condition, have a poor diet, or are older.
  - They are exposed to humidity.
  - They are exposed to high winds.
  - They become wet or contact cold surfaces such as metal.
  - They wear inadequate clothing.

Frostbite

- The three degrees of frostbites are:
  - First degree - Freezing without blisters or peeling.
  - Second degree - Freezing with blisters or peeling.
  - Third degree - Freezing with death to outer tissues and possibly of the deeper tissues.
- Symptoms:

- At first, skin becomes slightly flushed.
- Skin may become white or grayish-yellow.
- Blisters may appear later.
- Pain is sometimes felt early, but there is often no pain at all. There may be a cold, numb feeling.

- First Aid:
  - Do not rub the frozen area with snow or hand.
  - Cover the frozen area with extra clothing.
  - Bring the victim indoors as soon as possible.
  - Give the victim a warm drink.
  - Quickly rewarm the frozen area by immersing in water at body temperature. Do not use hot water.
  - Handle the frozen part with great care.
  - Do not use hot water bottles or heat lamps or place frozen area near a hot stove.
  - Do not disturb blisters. Lightly bandage blisters if possible.

Hypothermia

- Remove any wet clothing and dry the victim.
- Warm the body gradually by wrapping the victim in blankets or putting on dry clothing and moving the individual to a warmer place. Do not warm body quickly by immersing the person in hot water. Rapid warming can cause dangerous heart problems. If available, apply heating pads or other heating source to the body. Keep a protective barrier, such as towel, blanket, or clothing between heat source and victim to avoid burning the individual.
- If the victim is alert, give warm liquid to drink. Never give liquids to an individual who is unconscious or semi-conscious.
- Handle the victim gently.
- Get professional help immediately.

716 Thermal Exposure - Heat

Requirement

Pike employees work outdoors and are exposed to hazards associated with temperature extremes. The nature of the work and required PPE increases an employee's chances of heat related illness. To mitigate hazards associated with heat:

- Supervision must be trained in preventing heat related illnesses, heat illness identification, and heat illness response procedures before supervising employees working in hot conditions.
- Personal factors must be taken into consideration when assigning work and scheduling breaks.
- Employees must prepare themselves to work in hot conditions and take steps to limit their exposure.
- Employees must be trained in heat illness prevention, identification, and response procedures.

Working in Hot Conditions

- Below are guidelines for working in hot conditions. Each is explained in detail.
  - Show up fit for duty (well rested, nourished and hydrated).
  - Remain hydrated throughout the day (drink water and electrolyte drinks such as Gatorade).
  - Employees should take regular breaks and stop work immediately if they begin to feel ill.
  - Everyone should be monitored for signs of heat illness throughout the day.
- Show up fit for duty (well rested, nourished and hydrated).
  - Eat regular, small meals and avoid big meals before and during work hours.
  - Get a good night's sleep.
  - Inform supervision of any medications being taken or pre-existing conditions such as diabetes that have side effects that can be exacerbated by heat andsun exposure.

Common Beverages		
Water	Sports Drinks	Energy Drinks
		
Always	**Sometimes**	**Never**
Caffeine Levels		
Beverage	Serving Size	Caffeine (in milligrams)
Coffee	6 oz.	80-200
Espresso	Single shot	29-100
Tea	12 oz.	30-90
Soda	8 oz.	30-70
Energy drinks	8 oz.	70-280
Sports drinks	8 oz.	0

Table 7c Caffeine Levels in Common Beverages

- Remain hydrated throughout the day (drink water and electrolyte drinks such as Gatorade).
  - Drink at least half a cup of water every thirty minutes during strenuous activity.
  - Drink 1 ounce of water for every 10 pounds of body weight 1-2 hours before strenuous activity.
  - Avoid excessive amounts of caffeine. Caffeine is a diuretic that increases the chances of dehydration.
    - Caffeine intake should be limited to 300 to 400 milligrams daily.
  - One of the best ways to monitor personal hydration is to monitor the frequency and color of urine.
  - Hydration requirements vary based on heat exposure.

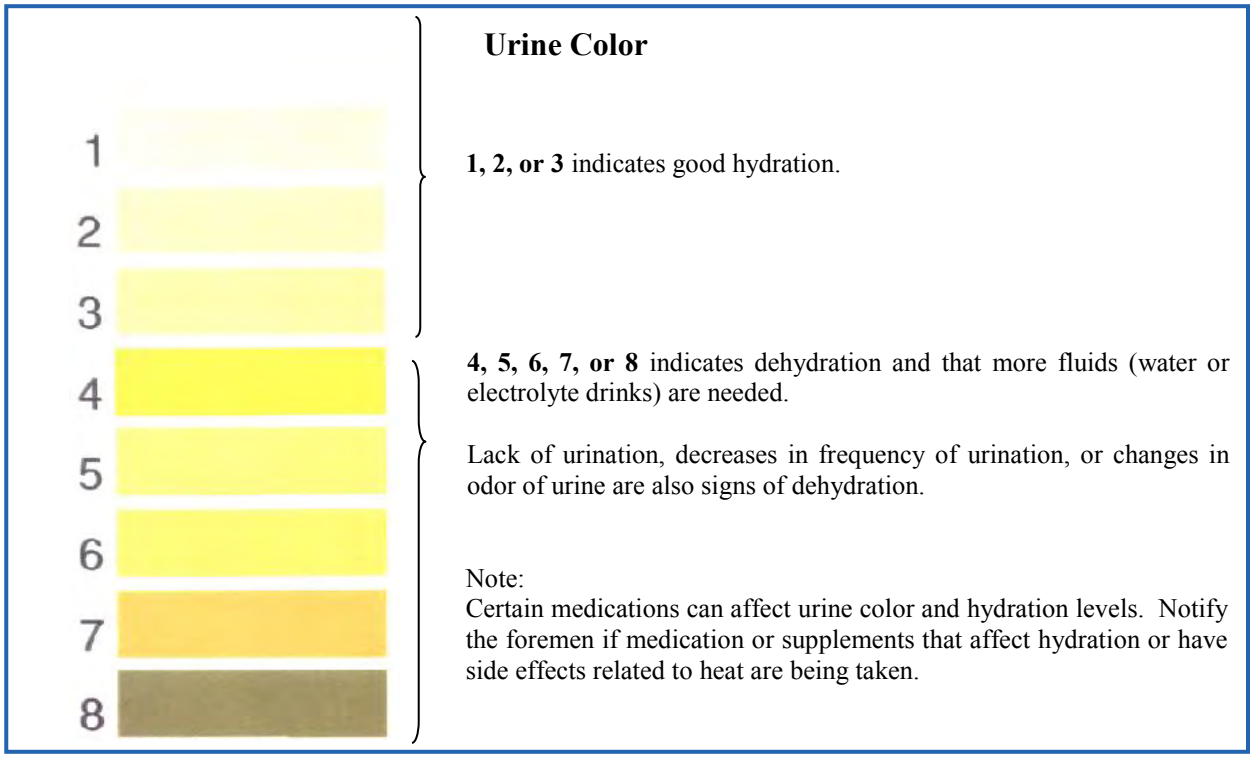


Figure 7k Urine Color and Hydration

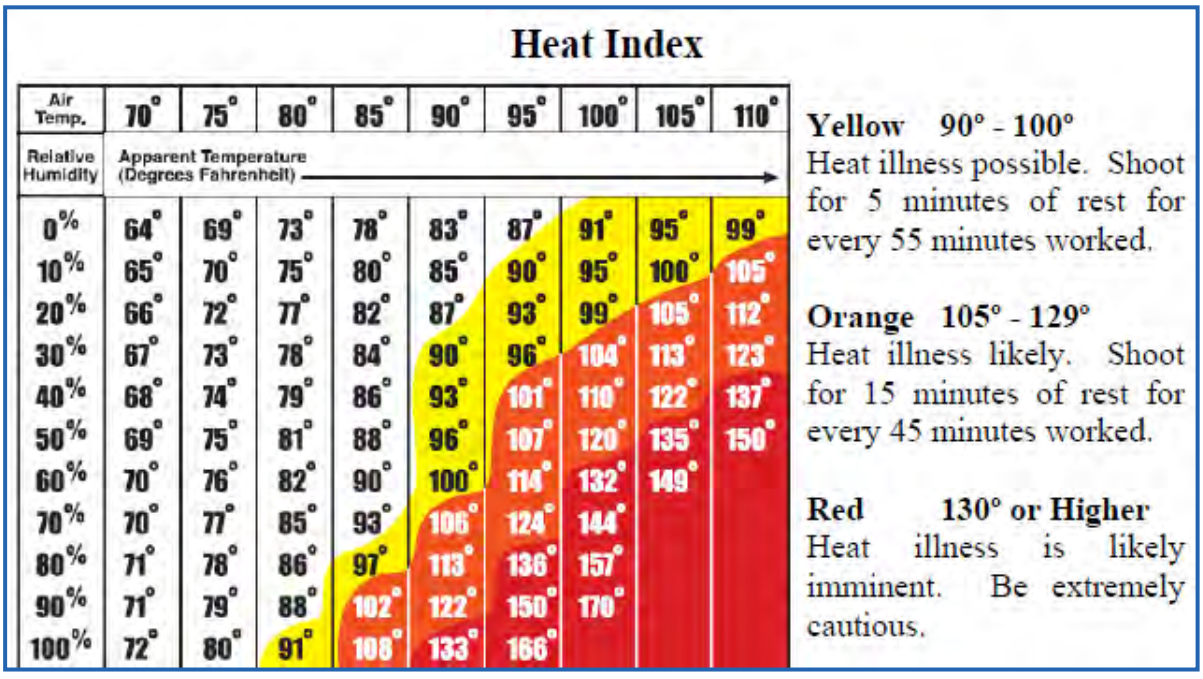


Figure 7l Heat Index and Recommended Rest

- Take regular breaks and stop work immediately if signs or symptoms of illness develop.
  - Seek shade and cooler temperatures during breaks.
  - Work at an appropriate pace while working in physically demanding situations.
  - Rotate work tasks such as working in a bucket with gloves and sleeves or strenuous manual material handling activities between employees.
- Each employees should be monitored for signs of heat illness throughout the day.
  - Know the signs and recommended treatment for various types of heat illness.
- Heat Exhaustion
  - Symptoms
    - Heavy sweating, nausea, headache, weakness, vomiting, fast pulse, tiredness.
  - Treatment
    - Move to cooler area, cool by wetting clothing and fanning, drink water, lie down, follow up with medical checkup.
- Heat Cramps
  - Symptoms
    - Severe muscle spasms in the back, stomach, arms, and legs, usually caused by drinking large quantities of water without replacing salt during periods of heavy perspiration.
  - Treatment
    - Move to cooler area, drink water moderately, and take salt tablets if health allows, follow up with medical checkup.
- Heat Stroke
  - Symptoms
    - High temperature and dry skin, rapid breathing and pulse, the victim may appear disorganized and confused, with headache, nausea, vomiting, diarrhea, seizures, and possibility of coma.
  - Treatment
    - This is serious, so move fast to a cooler area, call an ambulance, remove the outer clothing, and apply cool water to the entire body. Fan the victim to increase cooling until professional help arrives.

Notes:

- Heat illness is a serious matter. DO NOT try to tough it out if symptoms are exhibited. Rest, hydrate, and take it easy before resuming normal activities.
- History has shown employees with heat illnesses have long recovery periods and may be more prone to future heat illnesses. Ensure they are monitored closely and properly hydrated when they return to work.

717 Illumination

- Adequate illumination shall be provided at each work location for employees to safely perform their work.

Pike's primary method for eliminating dust exposure is to use the wet method.

718 Crystalline Silica

Crystalline silica is an important industrial material found abundantly in the earth's crust. Quartz, the most common form of silica, is a component of sand, stone, rock, concrete, brick, block and mortar. Materials containing quartz are found in a wide variety of workplaces.

General

- Silica dust is hazardous when small (respirable) particles are inhaled.
- These respirable dust particles can penetrate deep into the lungs and cause disabling and sometimes fatal lung diseases, including silicosis and lung cancer, as well as kidney disease.
- Exposures to crystalline silica dust occur in common workplace operations involving cutting, sawing, drilling, and crushing of concrete, brick, block, rock, and stone products (such as construction tasks), and operations using sand products (such as in glass manufacturing, foundries, sand blasting, and hydraulic fracturing).

Prevention

- Use all available engineering controls such as blasting cabinets and local exhaust ventilation.
- Avoid using compressed air for cleaning surfaces.
- Use water sprays, wet methods for cutting, chipping, drilling, sawing, grinding, etc.
- Substitute non-crystalline silica blasting material.
- Use respirators approved for protection against silica, in conjunction with the wet method, as needed; if sandblasting, use abrasive blasting respirators.
- Do not eat, drink or smoke near crystalline silica dust.
- Wash hands and face before eating, drinking or smoking.

Section 8 Work Area Protection

801 Work Area Protection

Work Area Protection is the safeguarding or protecting of pedestrians, motorists, utility workmen, and equipment by the use of barriers, warning signs, lights, flags, traffic cones, barricade ropes, flagmen, etc. on approaches to work areas.

- The foreman or other employee in charge shall be responsible for properly placing road signs, safety cones, flags, and barricades, when working near streets, roads, highways, or in any location where work area protection may be deemed necessary to protect the general public.
- Trenches, open pits, pole holes, manholes, etc. shall be barricaded any time they are left unattended. The foreman or employee in charge should make every effort to plan their work in order that these trenches, open pits, pole holes, manholes, etc. are not left open for extended periods of time.

Case Study

The following incidents occurred within a one and half week time frame:

A Pike crew had a proper work zone set up with an arrow board directing traffic away from their work zone. A driver hit the arrow board throwing it 37 feet into a line truck.

A Pike crew had a proper work zone set up in heavy traffic. A young driver ran through the work zone and struck the bucket truck pushing it into the line truck. The driver never hit her brakes and the lineman working in the bucket and another employee sitting in the line truck were injured and taken to the hospital.

Best Practice

You can't control the actions of the public, but you can protect yourself.

Equipment not in use on a jobsite should be used as a barrier at the end of the work zone from which traffic is approaching.

Be aware of your body position in relation to

Equipment

- All state and local traffic codes shall be followed when providing work area protection.
- Warning devices and equipment shall be removed and stored in a proper manner as soon as the hazard is eliminated.
- Equipment parked or operating on streets or highways shall be protected by proper flashers or warning devices.
- Proper cones and/or barricades shall be used where appropriate.

Traffic Control

Before any work is started:

- The following major traffic control considerations shall be made:
  - What type of work will be conducted (stationary, mobile, or moving)? What will be the time duration of the work?
  - Where is the work zone located (on the roadway, on the shoulder, or off the roadway)?
  - What type of road is involved?
  - What is the speed of the traffic?
  - What is the traffic volume on the roadway?
  - Should the work be rescheduled to avoid heavy volume conditions?
  - Will the nature of traffic change while work is underway?
  - Do the local law enforcement agencies need to be notified?
  - What kind of signage will be required?
  - Are cones, drums, barricades, or an arrow panel needed for traffic channelization?
  - Will a flagger be required?
- "Utility Work Ahead" and other warning signs shall be placed at the beginning and end of each work area according to spacing of warning signs chart immediately after the work area is established.
- There must be a sign indicating the end of the work area.

*** Keep in mind that these signs are to warn motorists they are approaching a work site. **THEY ARE NOT BARRIERS!**

Typical Signs

- The "UTILITY WORK AHEAD" sign may be used to advise motorists of maintenance or public utility work in or near the roadway.
- The "ONE LANE ROAD AHEAD" sign should be used where traffic in both directions must use the same single lane.
- The "RIGHT LANE CLOSED AHEAD" sign should be used to caution oncoming traffic that lane(s) on a multilane highway is closed. The LEFT overlay plate is available for left lane closures.

- The flagger symbol sign should be used in advance of any point where a flagger has been stationed to control traffic through a construction or maintenance project.

Spacing of Warning Signs

The distance from the first sign to the start of the transition area should be long enough to give motorists adequate time to respond to the conditions. Guidelines to determine how far to locate sign(s) from the truck on the end of the traffic taper and for minimum distances between warning signs are indicated in Sign Spacing figure. (Sign spacing should be at least one block for urban streets.)

Spacing of Warning Signs			
Road Type	Distance Between Signs		
	Point of Restriction to First Sign	Distance Between First and Second Signs	Distance Between Second and Third Signs
Urban (35 mph or less)	100 feet	100 feet	100 feet
Urban (36 mph or more)	350 feet	350 feet	350 feet
Rural	500 feet	500 feet	500 feet
Expressway / Freeway	1,000 feet	1,500 feet	2,640 feet

Table 8a Sign Spacing

Lane Closure Taper (Cones, Barricades, etc.)

The length of taper to close a lane is determined by the speed of traffic and the width of the lane to be closed (the lateral distance that traffic is shifted). If restricted sight distance is a problem, the taper should begin well in advance of the view of the obstruction. Following is a table of taper lengths, the recommended number of devices, and the spacing of channelizing devices for various speeds and lane widths.

Posted speed	Formula
40 MPH or under	$L = WS^2/60$
45 MPH or over	$L = WS$

where: L = taper length
W = width of lane or offset
S = posted speed

TAPER LENGTHS*

Speed (MPH)	Lane Width (feet) 10	11	12	14	# of Devices**	Spacing between Devices (ft.)
					Assuming 12 foot lane width	
25	105	115	125	150	6	25
35	205	225	245	290	8	35
45	450	495	540	630	13	45
55	550	605	660	770	13	55
65	650	715	780	910	13	65

Table 8b Lane Closure Taper Lengths

Areas in a Traffic Control Zone

The traffic control zone is the distance between the first advance warning sign and the point beyond the work area where traffic is no longer affected. Figure 3 shows the areas in a traffic control zone.

- NOTE: Cones are typically used for daytime operations. Reflective plastic barrels or Type I or II barricades, or cones with a reflective collar should be used for nighttime operations.
- A flagman shall be posted when the job operation presents a hazard to traffic.

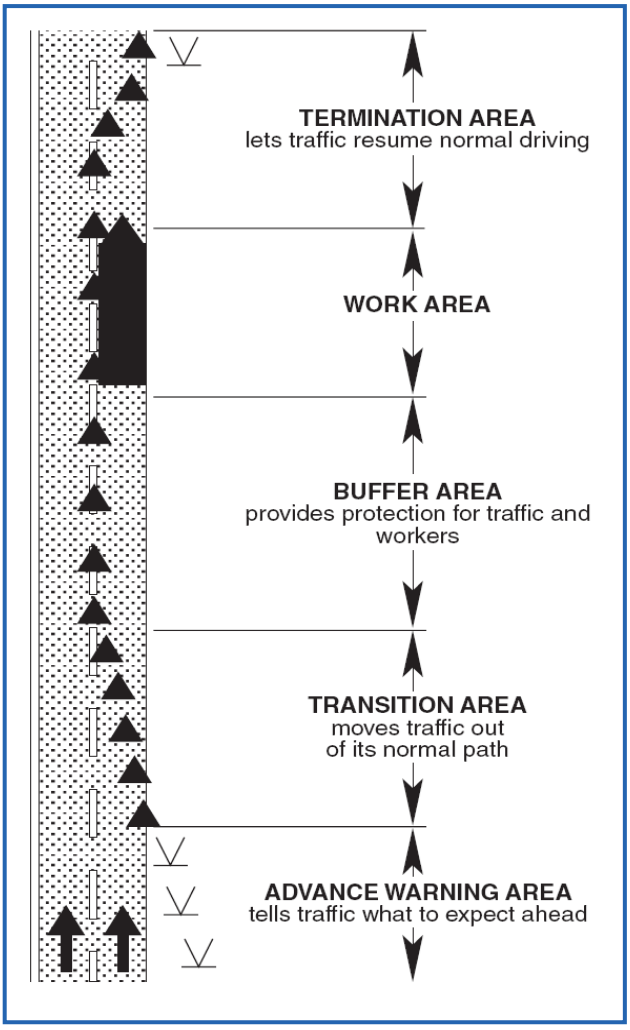


Figure 8a Traffic Control Zone

Installing Traffic Control Devices

1. Locate the beginning of Work Space and mark the location (when using paint, use white or pink colors only, as other colors have designations for the type of utility being marked).
2. From the beginning of the Work Space, measure the buffer distance (empty space in advance of the work area) and mark the beginning of the Buffer Space.
3. From the beginning of the Buffer Space, measure the taper length and mark the beginning of the taper.
4. From the beginning of the taper, measure the advance warning sign spacing distances and mark each location.
5. Install advance warning signs in Advanced Warning Area, beginning with signs located on the right shoulder first, then signs on the left shoulder if applicable:
   - 1st sign—Attracts the driver's attention.
   - 2nd sign—Shows what the driver is approaching.
   - 3rd sign—Shows the driver what must be done.
6. Install traffic control devices in the Transition Area with the flow of traffic.
7. Install traffic control devices along the Activity Area:
   - Start installing along the Buffer Space with the flow of traffic.
   - Continue placing devices along the Work Space.
8. Install traffic control devices for the Termination Area with the flow of traffic.
9. Inspect the work zone:
   - Perform a drive through inspection if possible.
   - Document the observations.
   - Correct any deficiencies.
10. Observe motorists driving through the work zone to look for trends in motorist difficulty in maneuvering through the work zone.

Figure 8b Day Cone Requirement

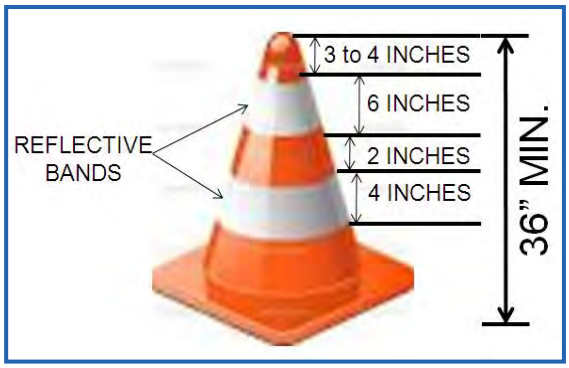


Figure 8c Night Cone Requirement

Removing Traffic Control Devices

1. Remove devices from the Termination Area against the flow of traffic.
2. Remove devices from the Activity Area against the flow of traffic:
   - Make sure Work Space is clear and cleaned before removing devices.
   - Remove devices from the Buffer Space.
3. Remove devices from the Transition Area against the flow of traffic.
4. Remove advance warning signs in the Advance Warning Area against the flow of traffic. Remove the first Advanced Warning Sign last.

802 Flagging Procedures

- Employees shall wear an approved traffic vest when involved in any type of traffic flagging operations or where the hazard of being struck by oncoming traffic may exist.
- For nighttime flagging operations, the flagger station shall be illuminated.
- Flagger stations shall be located far enough in advance of the work site so that approaching traffic will have sufficient distance to reduce speed before reaching the work site.
- The flagger should stand either on the shoulder adjacent to the traffic being controlled or in the barricade lane. In certain instances where a "spot" obstruction exists, the flagger may have to position himself on the shoulder opposite the barricade section to operate effectively.

ABCs of Flagging

Advance warning signs:

- Utility Work Ahead.
- Right/Left Lane Closed / One Lane Road Ahead.
- Flagger Ahead or Flagger Symbol.

Be visible and alert at all times:

- Proper flagging equipment.
- Watch the surroundings continually.

Control traffic with the proper procedures:

- Eye contact.
- Proper commands without confusing the driver.

UNDER NO CIRCUMSTANCES SHOULD A FLAGGER STAND IN THE LANE BEING USED BY MOVING TRAFFIC.

- STOP and SLOW paddles are the primary and preferred hand signaling devices and must be used if available. The following methods of signaling with sign paddles should be used:
  - To STOP traffic - The flagger shall face traffic and extend the "STOP" sign paddle in a stationary position with the arm extended horizontally away from the body. The free arm is raised with the palm toward approaching traffic.
  - When it is safe for traffic to proceed, the flagger shall face traffic with the "SLOW" sign paddle held in a stationary position with the arm extended away from the body. The flagger motions traffic ahead with the free hand.
    - The free hand should also be used to motion traffic to slow down.
  - When it is desired to alert or slow traffic, the flagger shall face traffic with the "SLOW" sign paddle held in a stationary position with the right arm extended horizontally away from the body.
- Flags shall be used only in emergencies if paddles are not available. The following methods of signaling with a flag should be used:
  - To STOP traffic, the flagger should face traffic and extend the flag horizontally across the traffic lane in a stationary position so that the full area of the flag is visible hanging below the staff. For greater emphasis, the free arm may be raised with the palm toward approaching traffic.
  - When it is safe for traffic to proceed, the flagger shall stand parallel to the traffic movement, and with flag and arm lowered from view of the driver, motion traffic ahead with the free arm. Flags shall not be used to signal traffic to proceed.

- Where it is desired to alert or slow traffic by means of flagging, the flagger shall face traffic and slowly wave the flag in a sweeping motion of the extended arm from the shoulder level to straight down without raising the arm above a horizontal position.

Paddle and Flag Requirements

Paddles must be:

- Octagonal shaped.
- 18 in. wide (minimum).
- Letters must be 6 in. tall.
- Stop shall have White Letters, White Border and Red Background.
- Slow shall have Black Letters, Black Border and Orange Background.
- Retroreflective during night operations.
- Rigid handle on staff that is high enough to be seen by approaching or stopped traffic.

Flags must be:

- 24 in. square.
- Attached to a 36 in. staff.
- Retroreflective during night operations.
- Constructed red in color.
- Used only during an emergency.

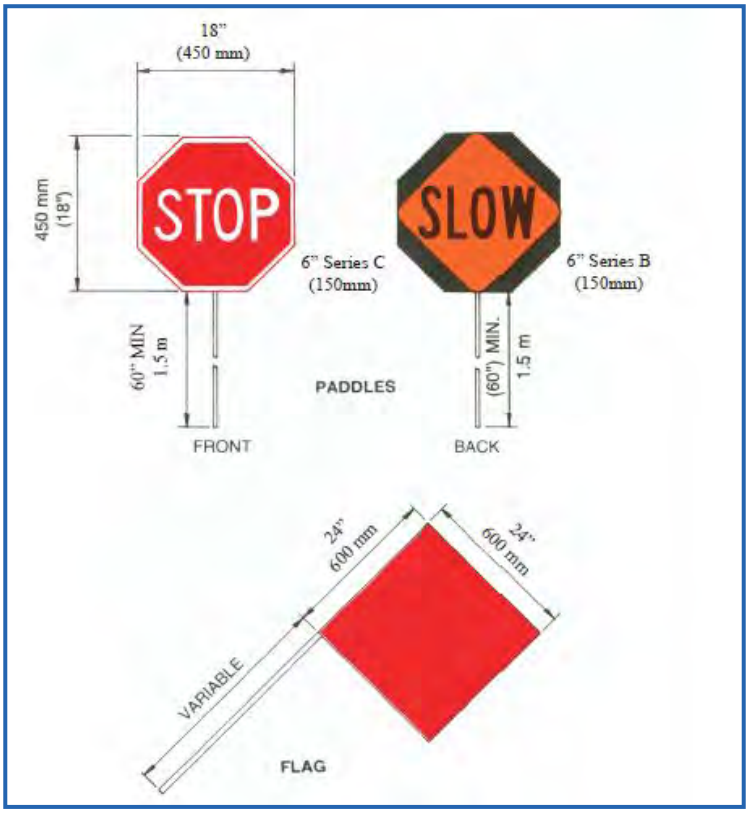


Figure 8d Paddle and Flag Requirements

Do's and Do Not's of Flagging	
Do	Do Not
• DO Be alert at all times. An alert flagger will more likely command the respect of motorists and will be more able to respond to emergency situations. • DO Wear proper PPE while on duty. • DO Stand alone where you can be identified by the motorists. • DO Have knowledge of the project's traffic plans. • DO Plan and prepare an escape route. • DO Treat each driver with courtesy. • DO Remove, fold over, or turn away the flagger sign and other inappropriate signs, when flagging is no longer being performed or during breaks of extended periods (ie: lunch). • DO Illuminate your flagger station during dusk or night time operations. • DO When in doubt, stop traffic to maintain control. • DO Always carry flagging card while on flagging duty.	• DO NOT Stand in an open traffic lane or with the back to traffic. • DO NOT Stand with a group of people or near equipment or vehicles. • DO NOT Place the staff inside a cone. The staff should always be held by the flagger. • DO NOT Take part in unnecessary conversation with workers, pedestrians, or motorists. • DO NOT Use vehicle radios for communication between flaggers. • DO NOT Give flagging instructions contrary to traffic control devices. • DO NOT Read, use cell phone, or listen to music while on duty. • DO NOT Leave the station until properly replaced except to avoid imminent danger. • DO NOT Sit while performing flagging duty. • DO NOT Lean on vehicles or argue with motorists.

Figure 8e Do's and Do Not's of Flagging

NOTE: The information in this section is general worksite rules to be followed by Company employees. There may be additional "Work Area Protection" requirements imposed by local, state or federal authorities.

Section 9 Vehicle Operation

901 Driver Qualification

- Only those employees specifically authorized and who possess a valid license or permit and valid medical card for the vehicle being driven shall operate Company owned motor vehicles.
- In order to drive a commerical vehicle:
  - A driver should be qualified through training and evaluation.
  - An up to date Driver Qualification file must be established and maintained per Federal Motor Carrier Safety Administration regulations. This file must include:
    - Driver's application for employment;
    - Previous employment check;
    - Motor Vehicle Record (Initial);
    - Motor Vehicle Record (Annual);
    - Annual review of Motor Vehicle Record;
    - Annual Driver's Certification of Violations;
    - Commercial Driver's License;
    - Entry Level Driver Training Certificate if necessary; and
    - Medical Certificate.
  - Each driver is responsible for:
    - Ensuring Regulatory Compliance receives a copy of their license and medical card when they are issued and each time they are renewed.
    - Completing an annual Driver's Certification of Violations and ensuring it is received by Regulatory Compliance.

902 General

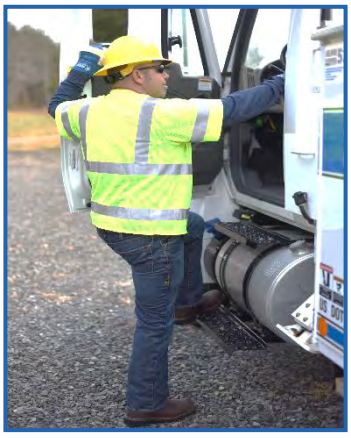


Figure 9a Three Points of Contact

- A valid License and medical card must be carried while driving a commercial vehicle.
- Drivers shall familiarize themselves with and obey all federal, state and local motor vehicle laws applicable to the operation of their vehicle.
- Use Three Point Contact when getting on or off any kind of equipment.
  - At least 2 Hands and 1 Foot or 2 Feet and 1 Hand in contact at all times.
- When driving:
  - Drivers shall drive at safe speeds no greater than that permitted by law.
  - Traffic, road, and weather conditions shall be given consideration in determining the safe speed.
  - The driver of a motor vehicle shall clearly signal their intention of turning, passing, or stopping.
  - The driver of a motor vehicle shall be courteous toward other drivers and pedestrians. He/she shall operate their vehicle in a safe manner and shall yield the right of way to pedestrians.
  - Be aware of vehicle height and notice overhead obstructions that could be encountered to prevent property and vehicle damage.
  - Seat belts shall be worn at all times.
  - The driver will stay a sufficient distance behind when following another vehicle so that he/she can safely stop the vehicle in the clear distance ahead. Following distance should be determined by using the Timed Interval Rule.
  - Drivers must exercise added caution when driving through residential and school zones.
  - Before a radio equipped vehicle is driven under or adjacent to energized equipment, especially in substation areas, the radio antenna shall be lowered and clearance checked in order to insure that proper clearances will be maintained.
  - When proceeding down grade the clutch shall not be disengaged. Trucks, particularly if heavily loaded, shall be in a lower gear on steep grades.
    - Do not over rev the engine.
  - Vehicles with derricks or booms shall not be moved until the derrick or boom has been lowered completely into the saddle and properly secured unless under the direct supervision of a foreman or supervisor.
  - Vehicle operators shall use emergency four-way flashers to warn other drivers when moving slowly or stopped on the road.
  - Vehicle operators shall adjust to weather and road conditions as required for safe operation.

- Stop at all weight stations (there are exceptions such as storm travel).
- A driver shall not allow unauthorized persons to drive, operate, or ride in or on a Company vehicle.
- Employees shall not allow anyone to ride on the running boards, fenders, or any part of the vehicle except on the seats.
- Employees shall not ride on trailers.
- Employees shall not jump on or off moving vehicles.
- No more than 3 persons shall ride in the front seat of a car or truck.
- If the body or bed of a truck, trailer, or similar type vehicle becomes accidentally energized, the following procedures shall be followed:
  - The Area Supervisor shall be notified immediately.
  - The Safety Department shall be notified immediately.
  - The equipment shall not be used until it is inspected and released by a qualified and competent person.
- Vehicles shall not be started or moved while under repair without first checking with the person performing the repairs or his supervisor.
- Texting or emailing while driving is not allowed.
- The use of handheld mobile devices is not allowed in commercial vehicles.
- The Materials of Trade exemption allows the transport of small quantities of hazardous materials such as gasoline or oil without labeling or placarding.
- Be aware drivers of utility vehicles are exempt from hours of service regulations.
- Drivers and passengers are required to wear seat belts.

Figure 9b Stopping Distances

903 Timed Interval Rule

This rule states that one second of following distance is needed for each 10 feet of the length of the vehicle under normal driving conditions (adjust for hazardous roads, traffic, and/or weather).

1. Pick a stationary object such as a road sign in front of the vehicle being followed.
2. Watch the rear of the vehicle in front pass the object and begin counting in seconds.
3. Stop counting when the front of the vehicle being driven passes the same object.

Timed Interval Rule for Pike Equipment

- Bucket (30 feet long) and Line Trucks (26 feet 2 inches long) require 3 seconds of following distance.
- Bucket and Line Trucks pulling a trailer (between 20 and 30 feet) require 6 seconds of following distance.

Figure 9c Parking to Prevent Theft

904 Parking

- Trucks or trailers stopped on any public roadway shall be protected by proper warning lights, reflectors, or red flags in accordance with state or local requirements.
- When it is necessary to park on an incline, the driver shall make sure the vehicle is left in a safe position. The engine shall be turned off, the vehicle placed in the lowest gear, or "Park" position, and the parking brake set.
- Wheel chocks must be used:
  - Prior to operation of derricks or booms.
  - When a vehicle larger than a pickup is parked.
- Chocks should be placed on each side of the wheel when the vehicle is not on a noticeable grade.
- Trucks should be parked in a manner to prevent theft when being left unattended. Whenever possible:
  - Position trucks close enough so bin doors cannot be opened.
    - Store most valuable tools and equipment in least accessible bins.
  - Park in a well-lit and fenced in area.

- Locate material trailers with doors facing the road.
- Lock all bin doors individually as well as with the steel slide bar if equipped.
- Do not leave equipment on job sites over weekends, holidays, etc.
- Do not leave valuable tools and equipment such as copper wire in plain sight.
- Park equipment where it blocks movement and limits accessibility of other vehicles.

- Drivers will never use hydraulic (Mico) brake locks as parking brakes while the vehicle is unattended.
  - These brake locks will leak off and release the brakes.
- When setting up at work locations along roadways, the equipment should be set with the flow of traffic if possible and traffic warning signs used.
- When it is necessary to leave excavating equipment unattended, the blade, bucket, or scoop shall be lowered to the ground.
- Utilize pull-through parking when possible to avoid the need to back up.

Figure 9d Use of a Spotter while Backing

905 Backing

- A spotter will be used if available when backing. If no spotter is available, the driver must get out and view the area around the vehicle before backing.
- Whenever possible, the vehicle shall be positioned to avoid the necessity of backing later.
  - Back into parking places when possible.
  - If a turn is missed – continue driving until a safe place to turn around is located.
- Extreme caution shall be exercised when backing a vehicle to avoid injury to persons and to prevent property damage.
- Keep mirrors clear and properly adjusted.

Spotter Techniques and Safety Tips
Spotters are a proven method of protecting employees and preventing vehicle accidents. During maneuvers where a spotter is needed:

- Ensure that spotters and drivers agree on hand signals before maneuvering, and have a good plan.
- Spotters should always maintain visual contact with the driver while the vehicle is in motion.
- Drivers should stop maneuvering immediately if they lose sight of the spotter.
- Spotters should not have additional duties while they are acting as spotters.
- Spotters should not use personal mobile devices, headphones or other items which could pose a distraction during spotting activities.
- Spotters should wear high visibility clothing, especially during night operations.
- Spotters should ensure they are in a safe location to perform spotting activities, and mitigate any hazards such as slip, trip or fall hazards.
- Perform a 360 degree walk around of the vehicle identifying any hazards such as persons on the ground, overhead hazards, terrain hazards, etc.

906 Winter Driving

It is the responsibility of every driver to know the hazards of winter driving and how to drive safely in spite of these hazards. Winter means less daylight, slippery road surfaces, steamy or frozen windshields, dirty headlights and mirrors, and other hazards that occur during this season.

Inclement weather conditions such as rain, ice, snow, and fog can reduce visibility, traction, control, and especially vehicle stopping distance. Keep in mind when braking on ice or other slippery surfaces, the distance needed to safely stop a commercial motor vehicle can increase from 4 to 10 times as compared to stopping in ideal driving conditions.

Adhere to the following winter driving tips and techniques:
- Conduct a thorough pre-trip inspection, paying particular attention to safety related items and components.
- Greatly increase following distance.
- Make sure lights, mirrors, and reflectors are kept clean and free of ice, snow, and dirt.
- Avoid using high beams while driving in snow, sleet, or fog.
  - High beams reflect off snowflakes and water particles decreasing visibility.

- Since stopping distances increase in the winter, slow down gradually, which will require deceleration sooner.
- Exercise extreme caution when passing other vehicles.
- Watch for black ice. Black ice is a thin, transparent layer of ice that appears black on the pavement. It occurs most often on bridges, overpasses, low sports in the road, and in shady areas.
- If conditions become too hazardous, safely pull off the road at the earliest opportunity and wait for the road to be cleared.
- Drive at least half the normal speed on packed snow and even slower on ice.
- Use chains as needed.
- When first starting out:
  - Get a feel for the road and conditions.
  - Make turns gently.
  - Never brake harder than necessary.
- Look for the following cues that can alert potential icy conditions:
  - Feel for ice on the front of the outside mirror. Icy buildup here may indicate ice on the road ahead.
  - Watch spray from other vehicles. A lack of spray on wet roads indicates icy conditions.
- If a vehicle gets stuck:
  1. Avoid spinning the wheels which makes the situation worse.
  2. Dig out from in front of the tire.
  3. Put something (kitty litter, sand, chains) under the drive tires to increase traction.
  4. Put the engine in gear and accelerate smoothly.

907 Vehicle Inspections

- "Post-Trip/Pre-Trip Inspection Form" shall be completed daily by the driver in accordance with Federal Motor Carrier Safety Regulations.
- Vehicles or equipment deemed unsafe to operate during inspection will be taken out of service until necessary repairs are made.
- The driver shall keep the employee in charge advised of expiration dates of vehicle license, fuel stickers, inspection stickers, fire extinguishers, first aid kits, etc.
- A pre-trip inspection must be performed each day before the vehicle is driven to identify problems that might cause a breakdown or accident. The driver must:
  - Ensure the vehicle is in safe operating condition.
  - Review the last Pike driver vehicle inspection report.
  - Properly fill out the Pike driver vehicle inspection report.
    - Completed inspection books must be sent to Regulatory Compliance when complete.
- A post-trip inspection covering the same must be completed at the end of each day and signed by the driver.
- At a minimum the following items should be checked during a pre or post trip inspection:
  - Service brakes including trailer brakes, parking brake, steering mechanism, lighting devices, tires, horn, windshield wipers, mirrors, coupling devices, wheels and rims, and emergency equipment.

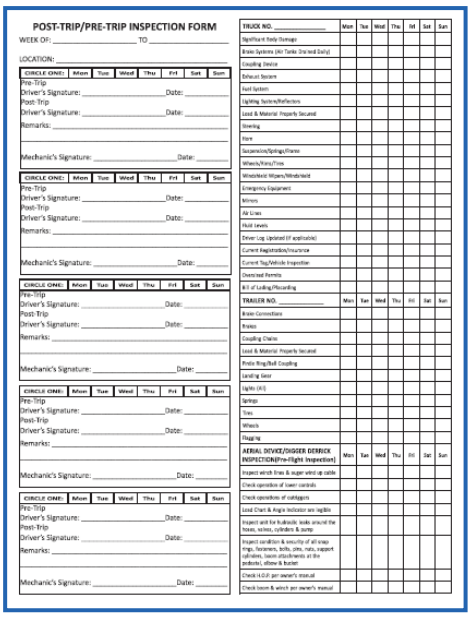

POST-TRIP/PRE-TRIP INSPECTION FORM

Figure 9e Post Trip / Pre Trip Inspection Form

Items to Check During Vehicle Inspections			
Vehicle Overview	• Signs of leaks	• Overall condition	• Is vehicle sitting level
Engine Compartment	• Fluid levels	• Condition of hoses, belts and wires	• Battery and electrical connections
Inside the Cab	• Start engine	• Check gauges and controls	• Fire Extinguisher, spare fuses and 3 reflective triangles
Lights	• Make sure all lights (high and low beam) and signals work properly • Ensure all lights and reflectors are the proper color		
Tires	• 4/32" tread depth on front tires • 2/32" tread depth on rear tires	• Tires touching each other or parts of vehicle or trailer • Visible tire fabric	• Tread separation • Mismatched tire sizes • Cut or cracked valve stems

Wheels and Rims	• Rust around lug nuts • Missing clamps, spacers or studs	• Mismatched, bent or cracked lock rings
Brake Drums and Shoes	• Shoes or pads covered with oil, grease or brake fluid	• Broken or thin shoes • Cracked drums
Brakes	• Check air pressure • Listen for leaks	
Steering System	• Play in the steering wheel • Missing nuts, bolts and cotter keys	• Bent or broken parts on the steering column
Suspension	• Broken, cracked or missing spring hangers • Broken, cracked or missing leaf springs	
Exhaust System	• Leaking, loose, broken or missing exhaust pipes, mufflers, and stacks including brackets, clamps, nuts and bolts	
Cargo	• Correct loading, balancing and securing of any load • Placards or markings if applicable	

Table 9a Items to Check during Vehicle Inspection

908 Characteristics of Pike Vehicles

Commercial vehicles handle differently than smaller vehicles. Understanding the differences between commercial and personal vehicles is a key to safe driving. It is also important to know the height of a vehicle before it is driven.

- Pike line and bucket trucks have much different steering, braking, accelerating, and rollover characteristics than personal or passenger vehicles.
- Leave more following distance.
- Go slower around curves.
- Begin braking earlier.

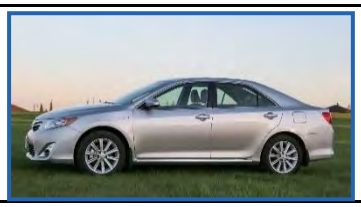
Characteristics of Pike Vehicles		
PERSONAL VEHICLE	**UTILITY TRUCK**	**LINE TRUCK**
		
3,500 POUNDS	33,000 POUNDS	45,000 POUNDS
LOW CENTER OF GRAVITY	HIGH CENTER OF GRAVITY	HIGH CENTER OF GRAVITY
BRAKES – SHORT DISTANCE	BRAKES – LONG DISTANCE	BRAKES – LONG DISTANCE
FIBERGLASS / PLASTIC	STEEL	STEEL
15 – 20 FEET LONG	25 FEET LONG	35 FEET LONG
5 – 8 FEET TALL	9 – 13 FEET TALL	9 – 13 FEET TALL
SHORT TURING RADIUS	LONG TURNING RADIUS	LONG TURNING RADIUS
LIMITED BLIND SPOTS	LARGE BLIND SPOTS	LARGE BLIND SPOTS

Table 9b Pike Equipment Compared to Personal Vehicles

- Drivers shall be familiar with the height and weight of the vehicle they are driving before departing.
- Drivers shall adhere to low clearance warnings at all times.

Heights and Weights of Pike Vehicles							
Type	**Unit**	**Height**	**Weight***	**Type**	**Unit**	**Height**	**Weight***
Utility Trucks	8A	12'4"	30,590	Underground Trucks	37S		17,620
	8C	11'0"	24,140		37U		15,330
	8D	9'6"	14,720	Pickups	38B		7,980
	8G	11'10"	25,310		38G		8,540
	8N	11'10"	25,310		38H		9,140
	8R	13'6"	45,060		38L		8,160
	8S	12'7"	27,800		38M		9,600
Pressure Diggers	15C	12'1"	34,340	Trailers	27A		5,080
	15E	12'7"	37,660		27J		4,460
Line Trucks	20A	12'7"	29,980		32A		18,280
	20E	12'0"	26,220		33C		7,740
	20P	12'6"	40,780		33F		8,840
	20R	12'0"	33,500		33J		4,600
	20S	12'6"	44,700		33K		9,720
	20V	12'3"	24,820		33N		4,600
	20Y	11'10"	27,820	Mechanic	41C w Crane	9'0"	19,000
*Weights are approximated empty weights with no tools or equipment							

Table 9c Heights and Weights of Pike Vehicles

909 Cargo Securement

- All equipment being hauled shall be tied down securely with approved devices prior to the vehicle being moved.
- One tie down is required for each 10 feet of cargo being hauled with a minimum of 2 tie downs.
- Be aware of how hauling heavy loads can affect the center of gravity of a vehicle.
  - Moves center of gravity back and up increasing the risk of turnover.
- Pipe and ladders,etc. shall be loaded paralleled with the truck length. Such material shall not extend beyond the normal sides of the vehicles unless proper warning devices are installed.
  - Pipe longer than 40 feet must be hauled on a pole trailer.
- Any load which extends more than 4 feet beyond the front or back of the truck or trailer shall have warning devices attached in accordance with the traffic laws of the particular state. During the day approved warning flags shall be used. At night and during periods of poor visibility, approved warning lights shall be used.
- When hauling long poles and entering congested areas or heavy traffic conditions, an escort vehicle displaying suitable warning signs shall be used.
- Emergency four-way flashers shall be used when hauling poles.
- When in tow position, safety chains on the vehicle being towed shall be crossed securely to the towing vehicle.
- Heavy vehicles, equipment and machinery which operate on wheels or tracks, such as backhoes, tractors and excavator backhoes that are being hauled must be restrained against movement in the lateral, forward, rearward, and vertical direction using a minimum of four tie downs.
- Accessory equipment, such as backhoes, must be completely lowered and secured to the vehicle. Articulated booms shall be restrained in a manner that prevents articulation while in transit.
- Each of the tie downs must be hooked as closely as practicable to the front and rear of the vehicle or mounting points on the vehicle that have been specifically designed for that purpose.
- Vehicles and equipment weighing less than 10,000 lbs., such as the 5N excavator, can be tied down with two (2) tie downs and a third tie down for the bucket.
- Refer to the Gross Vehicle Weight Rating (GVWR) on all trailers for weight capacity prior to loading.

Figure 9f Securement of Heavy Equipment

Figure 9g Excavator Securement

910 Five Keys of Decision Driving

EXPAND YOUR LOOK AHEAD CAPACITY

Look 15 seconds ahead of your vehicle. Driving conditions may change quickly and at 30 mph you travel 1 ½ blocks in 15 seconds – ¼ of a mile at 50 mph. K**now** wha**t conditions** are **before** you get there.

SIZE UP THE WHOLE SCENE

Decision driving involves always knowing what is happening around you and looking to see what will be happening. You should **be aware 360° around your vehicle**. An important part of sizing up the whole scene is to maintain proper following distance so you can see where your vehicle will be in the future.

SIGNAL YOUR INTENTIONS EARLY

Use your lights, horn, hands, and directional signals to **communicate with other drivers**. Avoid driving in other's blind spots and be predictable, giving other drivers time to react to your movements. Signal 5-8 seconds before making a move that affects others such as switching lanes or turning.

PLAN AN ESCAPE ROUTE

Make an escape route by **building a cushion** around your vehicle. If the vehicle in front of you slams on the brakes you should have enough room to stop. Maintain a safe following distance while traveling and ensure you can see the bottom of the rear tires of the vehicle in front of your when stopped (**The Wedge Concept**). Park your vehicle so you do not have to back when possible. Travel in the right hand lane as most vehicles will pass on the left and adjust your speed if you become boxed in. As a general rule, if you do not have an escape route, you are driving too fast.

TAKE DECISIVE ACTION

No matter how safely you are driving, a very important part of decision driving is predicting what others may do and make sure they are aware of you. This involves *expanding your look ahead capacity* by *sizing up the whole scene* and then communicating with other drivers by *signaling your intentions early* and *having an escape route*.

- Use proper gear before going up or down a grade and do not depress clutch when going down a steep grade.
- Maintain proper following distance.
- Use the radio for directions – never run red lights or speed to keep up with your crew.
- Be familiar with the stopping characteristics of your vehicle and allow ample room to stop.
- Adjust your driving and speed to conditions such as weather, narrow loads, traffic, etc.
- Be mindful of the rollover potential for your vehicle and how loads and / or pulling a trailer may affect it.
- Know the vertical clearance of your vehicle.
- Secure all loads properly – keep them as low as possible on the vehicle.
- Avoid backing if possible – use a spotter or perform a walk around before backing.
- Think about boom or length of poles being hauled.
- Plan your route before you leave especially if driving in a unfamiliar area.

Intersection Related	• Stale green lights (A light you didn't see turn green).
	  ○ High probability it will change.
	  ○ Take your foot off the accelerator as you approach a Stale Green Light and be prepared to stop.
	• Pause and look in both directions when your light turns green.
	• Use the Wedge Concept (see the rear tires of the vehicle in front of you touching the ground) when stopping behind another vehicle.
	• Do not change lanes while moving through an intersection.

Distracted Driving	• While driving you should never: ○ Eat, text or email, become distracted by members of the public or your surroundings, use a computer, perform personal grooming tasks, reach down behind the seat or into the glove compartment, or read work orders or maps. • Switch drivers or pull over in a safe location if you become fatigued. • Avoid road rage and watch out for actions of other drivers.

Running Off the Road	• If your tire falls off the road at speed:
	  ○ Remain calm, remember SLOW and EASY, keep the truck moving straight, slow the truck to a crawl, clear traffic, and ease truck back onto road.
	  ○ DO NOT try to jerk the truck back onto the road. This is a natural reflex but is the most dangerous thing you can do in this situation.
	  ○ Ease your foot off the gas pedal and apply light pressure to the brake pedal to slow your truck before proceeding back onto the road.

Table 9d Vehicle Accident Prevention

911 Transporting Hazardous Materials

- Prior to operating a Pike vehicle which contains hazardous materials, the driver must have been trained in Hazardous Materials Transportation and have the proper CDL endorsement.
- A Pike vehicle which contains hazardous materials must be driven and parked in compliance with the laws, ordinances and regulations of the jurisdiction in which it is being operated.
- A motor vehicle carrying 50 Lbs. or more, must be attended at all times unless all of the following conditions apply:
  - The vehicle is located on the property of the motor carrier,
  - The property of a shipper or consignee of the explosives or hazardous materials,
  - In a safe haven, and
  - On a construction or survey site.
- Hazardous materials must be loaded, blocked, braced, and unloaded in accordance with DOT safeguards.
- When transporting flammable liquid materials:
  - Bond and ground a cargo tank if it is loaded through an open filling hole.
  - Cargo tanks do not have to be bonded and grounded if it is loaded or unloaded through a vapor tight connection into a stationary tank, provided the metallic connection is in contact with the filling hole.
- Safety requirements for shipping compressed gas cylinders include:
  - Securely restrain in an upright or horizontal position, or
  - Load into racks securely attached to the motor vehicle.
- Shipping papers must remain:
  - Within driver's immediate reach and readily visible, or
  - In the holder mounted to the inside of the driver's door.
- A motor vehicle containing hazardous materials must not be parked:
  - On or within 5 feet of the traveled portion of a public street or highway,
  - On private property without the consent of the person who is in charge of the property and who is aware of the hazardous materials, or
  - Within 300 feet of a bridge, tunnel, dwelling or place where people work, congregate or assemble, except when the necessities of operation make it impracticable to park in any other place.
- A motor vehicle containing hazardous materials must not be operated near an open fire unless the driver has taken precautions to ensure that the vehicle can safely pass.
- A motor vehicle containing hazardous materials must not be parked within 300 feet of an open fire.
- No person may smoke or carry a lighted cigarette, cigar or pipe on or within 25 feet of:
  - A motor vehicle which contains hazardous or flammable materials.
  - An empty tank motor vehicle which has been used to transport flammable materials or gases.
- When a motor vehicle which contains hazardous materials is being fueled:
  - Its engine must not be operating, and
  - A person must be in control of the fueling process at the point where the fuel tank is filled.
- If a tire is flat, leaking or improperly inflated, the driver must have the tire repaired, replaced, or properly inflated before the vehicle is driven.
- A placard must be placed on each side and each end of the vehicle when transporting hazardous materials.
- Hazmat shipments must be accompanied by a Bill of Lading.
- An Emergency Response Guidebook shall remain with the vehicle at all times.
- In the event of a vehicle accident, the driver shall:
  - Stop the unit in a safe location,
  - Remain with the unit,
  - Secure the area,
  - Locate paperwork (Bill of Lading and Emergency Response Guidebook),
  - Identify leaks or spillage, and
  - Report the accident to Pike.
- In the event of a spill and release, the driver shall:
  - Stop the flow,
  - Contain the spill,
  - Dial 911 if necessary,
  - Mitigate contaminants, and
  - Report the accident to Pike.

Section 10 Equipment Operation

1001 General

- Only qualified operators with documented training and evaluation shall operate equipment.
- Employees shall not operate, assemble, disassemble, modify, or use equipment or vehicles except in accordance with the recommendations of the following:
  - The manufacturer (as set forth in the operator/maintenance manual).
    - If operator/maintenance manual is not available, contact an area supervisor who will obtain one.
  - The employer (as set forth in this manual).
  - The Federal Government (as set forth by OSHA, FMCSA, and DOT Standards).
- Guards, covers, and safety devices must be in place and operational.
- Equipment shall not be field modified unless written approval is obtained from the manufacturer.
- Never attempt to perform lifting operations with equipment that is parked on a trailer.
- Be aware of the possibility of starting a grass fire.
  - Do not set up in areas with high grass and check the site after moving a vehicle.
- Equipment shall be inspected and deemed to be in safe working order before use.
  - Defective equipment shall be taken out of service immediately and not be used until repairs are made.
  - Equipment shall be operated so that a clearance of 10 feet from overhead lines is maintained up to 50 kV. This clearance distance must increase 4 inches for every 10kV over 50kV. This clearance can be reduced only as follows:
  - If equipment is in transit with booms, buckets, etc. lowered, the clearance is 4 feet up to 50 kV plus 4 inches for every 10kV over 50kV.
  - If insulating barriers rated for the voltage are in place, the clearance may be reduced to a distance within the designed working dimensions of the insulating barrier.
  - Insulated aerial lifts operated by Qualified Employees follow Minimum Approach Distances.
- Failure to follow safety instructions can lead to death or serious injury.

1002 Seat Belts

- Where seat belts are provided, they shall be used.
  - Check for wear and tear and make sure locks work properly.
  - Report any defective seatbelts immediately.

Figure 10a Seat Belts Save Lives

1003 Entering or Exiting Equipment

Keep free from injury when entering or exiting a vehicle or piece of equipment such as a backhoe by:

- Knowing the equipment.
  - The position and design of steps, ladders, grab handles, etc. varies by make and model of equipment. Know what is available on equipment and inspect it regularly.
- Maintaining 3 points of contact.
  - Keep 3 limbs (one hand/two feet or two feet/one hand) in contact with the vehicle at all times.
- Practicing proper housekeeping.
  - Keep employees, tools, and equipment safe by storing all materials in their proper location. Be familiar with walking surfaces on equipment and make sure they are kept clear of slip, trip, and fall hazards. Also make sure there is no hydraulic oil or other fluids on walking surfaces of equipment.
- Looking before exiting.
  - Before getting down off equipment or out of a vehicle look at the ground surface where feet will land. Inspect the area for holes, boards with protruding nails, snow, ice, debris, cracked pavement, and other hazards that could contribute to a fall.
- Facing the vehicle.

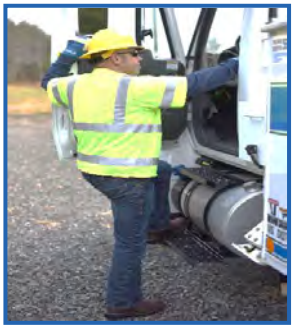


Figure 10b Three Point Contact

- Face the equipment when getting off or on the equipment. Never climb up or down stairs facing away from the equipment or jump from equipment.

- Keeping hands free.
  - Avoid ascending or descending equipment while carrying any material, tools, equipment, etc. Anything in the hands will interfere with the ability to maintain three points of contact.

1004 Outriggers

- All outriggers shall be extended for stability before raising booms or aerial devices.
- Outrigger pads shall be placed under outriggers in areas where the soil conditions will not properly support the weight on that outrigger, where the pads are needed for stabilization, or where pads could prevent property damage.
- It shall be the responsibility of the employee positioning the outriggers to see that the area is cleared prior to lowering them.
- Visually observe moving outriggers.
- Utilize Echo Protocol to ensure the area is clear.
- Outriggers will be used to level equipment as required per the type of equipment being leveled. As an example, bucket and line trucks must be set up within 5 degrees or less of level.

Case Study

In less than a year, 4 feet and 2 hands were injured by moving outriggers.

3 of the foot injuries were from outriggers lowered onto a foot and the other was a broken ankle when an employee fell because the outriggers were raised as he attempted to get off a line truck.

The hand injuries were both to employees attempting to insert pins into moving outriggers.

Echo protocol must be used to clear the area as outriggers are being lowered or raised!!

1005 Electronic Brake Controllers

- Brake controllers must be properly adjusted.
- Proper adjustment includes changing the controller settings based on the load.
- For example, hauling an empty pole trailer requires a different setting than a loaded pole trailer.
- Follow manufacturer's instructions for all tools and equipment.

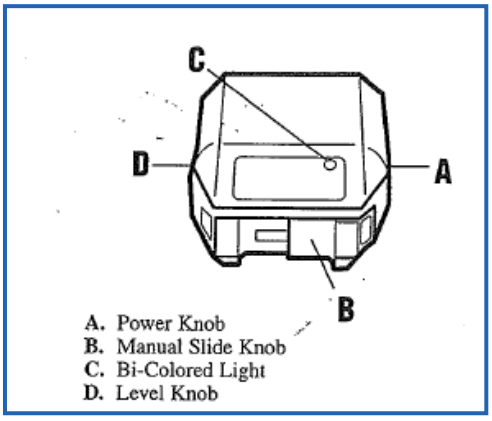


Figure 10c Electronic Brake Controller

Voyager XP Brake Controllers

Leveling the Sensor

1. Connect trailer to tow vehicle. Bi-Colored Light should glow GREEN.
2. Set Power Knob to maximum by fully rotating clockwise.
3. Depress tow vehicles brake pedal and hold.
4. Rotate the Level Knob counter-clockwise (towards the back of the control) until the Bi-Colored Light starts to change colors from GREEN to RED.
5. Carefully rotate the Level Knob clockwise (towards the front of the control) until a shade of ORANGE is visible.
6. Release brake pedal.

Adjusting the Power to the Trailer Brakes

1. Set Power Knob to the 12 o'clock positions.
2. Drive tow vehicle and trailer on a dry level paved surface at 25 mph and apply manual slide knob.
   a. If trailer brakes lock up:
      i. Turn power down using power knob (Rotate power knob toward the 8 o'clock position, counter-clockwise.)
   b. If braking was not sufficient:
      i. Turn power up using power knob (Rotate power knob toward the 5 o'clock position, clockwise.)
3. Repeat Step (2) until power has been set to a point just before wheel lock up or at a sufficient force as to achieve maximum braking power.
4. Using the brake pedal, make a few low speed stops to check the Power and Level adjustments.

Fine Tuning

1. Make several slow (25 mph) stops as if coming up to a stop sign and take notice of how the trailer brakes respond:
2. Brakes Grab Too Much
    a. There is an Aggressive Setting:
        i. To correct this condition rotate level knob clockwise.
    b. Trailer Tending to Push Tow Vehicle:
        i. There is a Delayed Setting.
        ii. To correct this condition rotate level knob counter-clockwise.
3. Repeat until desired trailer braking is achieved.

NOTE: If a different type brake controller is encountered, contact Fleet and they will send instructions.

1006 Rope

Common Ropes Used by Pike			
Description and Size		**Where Normally Used**	**Safe Working Load**
Polypropylene Rope	3/8" (3 Twist)	Slack Blocks	244 lbs.
	1/2" (3 Twist)	Hand Lines	420 lbs.
	3/4" (3 Twist)	Bull Rope	1,090 lbs.
Polyester (TENEX)	5/8" (Single Braid)	Puller	3,420 lbs.
	1/2" Pilot Line (Single Braid)	Puller	2,360 lbs.
Polyester & Olefin Duraplex	3/8" Pilot Line (Single Braid)	Puller	776 lbs.
	5/16" Pilot Line (Double Braid)	Puller	1,350 lbs.
Polyester	1/2" (3 Twist)	Trees crews – climbing	1,148 lbs.
Polyester Stable Braid	1/2" (2 in 1 Braided)	Material Handling Bucket Trucks	2,000 lbs.
Spectra II Polyester	7/8" (2 in 1 Braided)	Line Truck Derricks	10,000 lbs.
	1" (2 in 1 Braided)	14C, 20D, 20F, 20P, 20Q, 20T Commander II Derrick Rope	11,400 lbs.
Steel Rope	3/8" Improved Plow Steel	Front Winch – Pickups	1.31 tons (2,620 lbs.)
	1/2" Improved Plow Steel	Most Truck-mounted front winches	2.66 tons (5,320 lbs.)
	5/8" Improved Plow Steel	Truck-mounted front winches on larger vehicles 20P, 37L, 37M	2.72 tons (5,440 lbs.)

Table 10a Rope Safe Working Loads

- It is essentail that the employees operating tools or equipment familairize themselves with the following prior to attempting to lift a load:
    - Weight of item being lifted.
    - Lifting capacity of equipment performing the lift.
    - Lifting capacity of weakest link in lifting and rigging components (typically safe working load of rope).
- Unless specifically designated, rope is considered conductive.
- Keep in mind that double and/or triple blocking a rope greatly reduces the tension on the rope being used to pick up and/or pull a load, particularly if the angle of pull is parallel to load line.
- Reverse rope ends regularly.
    - This permits even wear and assures a longer and more useful life.
- Use waterproof tarps to keep rope covered when not in use.
- Avoid all abrasive conditions; rope will be severely damaged if subjected to rough surfaces or sharp edges.
- Blocks, drums, and other surfaces must be kept in good condition and free from burrs and rust.

- Avoid dragging rope over rough ground.
- All rope should be stored dry and out of direct sunlight.
- Avoid any chemical exposure to the rope.
- Join rope by splicing, do not use knots.

Rope Inspection

- Inspect rope before each use.
- Avoid using rope that shows signs of aging and excessive wear.
  - No type of visual inspection can be guaranteed to accurately and precisely determine actual residual strength.
- When the fibers show wear in any given area the rope should be respliced, eliminating the damaged area, or should be replaced. Check the line regularly for frayed strands and broken yarns. Pulled strands should be rethreaded into the rope if possible. A pulled strand can snag during a pulling operation.
- Both outer and inner rope fibers contribute the strength of the rope. When fibers are worn, the rope will appear compacted or hard which indicates reduced strength.

Figure 10d Rope with Wear and Burned Fibers

1007 Battery Charging

Wet cell batteries can and often do explode. During the process of jumping or charging a wet battery, oxygen and hydrogen are generated. Add to this explosive mixture a spark from a jumper or charger clamp, cigarette, match, tool, etc. and the battery explodes hurling fragments and acid with violent force.

To safety charge a battery:

- Check the terminals, clamps, and connections for corrosion, which can stop the normal flow of electricity and is the leading cause of no starts.
- If battery charging is required, follow the charger manufacturer's instructions, and to prevent sparking, shut the charger off before connecting or removing terminal clamps.
  - Before jumping or charging:
    - Check and restore proper fluid levels.
    - Never attempt to jump or charge a frozen battery.
    - Make sure the charger and batteries are the same voltage.
    - Vehicles should not be touching.
    - Keep vehicles in park or neutral with brakes set and wheels chocked.
    - Turn off all accessories and ignitions.
    - Wear rubber gloves and eye protection.
- When jump starting negative ground systems:
- Attach the red clamp of the booster cable to the positive (+) terminal of the good battery, and then the other red clamp of the same cable to the postive (+) terminal of the dead battery.
- Connect the black clamp fo the second booster cable to the negative (-) terminal of the good battery, and make the last connection of the black clamp to a good metal ground on the engine block, away from the battery. After start up, remove clamps in reverse order.
- Before jump starting any vehicle, especially heavy equipment, check the operator's manual for specific requirements to prevent damage from electrical arcing and fire.
- Adhere to the following safety precautions during battery charging or jumping operations:
  - Do not smoke.
  - Remove flammable materials from the area.
  - Do not charge or jump in the presence of gasoline vapors.
  - Ensure good connections and do not plug chargers into power sources until after connections are made.
  - Tools touching both battery posts or a battery post and metal part will short circuit and spark. Maintain positive control of tools.
  - Keep chargers as far away from equipment being charged as the cables will permit.
  - Be aware of body position. Keep the body as far away from batteries as possible.
  - Avoid overcharging batteries.

1008 Industrial Trucks, Forklifts and Industrial Lifts

- Industrial trucks shall be operated only by authorized persons who are qualified and trained in their use.
  - Operators must be qualified and trained on the specific type of forklift they are operating.
  - Operators must be evaluated at least once every 3 years.
- Brakes and controls shall be tested prior to use. Equipment with faulty brakes or mechanical or electrical defects shall not be operated. Needed repairs shall be reported immediately.
- Equipment shall always be operated at a safe speed for existing conditions.
- Before moving the equipment, the operator shall make sure that no person or objects are in the path of the vehicle. Clearances in all directions shall always be checked; particularly overhead clearances.
  - Horns should be used to warn potential pedestrians around corners, when backing, or when vision may be obstructed in the path of travel.
- When picking up a load, forks shall be set squarely and as far as possible under the load. Loads should not be raised or lowered while traveling. Loaded or empty forks should be carried as low as possible, but high enough to clear uneven surfaces. Manufacturer specified load capacity shall not be exceeded.
- Loads shall not be suspended or swung over other persons. No one shall be allowed to stand or walk under elevated forks.
- Industrial lifts shall not be parked (for working purposes) where any wheel is closer than 6 inches from the edge of a drop off. These lifts shall not be operated in the forward or reverse direction when the lift is in the raised position and the wheels are within 2 feet of any drop off unless the lift itself is lowered completely into the cradle prior to moving.
- On inclines all types of loaded lift trucks shall be driven with the load on the upgrade side of the driver whether ascending or descending.
- Sudden stops which might spill the load shall be avoided.
- All loads shall be securely fastened or safely positioned to prevent tipping or falling.
- Lift bars on forklift trucks which are movable or replaceable shall be firmly secured by a proper securing pin.
- No one shall be allowed to ride the truck, forklift or other equipment other than the operator, except when seats are provided for this purpose.
- When an industrial truck (forklift) is left unattended, the load shall be fully lowered, controls shall be neutralized, power shall be shut off and brakes set. Wheels shall be chocked when the truck is parked on an incline.
- Equipment with internal combustion engines shall not be operated in enclosed areas for prolonged periods of time so as not to exceed allowable levels of carbon monoxide.
- When loading or unloading trucks or railroad cars, approved dock boards which are properly secured shall be used. The wheels of the truck or railroad car shall be blocked or wedged.
- When operating industrial trucks or forklifts, hard hats shall be worn.

1009 Cranes and Hoisting Equipment

General

A crane is a machine designed to raise and lower heavy weights and transport them as they are suspended. There are three typical types of cranes:

1. Mobile cranes.
2. Tower cranes.
3. Track cranes.

Pike utilizes mobile cranes.

- Equipment classified as cranes includes boom trucks, industrial, crawler, rough-terrain and all-terrain cranes and equipment using a winch and hook to lift material.
- Equipment not classified as cranes:
  - Digger Derricks when used in placing, removing poles, and associated material of electric lines. A digger derrick used for other purposes (moving concrete, trees, dumpsters, etc.) is considered a crane.
  - Mechanic's trucks.
  - Wheel loaders and backhoes when used with slings and other rigging to lift loads.

- Helicopter cranes.
- Knuckle boom truck cranes, when used to transfer materials from the truck to the ground without arranging the material in a particular sequence for hoisting.

Operator Certification

- Mobile crane operators must have a current and valid ANSI approved, OSHA compliant certification.

Inspection

- Prior to each shift a competent operator must inspect the crane for apparent deficiencies. The inspection must include the following:
  - Control and drive mechanisms.
  - Air, hydraulic and other pressurized lines.
  - Hydraulic system proper fluid levels.
  - Wire rope condition and wire rope reeving for compliance.
  - Electrical systems.
  - Tires.
  - Operator cab windows.
  - Safety devices and operational aids for proper operation.
  - Ground conditions around equipment.
- A documented monthly and annual comprehensive inspection must also be completed.

Set Up

- A competent and qualified person must direct assembly, disassembly, and set up of equipment.
- The machine shall be leveled on a supporting surface.
  - It may be necessary to use padding under the outrigger floats.
- Surfaces must be able to support the weight of the crane. If not; cribbing, blocking, or mats must be used when setting up and leveling the crane.
- Blocking must always be level, stable, and in good condition. Blocking needs to be a hard wood or prefabricated type of material. NO REEL TOPS.

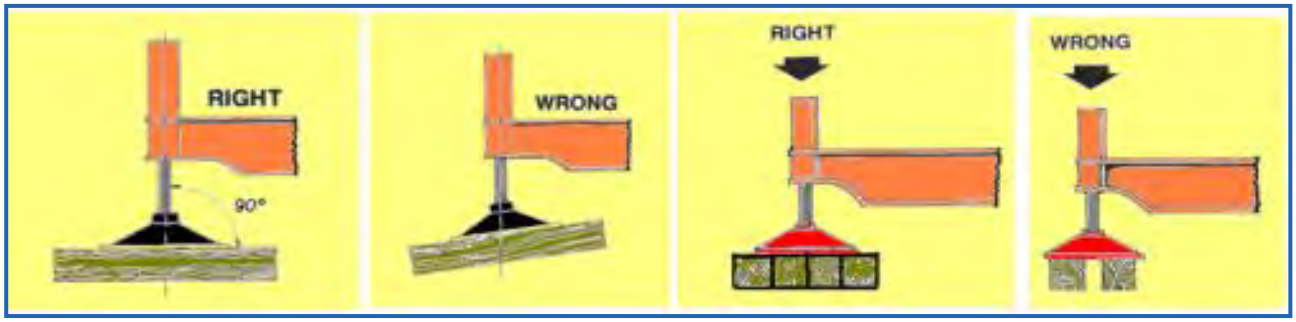


Figure 10e Proper Outrigger Set Up

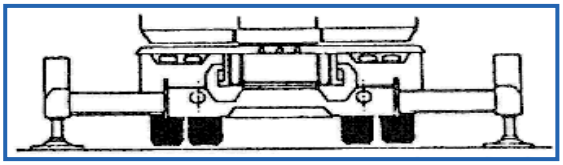


Figure 10f Crane Set up with Tires off the Ground

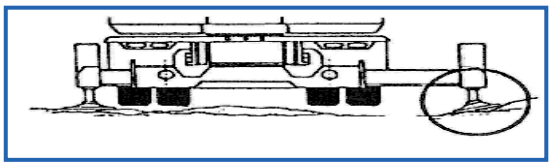


Figure 10g Crane Set Up on Rubber

- Cranes shall be set up within 1% of grade. This is 1foot rise in a 100 feet horizontal distance or 0.57 degrees.
- Outriggers shall be properly extended with tires raised free of the ground.
  - Tires should be just clear of the ground to keep ram cylinder length as short as possible to minimize rocking of the crane.
  - Figure 10f shows properly raising tires off the ground while Figure 10g shows a crane set up on rubber because the outrigger is not level.
- When leveling the crane check the level front to back and side to side, then rotate the boom 90 degrees and recheck.
- During lifting operation periodically recheck the level of the crane.
- If machine is equipped with a front outrigger, it shall be used in accordance with the manufacturer procedure.
- When equipped with extendable counterweight, it shall be fully extended before operation.
- Barricade the swing path of the counterweight.

Lifting Operations

After confirming that the site is adequately prepared by performing a thorough site analysis and the crane is set up properly, focus on completing the lift safely. Look over the site again with crane in place for other hazards including:

- Weather conditions - wind and lightning (wind adds to inability to control the load, side loading of boom, and tipping or structural failures).
- Overhead hazards including energized overhead lines.
  - Use a Qualified Observer around overhead energized lines.
  - Qualified operators must adhere to minimum approach distances.
  - Unqualified operators must take special precautions if they must get within 20 feet of energized overhead lines.
- No employee shall position themsevles under a suspended load.
- Workers reaching under loads being landed.
- Operating within the load chart for crane set up and configuartion (Radius and weight known, proper out rigger position, correct number of rope reeving).
- All safety devices on crane working properly.
- Echo Protocol being used.
- The operator has the authority to stop lifting operations and refuse to handle loads if a safety concern arises.
- A formal/documented lift plan will be developed for any critical lift. Critical lifts are lifts that involve multiple cranes, loads that are 85% or more of rated capacity, and/or lifts over buildings or public streets.

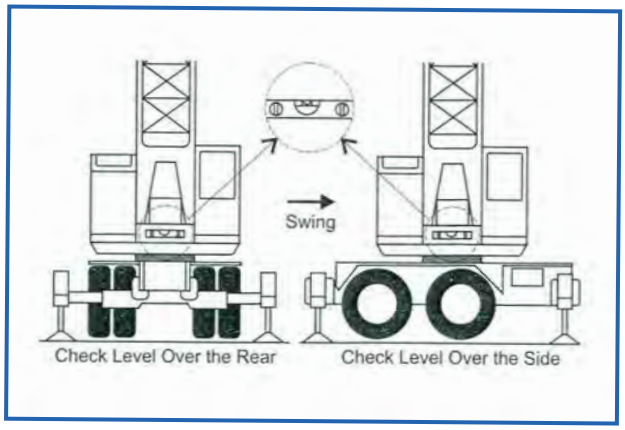


Figure 10h Barricading Swing Path

Rigger

Riggers have an important part in every lift. This includes but is not limited to making sure that the load is lifted in a safe manner to protect the safety of all personnel on the ground and the crane operator. The rigger along with the operator has to determine if the area is adequate for the lift.

- Responsibilities of the rigger.
  - Determine the weight of the load before rigging.
  - Able to determine the center of gravity of the load.
  - Ability to select the appropriate rigging material.
  - Ability to inspect the rigging for defects and proper identification.
  - Knowing how to figure in sling angle factors.
  - Understanding the use of tag lines and how to secure them to the load.
  - Know the safe working load limit of the equipment and never exceed the limit.
  - Understanding the limitations and capacities of the crane being used.
  - Immediately report defective equipment or hazardous conditions to a supervisor.
  - Riggers must be qualified.

Signalperson

Each signal person shall know and understand the type of signals used. If hand signals are used, the signal person shall know and understand the standard method (ASME) for hand signals. Examples of these are on cranes and can also be found on digger derrick trucks.

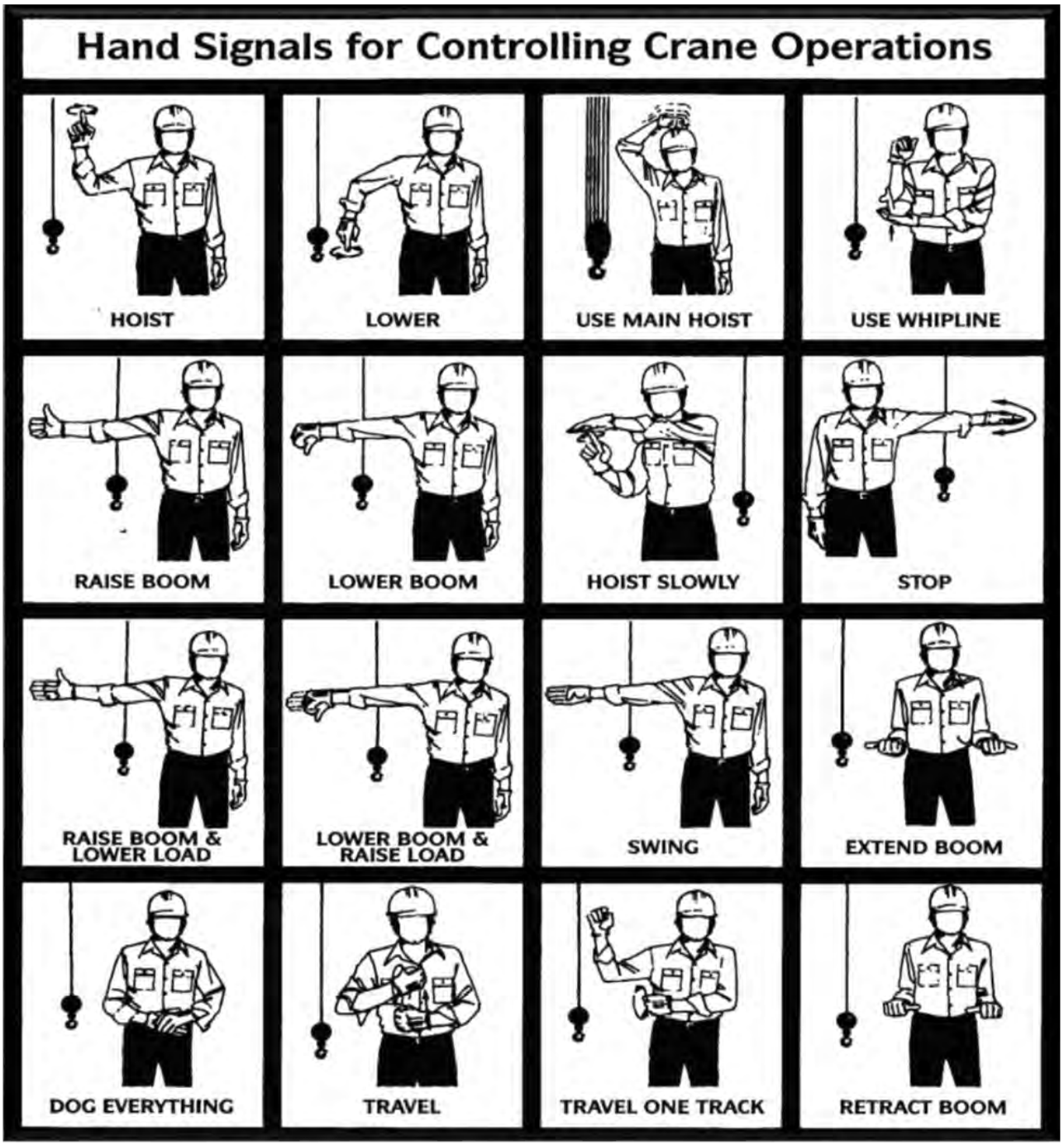


Figure 10i Hand Signals

- A signal person must be provided when load travel or load placement area is not in view of the operator, the equipment is traveling and view of direction of travel is obstructed, and any time the operator or employees handling loads determines they are necessary.
- Signal person must be competent in the application of the type of signals used.
- They must have a basic understanding of the equipment operation and limitations, including the crane dynamics involved in swinging and stopping loads and the boom deflection from lifting loads.
- The signal person must be in clear view of the operator at all times when using hand signals. They must be aware of the standard hand and voice signals and the path the load will take for each.

- They must have a clear view of the load, boom, hazards, and the operator.
- They must keep unauthorized persons outside the crane's operating area.
  - Use barricades or a warning device if needed.
- Give signals according to the operator's right or left.
- Stay focused on the work.
- Don't be distracted by cell phones or other people.

Types of Signals

- Hand Signals.
- Voice/Radio Signals.
- Audible Signals (Used to signal cranes when they are traveling with a horn).
  - 1 short audible signal – Stop.
  - 2 short audible signals – Go.
  - 3 short audible signals - Back Up.

Communications between the operator and the signal person must be continuous. If communication is disrupted the operator shall stop movement until communications is restored.

Load Charts

- Operators should be familiar with the limits and capabilities of thier equipment to avoid overload conditions.
- These limits can be determined by becoming familiar with and understanding the load chart on each piece of equipment that an employee operates.
- Load charts vary from manufacturer to manufacturer and even vary on like cranes. Only use the load chart designed specifically for the crane being operated.
  - Load charts are not interchangeable.
- Load charts have to be located at the operator's platform and permanently attached to the crane.
- Operator verifies that rigging is complete, verifies the path of travel is clear and agrees on the signals.
- The following factors must be taken into consideration when reading a load chart:
  - Level set up.
  - Boom length.
  - Boom angle.
  - Load operating radius.
- Load charts are developed with equipment in like-new condition being operated by an experienced operator with no inclement weather and a known weight. They also assume correct rigging, counterweights used as applicable, and that the load block or hook remains over the load.

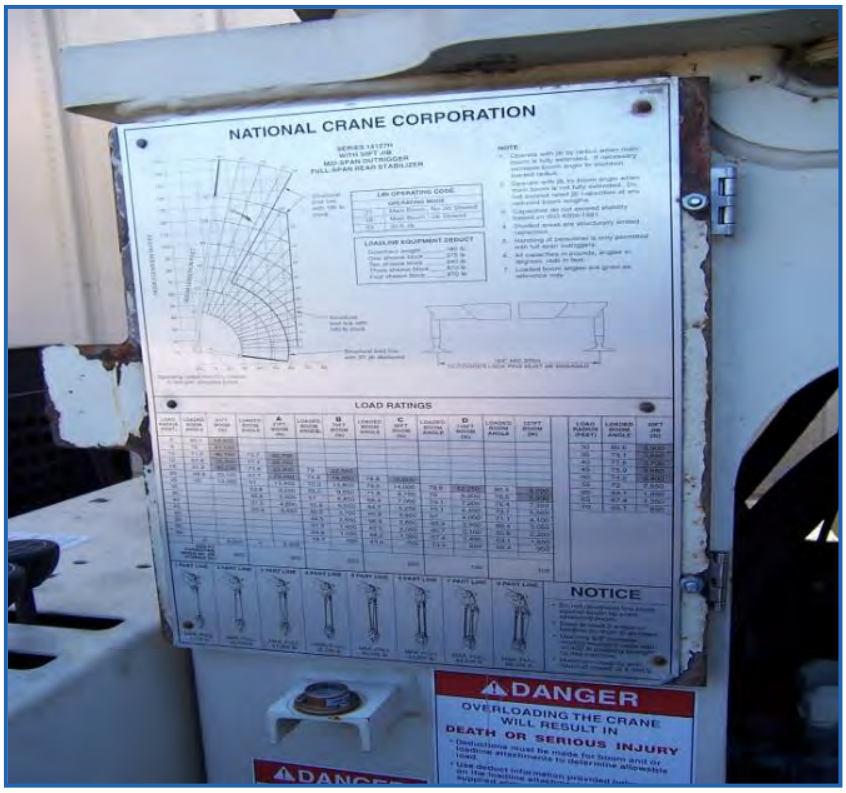


Figure 10j Load Chart

1010 Backhoes and Trackhoes

General Precautions

Case Study

Injuries are more likely to occur to workers around backhoes and trackhoes than to the operators. These injuries are typically caused by:

- Struck by moving machine or rotating machine components.
- Rollovers.
- Slides into excavations after cave ins.

- Locate utilities before beginning work.
- Recognize safety information and follow safety instructions located in the Operator's manual and on the equipment.
- Only qualified operators should operate machinery. Qualified operators must be familiar with:
  - The machine.
  - Inspection procedures.
  - Controls.
  - Operator's Manual.
- Do not make any modifications including additions of unapproved products or attachments or removal of safety features. Changes to machinery affects stability and reliability.
- Inspect equipment before each use and use equipment only for its intended purpose.
- Ensure attachments such as quick connect buckets are securely latched before use.
- Stay clear of moving parts and ensure all guards and shields are in place.
- Maintain machine according to manufacturer's instructions.
- Rollover protective systems shall be used as designed and not modified.

Figure 10k Three Points of Contact

Operating Precautions

- Face the machine and use 3 points of contact when getting on or off the machine.
- Never mount or dismount a moving machine.
- Start the machine only from the operators seat with seat belt engaged.
- Wear a seat belt at all times while operating the machine.
- Set the parking brake before leaving the operators seat for any reason to prevent unintended movement.
- Operate on solid footing and take extra care around embankments and excavations.
- Only the operator is allowed on the machine. This includes the bucket.
- Clear the travel path of the machine or any of its components before moving or rotating the machine.
  - Use spotters, signals, and/or barricades as needed.
- Make smooth movements and never jerk a load being lifted.
- Do not exceed load capacities when lifting materials.
- Never attempt to lift a load with equipment parked on a trailer.
- Use stabilizers to lift and level the machine before operating the backhoe.

1011 Dozers

General Operation

- Only authorized persons who are properly trained and qualified shall use or operate this equipment.
- Start the machine only from the operator's seat.
- Avoid unexpected machine movement.
- Before starting engine, sit in operator's seat.
- Ensure parking lock lever is in "lock' position.
- Never attempt to start engine from the ground or tracks.
- Do not attempt to start engine by shorting across the starter solenoid terminals.
- Prevent unitended machine movement.
- Always move the park lock lever to the 'lock' position before leaving the operator's seat for any reason.
- Be careful not to accidentally actuate controls when co-workers are present.
- Engage park lock and lower work equipment to the ground during any work interruptions.
- Stop engine before allowing anyone to approach the machine.
- Following these same precautions before standing up, leaving the operator's seat, or exiting the machine.
- Keep riders off machine.
    - Only allow operator on machine.
    - Riders are subject to injury. They may fall from machine, be caught between machine parts, or be struck by foreign objects.
    - Riders may obstruct operator's view or impair their ability to operate machine safely.

Avoid Backover Accidents

- Before moving machine, be sure persons are clear of the machine path.
- Turn around and look directly for best visibility.
- Use mirror to assit in checking behind the machine.
- Keep windows and mirror clean and in good repair.
- Be certain backup warning alarm is working properly.
- Use a signal person if view is obstructed or when in close quarters.
- Keep signal person in view at all times.
- Use prearranged hand signals to communicate.

Avoid Machine Tip Over

- Use seat belt at all times.
- Do not jump if the machine tips. This could lead to a crushing injury.
- Load and unload from trucks or trailers carefully.
- Be sure truck is wide enough and secured on a firm level surface.
- Use loading ramps and be sure they are attached properly.
- Be careful on slopes.
- Use extra care on soft, rocky, or frozen ground because machine may slip sideways in these conditions.
- When traveling up or down steep slopes, keep the bucket or blade on uphill side and just above ground level.
- Ensure solid footing.
- Use extra care when operating on stockpile materials or near banks or excavations that may cave-in and cause machine to tip or fall.

Inspect Machine Daily Before Starting

- Safety and Protective Devices Checks:
    - Walk around machine to clear all persons from machine area before starting machine.
    - Check condition of guards, shields, and covers.
- Overall Machine Checks:

- Check for worn or frayed electrical wires and loose or corroded connections.
- Check for bent, broken, loose, or missing boom, bucket, sheet metal, track parts.
- Check for loose or missing hardware.
- Check for oil leaks, missing or loose hose clamps, kinked hoses, and lines or hoses that rub against each other or other parts.
- Check engine coolant level in coolant recovery tank.
- Check engine oil level.
- Drain sediment from water separator.
- Check hydraulic system oil level.
- Check transmission oil level.
- Check air cleaner dust unloader valve.
- Check track sag.
- Grease dozer linkage.

Avoid Work Site Hazards

- Avoid contact with gas lines, buried cables, and water lines.
- Call utility line location services to identify all underground utilities before starting work.
- Prepare work site properly.
- Avoid operating near structures or objects that could fall onto machine.
- Clear away debris that could move unexpectedly if run over.
- Avoid boom or attachment contact with overhead obstacles or overhead electrical lines.
- Keep bystanders clear at all times.
- Use barricades or a signal person to keep vehicles and pedestrians away.
- Use a signal person if moving machine in congested area or where visibility is restricted.
- Always keep signal person in view.
- Coordinate hand signals before starting machine.
- Operate only on solid footing with strength sufficient to support machine.
- Be especially alert working near embankments or excavations.
- Avoid working under over-hanging embankments or stockpiles that could collapse under or over machine.
- Reduce machine speed when operating with tool on or near ground when obstacles may be hidden (e.g., during snow removal or clearing mud, dirt, etc.) At high speeds hitting obstacles (rocks, uneven concrete, or manholes) can cause a sudden stop.
- Always wear a seatbelt.

For additional information on safe dozer operation, consult the operator's manual that is provided with the machine.

1012 Skid-Steer

- Only authorized persons who are properly trained and qualified shall use or operate this equipment.
- To be qualified, operators must understand the written instructions supplied by the manufacturer, have training, including actual operation of a skid steer, and know the safety rules and regulations of the jobsite.

Know the Rules

These are some of the general rules you must work by:

- Know the capacity and operating characteristics of the loader.
- Never modify or remove any part of the loader (except for service and reinstall before operating).
- Fasten your seat belt/operator restraint before you start.
- Keep bystanders away from your work area.
- Drive forward whenever possible.

- Always look in the direction of travel.
- Look before backing up.
- Carry the load low.
- Whenever you leave a loader, always lower the lift arms and put the bucket/attachment flat on the ground or secure the lift arms with the approved lift arm support device(s).
- Engage the parking brake, stop the engine, cycle the hydraulic controls to eliminate pressure, and remove the key before you dismount.
- Know the rules covering traffic at the jobsite.
- Know what all signs, flags, and markings mean.
- Know hand, flag, horn, whistle, siren, or bell signals.

Know the Skid-Steer Loader

- Know how to operate all equipment on the loader.
- Know the purpose of all the controls, gauges, and indicators.
- Know the rated operating load, speed range, braking and steering characteristics, turning radius, and operating clearances.
- Keep in mind that rain, snow, ice, loose gravel, soft ground, slopes, etc., change the operating capabilities of the loader.
- Study the danger, warning, and caution safety signs on the loader and the information signs.
- Read and understand the manufacturer's operator's manual before starting the engine.
- If there is something in the manual that is not understood, ask a supervisor or someone from fleet for explanation.

Check and Use All Available Protective and Safety Devices

Loaders may be equipped with the following safety equipment. Additional equipment may be required or some items may not apply, depending on attachments used, jobsite conditions or applicable worksite rules. Check that each item is securely in place and in operating condition.

- Falling Object Protective Structure (FOPS)
- Rollover Protective Structure (ROPS)
- Seat Belt
- Operator Seat/Restraint Bar(s)/ Interlock
- Cab side screens or windows
- Special enclosures to restrict material from entering cab openings
- Alternate exit (rear window)
- Grab Handles
- Lift Arm Support Device(s)
- Lights
- Anti-skid Tread/Steps
- Safety Signs
- Safety Signs
- Horn
- Guards
- Back-Up Alarm
- Fire Extinguisher
- First-Aid Kit
- Rotating Beacon
- Windshield Wiper
- Defroster

Never remove or disconnect any safety device.

Check the Loader

Before beginning the workday, you must inspect your loader and have all systems in good operating condition. Do not operate the loader until all deficiencies are corrected.

- Check for broken, missing, loose, or damaged parts.
- Check the tires or tracks for cuts, missing lugs, bulges, and correct pressure or track tension.
- Check condition and operation of attachment quick coupling device. Perform daily cleaning and maintenance following the manufacturer's instructions.
- Check the parking brake for proper operation.
- Perform all maintenance procedures outlined by the manufacturer of your loader.
- Check the hydraulic system and have any leaks repaired.
- Check cooling system. If air cooled, check for unobstructed airflow. If liquid cooled, check coolant level (at overflow tank) if provided.

Warning: Diesel fuel or hydraulic fluid under pressure can penetrate the skin or eyes and cause serious injury, blindness or death. Fluid leaks under pressure may not be visible. Use a piece of cardboard or wood to find leaks, but do not use a bare hand. Wear a face shield or safety goggles for eye protection. If any fluid is injected into the skin, seek medical attention immediately.

Starting the Engine

- Start the machine only from the operator's seat.
- Never attempt to start the engine by shorting across starter terminals.
- Know the exact starting procedure for your loader (see the manufacturer's manual for starting).
- Sit in the operator's seat and adjust the seat so all the controls can be operated properly.
- Fasten the seat belt/operator restraint.
- Familiarize yourself with warning devices, gauges and operating controls.
- Lower the operator seat/restraint bar (s) (if so equipped).
- Engage the parking brake and put all controls in the neutral/park position.
- Clear the area of all persons.
- Start the engine following the instructions in the manufacturer's manual(s).
- If necessary to run the engine or operate the loader within an enclosed space, be sure there is adequate ventilation.

Run an Operating Check

- After starting the engine, observe all gauges, instruments, and warning lights to ensure that they are functioning and their readings are within the operating range.
- Test all controls to ensure that they are working properly.
- Make sure the engine is operating correctly.
- With the control levers or joysticks in neutral, test engine speed control.
- Operate each pedal, lever or joystick to make sure all lift arm and tilt functions are correct.
- Operate the travel control lever(s) or joysticks to ensure correct operation in forward and reverse.
- Test steering right and left while moving slowly in a clear, safe area.

Do not use a machine that is not in proper operating condition. It is the operator's responsibility to check the condition of all systems, and to run the check in a safe area.

Operate Safely

- Always have the lift arms down when traveling or turning.
- Plan operation to load, unload, and turn on flat level ground.
- Never ram the bucket into a material pile; skid-steer loaders have more force at slow speeds.
- When traveling over rough terrain, slow down to prevent losing control.
- The tracks on compact track loaders can drop down suddenly when traveling over uneven surfaces like curbs, ramps, or similar types of surfaces.
- If you cannot avoid these types of operating conditions, drive slowly when you approach these types of uneven surfaces to avoid spilling your load or tipping the machine.
- Always carry the load low.
- When raising loads, raise at an even rate and be ready to lower the load quickly if the load gets in an unstable situation.
- Avoid steep slopes or unstable surfaces. If you must drive on a slope, keep the load low and proceed with extreme caution.
- Check loader manufacturer's recommendations. Loaders are heavier on the rear end when unloaded and heavier on the front end when loaded.
- If you are working on a ramp or slope always have a flat, level turn-around area so you can turn, load and unload safely.
- The center of gravity of the skid-steer loader shifts as loads are lifted and lowered. Never attempt to make sharp turns or travel on steep slopes with a raised load.
- Never operate this machine too close to the edge of an overhang or gully. The edges could collapse or a slide could occur causing serious injury.

Loading and Unloading

Several precautions are applicable to all skid-steer machines including:

- Keep bystanders away.
- Load and unload on a level surface.
- Block transport vehicle so it cannot move.
- Use ramps of adequate size and strength, low angle, and proper height.
- Rear of trailer must be blocked or supported.
- Keep trailer bed and ramps free of clay, oil, ice, snow, and other materials which can become slippery.
- Back the loader up the ramp onto the transport vehicle (unload by driving forward down the ramp).
- If the machine is equipped with a heavy attachment it may be necessary to drive forward onto the transport vehicle.
- Follow the manufacturer's instructions in the Operator's manual for tying down.

For additional information on safe operation of a skid-steer, consult the operator's manual that is provided with the machine.

Section 11 Tools and Machinery

1101 General

- It is Company policy to make available the best tools for the work being performed. It is also the intention of the Company to have tools that are safe and durable. Supervision will determine what tools are needed.
- Tools and machinery must be used only for their intended purpose.
- Manufacturer's instructions must be followed when utilizing tools and equipment.

Foreman's Responsibilities with Respect to Tools

- It is the responsibility of the foreman to train their crew in the use, care, sharpening, handling, and storing of tools. This training will pay off in assuring that the tools will be safer, perform better, and give longer life.

- Keep a general list of all the tools supplied to the crew.
- Make sure no tools are missing.
- See that the crew puts tools away and secures them if necessary to prevent damage or loss. Each tool should have a designated place for storage.
- Lock up compartments and take any other precautions necessary to prevent thefts.
- Perform the following checks on tools:
  - Check to see that tools are sharpened.
  - Check to make sure tools are in adjustment.
  - Check to see that tools are not leaking.
  - Check and replace ropes that are burned, cut or frayed.
  - Check to make sure safety belt and snaps are in good condition.
  - Check to make sure striking tools are not mushroomed or chipped.
  - Check to make sure no tools have been dropped or abused in a way that might affect their operation or safety.
- Arrange for routine maintenance on tools.
- Have appropriate Owner/Operator's Manual available for reference.
- If any tools are unsuitable, contact supervision and have them exchanged.
  - A best practice is to keep information that will be useful when repair parts are needed. This could include Company numbers, model, and serial numbers, length of bars, etc.

1102 Hand Tools

- All tools, regardless of ownership, shall be of an approved type and maintained in good condition. Tools must be inspected before use and are subject to inspection at any time. A foreman has the authority and responsibility to condemn unserviceable tools regardless of ownership.
- Do not use tools that have been made unsafe by damage or defect.
- Defective tools shall be tagged and removed from the job site.
- Do not use electric powered hand tools within 6 feet of energized equipment.
  - Does not apply to tools with completely self-contained batteries (cordless tools).
- Use the proper tool for the job to be performed and use tools only for their approved purpose.
- Become familiar with the proper operation of each tool either through the appropriate owner's manual or by asking a supervisor.
- Tools with sharp edges shall be stored and handled so that they will not cause injury or damage and they shall not be carried in pockets.
  - Wooden handles that are loose, cracked, or splintered must be replaced.
- Tools must not be left lying around where they may cause a person to trip or stumble.
- Do not depend on the insulation on hand tools for protection from electrical shock.
- Do not use hammers with metal handles or screwdrivers with metal continuing through the handle, or metallic measuring tapes on or near energized electrical circuits or equipment.
- Tools shall not be thrown from place to place or from person to person; tools that must be raised or lowered from one elevation to another shall be placed in tool buckets or firmly attached to hand lines.
- Tools shall never be placed unsecured on elevated places.

- When impact tools such as chisels, punches, drift pins, etc. become mushroomed or cracked, they shall be dressed, repaired, or replaced before further use.

1103 Knives and Cutting Tools

- When using knives or other cutting tools use the correct tool for the job.
- Always cut away from the body.
- Keep knives and cutting tools properly sharpened.

Sharpening a Knife

- Tools needed - Leather gloves and flat file.

1. Hold knife by the handle with the blade pointing away from the body (do not rest tool against leg).
2. Place the knife on a flat service tilting the blade upwards slightly.
3. Starting at the back of the knife with a flat file, push the file toward the tip of the blade.
   - Do this 8-10 times, then turn the knife over and repeat.
4. Continue this process until the knife is sharp.
   - Do not try to sharpen the point, as this is not necessary in order to skin wire.

Make sure your cutting motion is away from instead of toward your body.

1104 Powered Tools

- All powered tools shall be examined prior to use to insure general serviceability and the presence of all applicable safety devices. The electric cord and electric components shall be given an especially thorough examination.
- Powered tools shall be used only within their capability and shall be operated in accordance with the instructions of the manufacturer. Eye, face and hand personal protective equipment shall be worn when using said tools.
- All tools shall be kept in good repair. Disconnect them from the power source while repairs are being made.
- Electrical tools shall not be used where there is a hazard of flammable vapors or gases.
- The non-current carrying metal parts of portable electric tools such as drills, saws, grinders and wire wheel buffers shall be effectively grounded (using 3 prong plug) when connected to a power source unless:
  - The tool is an approved double-insulated type, or
  - The tool is connected to the power supply by means of an isolating transformer or other isolated power supply (example-24V DC system).

1105 Pneumatic Tools (Air Compressors, etc.)

- Compressed air and compressed air tools shall be used with caution.
- Pneumatic tools or hoses shall never be pointed at another person.
- Shut off the air before changing air tools unless quick-change connectors are used. The hose shall be bled at the tool before breaking the connection.
- Do not exceed the manufacturer's safe operating pressure for hoses, pipes, valves, and other fittings.
- Secure pneumatic hoses by some positive means to prevent the coupling from becoming accidentally disconnected.
  - Safety clips or retainers shall be securely installed and maintained on pneumatic impact tools to prevent attached from becoming accidentally expelled.

1106 Ladders

Requirement

- Employees shall be trained on ladder usage before using a ladder.
- Ladders shall be properly maintained, inspected before each use, and used only for their intended purposes.
- Manufacturer's instructions and capacities shall be followed.

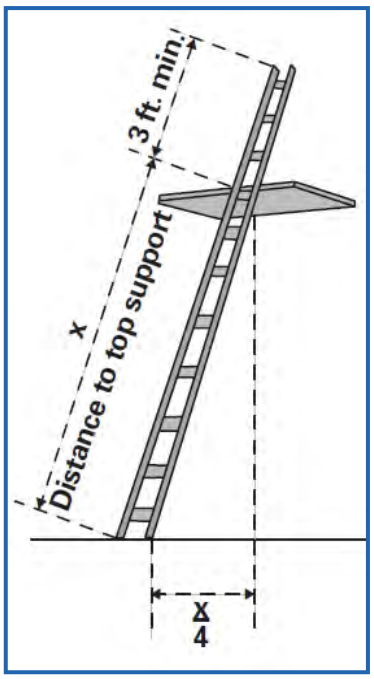


Figure 11a Ladder Requirements

General

- Read and follow all labels and markings on ladders.
- Never exceed the maximum load rating of a ladder and be aware that tools and equipment count towards the weight the ladder is supporting.
- All ladders shall be inspected before each use.
  - Ladders with weakened, broken or missing steps, broken side rails, or other defects shall be tagged and removed from service.
  - Other defects include but are not limited to oil, grease, and other slipping hazards; illegible warning labels; and inoperable locking mechanisms on spreader devices.
- Ladders may only be used for their intended purpose.
- Use a ladder only on a stable and level surface unless it has been secured.
- Do not place ladders on boxes, barrels, or similar unstable bases to gain heighth.
- Portable metal ladders shall not be used in the vicinity of energized electrical circuits.
  - Portable ladders must have nonconductive side rails if they are used where the employee could contact exposed energized parts.
- Do not use the top step/rung of a ladder as a step/rung unless it was intended for that purpose.
- Ladders shall not be placed in front of doors opening toward the ladder unless the door is open, locked or guarded.
- When ascending, descending, or working from ladders, employees shall maintain three points of contact at all times.
- When ascending or descending ladders, use a tool belt, pouches, or other means to move tools and equipment.
- The top of the ladder should be free of any material before the ladder is ascended or descended.
- Store ladders in such a manner they will not become warped, sagged, damaged, or contaminated with slippery surfaces.
- Ladder rungs, cleats, and steps shall be parallel, level, and uniformaly spaced when the ladder is in position for use.
- Straight Ladders:
  - Do not use portable straight ladders without nonskid bases.
  - Place the base of the ladder so that the distance between the bottom of the ladder and the supporting point is approximately one-fourth the working length of the ladder from the vertical surface.
    - The base of a job made wooden ladder should be one-eighth its length away from the wall.
  - A ladder used to access an elevated surface must extend 3 feet above the point of support.
  - When working from a portable ladder, the ladder must be securely placed, held, tied, or otherwise made secure to prevent slipping or falling.
  - Employees shall belt off to a secured ladder whenever both hands must be used for the job.
  - A ladder shall not be placed against an unsafe support.
  - Ensure the tip of the extension ladder extends at least three rungs beyond the landing surface, where practical.
  - Do not stand on the top three rungs of a straight, single, or extension ladder.
- Stepladders:
  - Stepladder legs shall be fully spread and the spreading bars locked in place.
  - When an employee is working on a stepladder over 10 feet high, the ladder shall be held by another person.
  - Do not stand on the top step or above the point indicted on the ladder.

1107 Scaffolds

- All scaffolds will be constructed by a qualified scaffold builder.
- Before using a scaffold, ensure that it is built correctly and safe to use.
- Pay attention to:
  - Footing.
  - Planking.
  - Guardrails, midrails, and toe boards.
  - Hardware cloth (mesh screen).
  - Connections.
  - Welds and rust.
  - Ladders or other access means.
- After significant events (e.g., impact loadings from vehicles, hoists, high winds) that could affect a scaffold's structural integrity, re-inspect the scaffold.
- Before working on a supported scaffold higher than 4 feet without railing, protect workers as follows:
  - Mark the area below with caution tape. (If tape is unavailable, equivalent signs may be used.)
  - Wrap the tape around nearby columns or caution stanchions to create the protection area.
  - Put tape (or signs) about 5 or 6 feet high so that it can be easily read from all directions.
  - Obtain and use fall arrest equipment.
- Where tools, materials, or equipment falling from a scaffold could strike employees below, do one or more of the following:
  - Install a toe board.
  - Mark with caution tape and barricade the area below to prohibit employees from entering.
  - If materials are piled higher than the toe board, use a screen around the perimeter of the scaffold.
- Always wear fall arrest equipment with independent life line on adjustable suspended scaffolds.
- Connect life lines to an anchor that is not part of the scaffold's suspension.
- For top level of multilevel suspended power scaffolds, tie off to an independent life line. On lower levels, tie off to scaffold.
- Do not use a defective scaffold.
  - Tag defective scaffolding out of service until it is repaired.
- In generating facilities, report any scaffold problems discovered in inspections to the location scaffold constructor or planner/scheduler.
- Unless a retractable life line and fall protection is used or landings are provided, avoid climbing scaffold ladders higher than 25 feet.
- Use the access that has been designed and provided by the scaffold builders.
- Climb with hands free. (Tools and materials should be hoisted with a rope while on the scaffold.)
- Use a 3-point climbing technique at all times (2 feet and 1 hand or 1 foot and 2 hands).
- Do not use toe boards for support while climbing up or going down a scaffold.
- Do not accumulate too many tools, materials, or debris on the scaffold or overload it beyond the rated capacity.
- Do not stand on or lay tools, materials, and equipment on any scaffold railing. (This also applies to placing anything on a railing to increase scaffold's height.)
- To prevent tipping, do not load a scaffold unevenly.
- During high winds and storms, do not work on an outside scaffold.
- Do not work on an ice-coated scaffold.
- Ensure mobile scaffolds rest on a solid level footing.
- If wheels or casters are provided, lock them to prevent accidental movement on scaffolds.
- When asked to move mobile scaffolds:
  - Get help so the pressure of pushing is not concentrated in one point on the scaffold.
  - Ensure scaffold will move across level floors that are also free of obstructions and openings. (Otherwise, do not move the scaffold.)
  - Apply force close to (5 feet or less) the base of the scaffold.
- Before performing work from a scaffold, identify and safeguard any electrical hazards.
- When moving mobile scaffolding, avoid obstructions (e.g., piping equipment, instrumentation, electrical lines).
- Keep the scaffold's working surface clean and organized at all times.
- When the job is completed, remove all items from the scaffold.
- Do not erect, use, dismantle, alter, or move scaffolds so that they or any conductive material handled on them comes closer to exposed and energized power lines than:
  - 10 feet for lines under 50kV.

- 10 feet plus 4 inches for each 10 kV over 50kV.
- Do not use the frame on welded tubular frame supported scaffolds to access upper levels unless the distance between the integral rungs is 16-3/4 inches or less. If the distance is greater than 16-3/4 inches, use an extension or hook-on ladder.
- Use tag lines or equivalent measures to control swinging loads when they are being hoisted onto or near scaffolds or if the loads could contact the scaffold.
- Use ladders on scaffolds to increase working level height of employees only on large-area scaffolds. Ensure the following:
  - If the ladder is placed against a structure which is not part of the scaffold, the scaffold is secured against the sideways force exerted by the ladder.
  - The platform units are secured to the scaffold to prevent their movement.
  - The ladder legs are on the same platform, or other means are provided to stabilize the ladder against unequal platform deflection.
  - The ladder legs are secured to prevent them from slipping or being pushed off the platform.
- Inspect wire ropes for defects before each work shift and after any occurrence that could affect a rope's integrity. Replace ropes if:
  - Any physical damage impairs the function and strength of the rope.
  - Kinks impair the tracking or wrapping of rope around the drum(s) or sheave(s).
  - Six randomly distributed broken wires are in one rope lay, or three broken wires are in one strand in one rope lay.
  - Abrasion, corrosion, and scrubbing causes the loss of more than 1/3 of the original diameter of the outside wires.
  - Heat damage caused by a torch or any damage caused by contact with electrical wires is evident.
  - The secondary brake has been activated and has engaged the suspension rope during an over speed condition.
- Ensure that wire rope clips on suspension scaffolds are inspected and retightened to the manufacturer's specifications at the start of each work shift.
- Ensure the wire ropes on suspension scaffolds are shielded, treated to resist corrosive substances, or made of material which is not adversely affected by the substance being used when acids and other corrosive substances are used.
- Shield suspension ropes when performing a heat-producing process.
- Reduce the possibility of welding current arcing through the suspension wire rope when welding is performed on suspension scaffolds by ensuring the following:
  - An insulated thimble is used to attach each suspension wire rope to its hanging support.
  - Excess suspension wire rope and any additional independent lines from grounding are insulated.
  - The suspension wire rope is covered with insulating material extending at least 4 feet above the hoist.
  - The tail line below the hoist is insulated to prevent contact between it and the platform.
  - The portion of the tail line that hangs free below the scaffold is guided and/or restrained so that it does not become grounded.
  - Each hoist is covered with insulated protective covers.
  - In addition to a work lead attachment required by the welding process, a grounding conductor is connected from the scaffold to the structure.
  - Ensure that the size of this conductor is at least the size of the welding process work lead, and this conductor is not in series with the welding process of the work piece.
  - If the scaffold grounding lead is disconnected at any time, the welding machine is shut off.
- An active welding rod or uninsulated welding lead is not allowed to contact the scaffold or its suspension system.

1108 Machine Guarding

There are three types of barrier guards that protect people from moving machinery. They consist of the following:

- Fixed guards
  - A fixed guard is a permanent machine part that completely encases potential hazards. Fixed guards provide maximum operator protection.
- Interlocked guards
  - Interlock guards are connected to a machine's power source. If the guard is opened or removed, the machine automatically disengages. Interlocking guards are often preferable because they provide adequate protection to the operator, but they also allow easy machine maintenance. This is ideal for problems such as jams.
- Adjustable guards
  - Self-adjusting guards change their position to allow materials to pass through the moving components of a power tool. These guards accommodate various types of materials, but they provide less protection to the operator.

Machinery with Moving Parts

- Whenever there is a possibility that operators may come in contact with moving mechanical parts, they shall be safely enclosed in affixed machine guards or placed behind barricades as to prevent operators from gaining access to the area of moving parts.
- Machines requiring a guard shall not be used if the guard is missing or defective. The missing or defective guard should be reported to the shop foreman immediately and replaced before the machine is operated. Only guards specified by the machine's manufacturer shall be used.
- Machine guards should be removed only for the purposes of servicing the machine. No guard, barrier, or enclosure shall be adjusted or removed from the machinery by an operator for any reason unless permission has been given by the supervisor to do so.
- Moving machine parts must be safeguarded to protect operators from serious injury. Belts, gears, shafts, pulleys, fly wheels, chains, and other moving parts must be guarded if there is a chance they could contact an individual.
- The hazards associated with moving machinery can be deadly and must be guarded at the following locations:
  - Point of operation. Area where the machine either cuts, bends, molds, or forms the material.
  - Pinch/nip point. Area where moving machine parts can trap, pinch, or crush body parts (e.g., roller feeds, intermeshing gears, etc.)
  - Sharp edges.

Procedures for Servicing Machinery with Moving Parts

- Prior to guards or other guarding devices being removed for servicing, all power sources to the machine (electrical, pressurized fluids and pressurized gases) shall be isolated from the machine. All electrical sources shall be turned off at the main breaker. The breaker shall be locked out and tagged with a warning sign by the person performing the servicing. Only one key shall be available and should be kept by the servicing person.
- Following the servicing, the guarding shall be replaced. Once it is securely affixed, the lock and tag on the main breaker may be removed.
- IMPORTANT: Guards must be in place. If a guard is removed to perform maintenance or repairs, follow lockout/tagout procedures. Replace the guard after repairs are completed. Do not disable or move machine guards for any reason. If a guard is missing or damaged, contact a supervisor and have the guard replaced or repaired before use.

1109 Powder Activated Tools

- Explosive charges shall be carried and transported in approved containers.
- Operators and assistants using these tools shall wear approved PPE.
- Tools shall be maintained in good condition and serviced regularly by qualified persons.
- Do not use these tools on unsuitable material that could be hazardous.
- Prior to use, the operator shall ensure that the protective shield is properly attached to the tool.
- Prior to use, the operator shall inspect the tool to determine that it is clean, moving parts operate freely, and the barrel is free from obstructions.
- Powder activated tools shall not be used in an explosive or flammable atmosphere.
- Tools shall not be loaded until just prior to the intended firing.
- Only cartridges with an explosive charge adequate for the job and with proper penetration shall be used.
- Tools and cartridges shall never be left unattended.
- Do not point tools at any person.
- In case of a misfire, the operator shall hold the tool in place for 30 seconds. The operator shall then try to operate the tool a second time and then wait another 30 seconds. Dispose of misfired cartridges by placing them in a metal container and returning them to supervision.

1110 Gasoline Driven Power Saws (Chain Saws)

- The operator shall familiarize himself with the manufacturer's operating and safety instructions prior to operating a chain saw.
- The operator shall have secure footing when starting the saw. Drop starting of saws is permitted outside of the bucket of an aerial lift only after ensuring that the area below the lift is clear of personnel.
- The engine shall ordinarily be stopped when power saws are being carried. The saw need not be stopped between cuts during consecutive felling, bucking, limbing, or cutting operations on reasonably level ground. The chain shall not be

moving and placed in the locked position and the operator's hand shall be off the throttle lever while operator is moving between work locations. One-man saws shall be carried by the worker on their side with the guide bar of the saw pointed behind their body.

- The engine shall be stopped for all cleaning, refueling, adjustments, and repairs to the saw except where manufacturer's procedures require otherwise.
- Chain:
  - Gloves shall be worn when handling the chain.
  - The chain shall be kept properly filed and snug on the bar.

Case Study

An employee sustained fractured ribs when he cut a limb under tension that struck him and pushed into a woodpile.

An employee cut his hand with a chainsaw while attempting to saw a limb above his head with one hand.

- Tensioning:
  - Hold the nose of the bar up and tighten the chain adjusting screw until the chain will move freely without binding when pulled by hand.
  - To check for kinks in the chain, pull the chain out from the bar and let go then recheck the tension.
  - Lift the chain from the top middle of the bar and ensure the drive links do not come out of the bar groove (this indicates saw is properly tensioned).
- Sharpening:
  - The chain should feed itself into the wood. If it must be forced it needs sharpening. Also, fine sawdust coming out of the wood instead of wood chips is an indication the saw needs sharpening.
  - Use the correct file size, guide, gauges, and angles when sharpening the chain.
- Kickbacks:
  - Do not allow the bar nose (tip of saw) to contact a solid object or become pinched to avoid kickback.
  - The operator shall work to one side of the saw to minimize injury from kickbacks.
  - Keep the chain brake in good working condition and replace when defective.
- The operator shall remain close to the saw for maximum control and minimum wear and tear on the arms, shoulders, lower back, and legs.

Be sure to use the appropriate fuel mixture as recommended by the manufacturer

- When fueling chainsaws:
  - Allow hot saw to cool 2-3 minutes before refueling.
  - Refuel saw only in a cleared area.
  - Clean spilled fuel from motor before starting.
  - Store fuel in approved containers.
  - Do not smoke in the vicinity of any fueling location.
- Work Methods
  - Before cutting a tree, branch, or limb:
    - Clear the area from slip, trip, and fall hazards such as rocks and debris.
    - Think about body position in relation to where the object(s) being cut will fall.
    - Do not stand between the object being cut and an immovable object such as a wood pile.
    - Thoroughly inspect, sharpen and tension the chain saw and blade as needed.
    - Fuel the chain saw in a safe location.
    - Maintain control of the saw and firm footing when starting a chain saw.
  - While cutting with a chain saw:
    - Do not cut higher than shoulder height.
    - Avoid using the tip of the chain saw to avoid kickbacks.
    - Maintain positive control of the saw with two hands at all times.
    - Wear proper PPE.
    - Chaps are required while operating a chain saw on the ground.
    - Do not wear loose fitting clothing.
    - Avoid binding the chain saw.
    - Watch for limbs and branches under tension.

Section 12 Training

1201 General Training Guidelines

Training is a cornerstone of the Pike Stay Safe program. Pike's training program has the simple goal of ensuring that employees know how to perform their work safely. Pike provides qualified, competent, and/or certified trainers capable of teaching relevant skills and information utilizing a vast library of materials. Training begins with Employee Orientation followed by on-the-job, classroom, and virtual training programs supplemented by refreshers through regularly scheduled safety and training meetings.

- In general, each employee should receive safety training and evaluation as follows:
  - Employee Orientation before beginning work.
  - A weekly safety meeting covering safety performance, incident reviews, and lessons learned based on the Friday Call-In.
  - Monthly safety meetings based on regulatory requirements and topics chosen by the Safety Department.
  - Equipment certifications prior to operating equipment.
  - Driver training prior to driving a commercial vehicle.
  - OSHA 10 hour training.
  - Periodic training including Qualified Employee, Pole Top and Bucket Rescue, Competent Person, etc. as applicable to the work being performed.
  - Regular auditing and inspection with retraining when deficiencies are identified.
  - Access to the Career Development Program.
- Training must be conducted by qualified instructors.
- Training must be documented using a Record of Safety Training form.

1202 Back Injury Prevention

Trainer Instructions

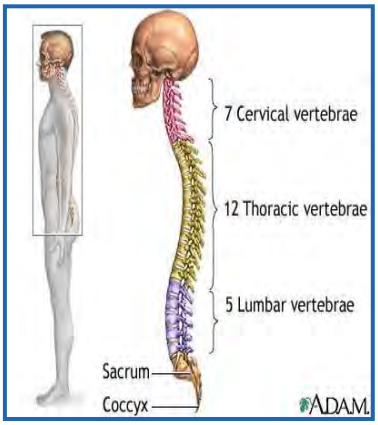
- Recommended training time is 1 hour.
- Review Training Objectives with trainees.
- Question trainees throughout the discussion to ensure their understanding and ask for questions upon concluding the training.

Training Objectives

- Upon completion of this training, trainees should know how to prevent back injuries. Specifically, they should:
  - Understand biomechanics associated with back injuries and how to keep the back properly positioned.
  - Know how apply proper lifting techniques in manual material handling operations.
  - Realize the need to utilize equipment or get help with heavy or awkward loads.
  - Understand the role of housekeeping and storage of materials in back injuries.

Training Material

Linework requires heavy lifting. Understanding how to lift safely during manual lifting and lifting with equipment is essential to staying safe. The large majority of back injuries are caused by improper bodily motion and improper lifting. Other factors, such as gripping, awkward positioning, bending, vibrating equipment, kneeling, repetitive motion, twisting, and overexertion can lead to back injuries.



The Human Spine

- The spine is divided into 4 natural curves, 2 forward and 2 backward for balance.
- It is important to maintain this curvature to prevent injuries.
- Back pain is often caused by weak abs.
- Your back's strongest ally is its abdominal muscles.
- Abs support the back and without the assistance of back and stomach muscles, your spine would collapse.
- Strong abs are critical to general health, good fitness, and a strong, pain-free back.
- People with low-back pain invariably have abdominal muscles that are much weaker than their lower-back muscles.
- Remember the importance of maintaining the natural curvature of the spine.
- As you progress through this training, look at the pictures and think about the effect body position has on the spine.
- If the curvature of the spine is not maintained the chances of injury increase.

WRONG

RIGHT

Proper Lifting

- Lifting is athletic, and requires the right training and technique, just like any sport.
- Most people lift the wrong way, and most back injuries result from improper lifting.
- The worst lifting situation is when the body is extended over the load.
  - Lower back becomes a fulcrum supporting the weight of the body plus the load.
  - Twisting invites injury.
- Keep your back upright to shift weight onto the powerful leg muscles and reduce the lever effect.
- To lift properly:
  - Crouch or squat with feet close to load.
  - Secure good footing and take a firm grip.
  - Bend at the knees.
  - Keep the back vertical.
  - Keep the load close to your body. Do not over extend.
  - Lift using knees, leg, and thigh muscles.
  - Never twist with a load.
    - Turn and face the load before attempting to lift or sit materials being carried down.

Crouch or squat with feet close to the load, and secure good footing

Take a firm grip

Keep the load close to your body – DON'T REACH

WRONG

RIGHT

Lift using knees, legs and thigh muscles while keeping your back straight

Never twist with a load. Turn and face the load before attempting to lift.

Keep the load close to your body – DON'T REACH

Use a stool

Walk on the Dock

Posture

- When standing:
  - Stand tall- head up, shoulders back and pelvis forward.
  - Keep one foot forward, knees bent slightly.
  - If you have to stand in the same spot for an extended period, shift your weight frequently, rest a foot on a slightly raised object like a bar rail.
- When sitting:
  - Sitting is one of the biggest causes of back strain.
    - Puts high loads on the lower back, can be twice as hard on the back as standing.
  - Slouching makes the ligaments, not the muscles do all the work. They stretch and put pressure on the vertebrae, then they hurt.
  - Good sitting will help keep your spine in balanced alignment and avoid backache, fatigue, and even back injury.
  - Don't sit with your back unsupported for long periods.
  - Sit with your back pressed against the back of the chair.
  - Sit slightly reclined with hips higher than your knees. Dangling legs put a strain on the lower back.
  - Sit with your feet flat, don't cross your legs. If you do cross them at the ankles.
  - If needed, use a lumbar support (rolled up towel).

Safe lifting of heavy loads. Get help or use equipment or tools to aid in lifting.

Bending

- Bend your knees and hips when working low.
- Keep objects close to you when lifting and carrying.
- Keep one foot forward.
- Keep your back straight and knees bent.
- Avoid bending your waist.
- Use your hands for support.

Example of Why Housekeeping is Important

Housekeeping

- A clean work area is a safe work area.
- Proper storage lowers your changes of overextension to reach a load you are picking up.
- Walkways should remain clear to avoid slips, trips, and falls.

Key Points

- Keep your back safe by keeping your spine in the proper position.
- Use proper lifting techniques.
- Get help or use equipment when lifting awkward or heavy loads.
- Maintain good fitness and posture.
- Stay Safe.

1203 Conducting Effective Training

Trainer Instructions

- Recommended training time is 30 minutes.
- Review Training Objectives with trainees.
- Cover Training Material.
- Question trainees throughout your discussion to ensure their understanding and ask for questions upon concluding the training.

Training Objectives

- Upon completion of this training, trainees should know how to conduct and document training.

Training Material

Preparing for a Training Session

- Become familiar with information.
- Practice the training.
- Anticipate questions and discussions topics.
- Determine nessecary materials (Powerpoint, handouts, tools, protective equipment, etc.)

Case Study

A Pike employee cut his hand with his pocket knife while skinning wire. He was working for a customer that doesn't allow pocket knives and had been through 3 trainings on skinning wire and knife usage in the previous 4 months. He was injured because:

- The trainer was not competent and knowledgeable. A training session was conducted on "Proper Use of Pocket Knives" for employees working for a customer that does not allow them.
- There was no follow-up to the training. The employee received training on using proper tools and cutting away from his body but continued to skin wire with a knife while cutting towards his body without correction.

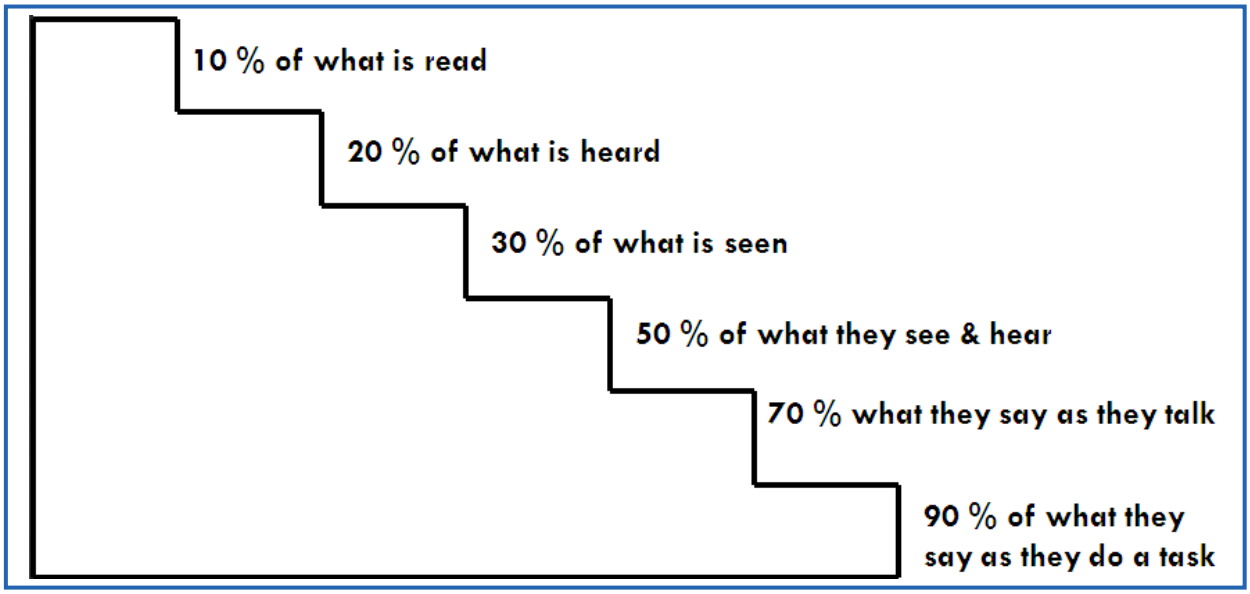
In another case, a safety trainer conducting training on cell phones in commercial vehicles explained the federal regulations and how they allowed the use of blue tooths to talk. Pike does not allow blue tooths or the use of any hand held mobile device in commercial vehicles. This is an example of creating confusion and conducting ineffective training by providing unnecessary information.

Conducting Training

Training Do's and Don'ts	
Do	Do Not
Relate material to trainee's jobs and lives.	Just read material or have trainees read material.
Maintain a positive learning environment.	Insult trainees.
Cover information based on training objectives.	Provide too much information.
Make trainees understand why.	Threaten trainees (do this because I said so).
Involve trainees.	Talk at the trainees.
Repeat, reinforce, and motivate.	Become distracted or act as if the training is not important.

- Relate learning to trainees' lives and jobs.
  - Make training personal.
    - Adults learn based on perceived need, economic factors, social factors, and negative factors.
    - People want to learn to better themselves. They do not want to sit through training that doesn't apply to their job or that has no personal benefit to them. They do not want their time wasted.
      - Think about a training session on winter driving conducted in July in Florida.
- Maintain a postive learning environment free from distractions.
  - The training environment should be non-threatening, comfortable, foster mutual respect, involve the group, and positively reinforce participation.
  - Training should be conducted away from distractions such as other workers and phones.
  - Take roll before or after the training. Do not pass around signup sheets or other handouts during training.
- Cover information based on training objectives.
  - Do not provide information trainees do not need.
  - Break information down into manageable pieces based on objectives.
- Make trainees understand why.
  - Think about the difference in the following:
    - Cover up because I said so, it's an Alive With Five rule, and you'll get fired if you don't.
    - Cover up to eliminate brush contact and second points of contacts that could lead to electrocution. Proper cover also prevents at-fault outages and protects people and equipment.
- Involve trainees.
  - Ask questions, have trainees explain material, use demonstrations and simulations, and let trainees practice skills.
    - "What voltage is a Class 2 rubber glove rated for?" is a good question. It has trainees recall information.
    - "Will a Class 2 rubber glove protect a worker on a 7200 volt line?" is a better question. It has trainees apply information and relates it to their job.
- Repeat, reinforce, and motivate.

People Learn and Remember



Let's use Pike's Driver Training program as an example. A full driver training would consist of a training manual the employee is responsible for reading and then passing a written test. There is also a PowerPoint that can be conducted in a classroom environment and a commentary driving session in which the trainee drives a vehicle and explains to a qualified trainer each decision they make as they drive.

Applying the chart to Driver Training:

- A driver learns 10% if they read the manual and pass the test.
- A driver learns 50% if they sit through classroom training.
- A driver learns 70% if they talk and ask questions during training.
- A driver learns 90% if they do a commentary driving session.
- Your goal as a trainer is for trainees to learn 100% of the training objectives.

Trainee Evaluation

Many training programs involve evaluations. Examples of this include commentary driving as part of driver training, field performance requirements in the Career Development Program, practical evaluations of equipment operations, and written tests. Your job as a trainer is to thoroughly evaluate each trainee and ensure they are qualified to perform a task. NEVER give a trainee a successful evaluation just to get them through training. Give honest evaluations, provide feedback to the trainees, and follow up to ensure they have gained proficiency. Lack of knowledge or skills should never be identified during investigations of injuries, vehicle accidents, property damages, or outages; they should be identified and corrected during training.

Documentation

It is of vital importance training is documented in an employee's file. It is also extremely important training is documented properly. As a rule of thumb, training should be documented on a Record of Safety Training form in such a manner that we can easily tell what the employee was trained on just by looking at the sheet three years from now. Follow these guidelines when documenting safety training.

- Complete all the required fields.
- Make sure the form including employee names and signatures is filled out accurately, completely, and ledgibily.
- Reference the specific Pike materials used in the training. If you are not using Pike materials:
  - Include a detailed description if no materials were used.
  - Include a copy of any non-Pike materials used with the Record of Safety Training form.
- Completed forms should be sent to the attention of Safety in the Corporate Office or emailed to training@pike.com.

1204 CPR and First Aid Basics

Training Objectives

As a Pike employee, you will receive extensive training on CPR and First Aid. This training material provides the basics of CPR and First Aid and should be used as awareness and refresher training only. It does not certify you in CPR or First Aid. Upon completion of this training, trainees should know:

- The steps in responding to an emergency situation.
- Basic hands-only CPR procedures.
- Basic first aid for minor injuries.

Training Material

Follow these steps in the event of an injury or emergency:

1. Check
   - Is the scene safe to approach? Is the situation life threatening? Does the victim need a doctor?
2. Call
   - Contact emergency personnel per your Emergency Action Plan or Workers Compensation based on your assessment in Step 1.
3. Care
   - Provide care based on your level of training.

CPR

Untrained personnel not certified in CPR should do the following:

- Contact emergency personnel.
- Perform hands only CPR by giving compressions in the middle of the chest between the nipples.

Personnel certified in CPR should do the following:

- CPR Sequence (C-A-B)
  - Compression.
  - Airway.
  - Breaths.
- Shoot for a compression rate of 100 per minute.
- Shoot for a compression depth of 2 inches.
- Allow complete recoil of the chest between compressions.
- Minimize Interruptions in Chest Compressions:
- NOTE: Use your body weight, not your arms, to compress the chest. Keep your elbows locked and fingers off the chest when giving compressions.

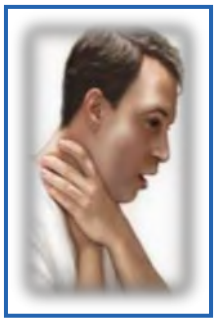
CPR Procedure

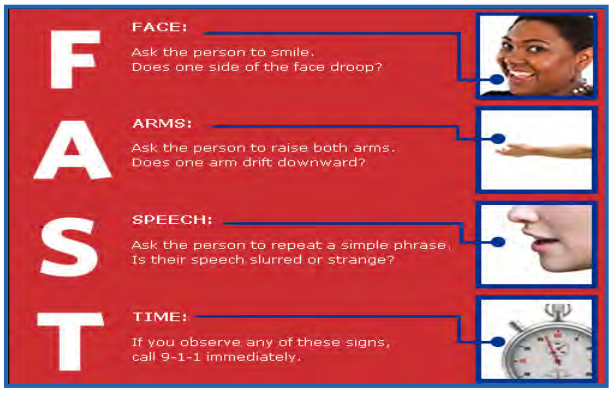
1. Find hand position in the center of the chest.
   - Kneel directly over the victim.
   - Place the heel of one hand in the center of the breastbone.
   - Place your other hand on top.
2. Give compressions.
   - Position shoulders directly over hands.
   - Compress the chest approximately 2 inches deep.
3. Head tilt – Chin lift

> Do not stop CPR unless the scene becomes unsafe, you are too exhausted to continue, the victim shows signs of life, or another trained responder takes over.

First Aid Kits

- A first aid kit containing adequate supplies should be readily available at each work location.

Basic First Aid		
Situation	Signs	Treatment
Allergic Reaction	• Skin turns red and swells. • Hives or a rash may develop. • Itching, weakness, or nausea. • Stomach cramps. • Vomiting. • Dizziness. • Trouble breathing (coughing and wheezing).	• Check the person's airway for breathing. • Call 911 if needed. • Help the person into the most comfortable position for breathing. • Monitor airway, breathing and circulation and keep the person calm until medical help arrives. • Use Epi-pen if available for life threatening cases.
Bleeding		• Apply basic precautions to reduce the risk of disease transmission when controlling bleeding. • Obtain consent. • Cover the wound with a sterile dressing, and press firmly against the wound until the bleeding stops (direct pressure). • Cover the dressing with a roller bandage, and tie the knot directly over the wound. • If bleeding does not stop: Apply additional dressings and bandages. Call or have someone else call 911. Provide care for shock.
Burns	• 1st Degree – redness. • 2nd Degree – redness with clear blister than blanches with pressure or red and white with bloody blisters. • 3rd Degree – stiff and white or brown.	• Stop the Burning – put out flames or remove the victim from the source of the burn. • Cool the Burn – Use large amounts of cool water to cool the burned area. Do not use ice or ice water! • Cover the Burn – Use a dry sterile dressing or a clean cloth. Bandage loosely.
Cold Exposures	• Hypothermia, frostbite, or immersion foot.	• Remove victim from the cold. • Remove wet clothing. • Give victim something warm to drink. • Immerse effected body part in warm water. • Call 911 if needed.
Conscious Choking 	• If a victim is conscious and cannot cough, speak or breathe then assume that the airway is blocked. • The universal sign of choking is the clutching of the throat. • Never give abdominal thrusts to a person who is not choking. Always ask!	• Apply emergency action steps and get consent from the victim. • Lean the victim forward and give five back blows using the heel of the hand. • Place thumb side of fist against middle of abdomen just above the naval. • Grasp the fist with your other hand. • Give 5 quick upward thrusts. • Press you abdomen into the back of chair to perform this procedure if you are alone. • Repeat the back blows and thrusts until: o The object is forced out. o The victim starts to breath or cough forcefully o The victim becomes unconscious o Trained person takes over.
Foreign Body in Eye	• Redness, itching, and/or scratchy feeling in the eye. • Visible foreign body.	• Irrigate the eye with large quantities of clean water for 15 minutes. • Use the edge of a clean handkerchief or similar device to gently remove foreign bodies on the eye. • Do not attempt to remove imbedded foreign bodies. • In most cases, the eye should be checked by a licensed healthcare provider.

Situation	Signs	Treatment
Heart Attack	• Discomfort in the center of the chest that lasts more than a few minutes, or that goes away and comes back. • Symptoms can include pain or discomfort in one or both arms, the back, neck, jaw or stomach. • Shortness of breath. • Other signs may include breaking out in a cold sweat, nausea or lightheadedness.	• Call 911. • Start CPR • Get advanced medical care ASAP.
Heat Illness	• Heat cramps, heat exhaustion, heat syncope, and heat strokes.	• Move victim to nearby cool place. • Massage the cramped muscle. • Keep the victim at rest. • Fan the victim's skin. • Give the victim water. • Treat for shock, but do not cover to the point of overheating. • Monitor breathing. • Call 911 immediately for emergencies.
Seizures	• Violent, uncontrolled shaking or spasms.	• Try to keep the airway open and prevent injury. • Do not attempt to restrain the victim or place objects between teech or in mouth.
Shock	• Restlessness or irritability. • An altered level of consciousness. • Pale or ashen, cool, moist skin. • A blue tinge to lips and nail beds. • Rapid breathing. • Rapid pulse.	• Have the victim lie down and rest comfortably. • Control any external bleeding. • Help maintain normal body temperature. • Try to reassure the victim. • Elevate the legs about 12 inches if no broken bones. • Do not give anything to eat or drink. • Call 911.
Strokes	• Sudden numbness or weakness of the face, arm or leg, especially on one side of the body. • Sudden confusion, trouble speaking or understanding. • Sudden trouble seeing in one or both eyes. • Sudden trouble walking, dizziness, loss of balance or coordination. • Sudden, severe headache with no known cause.	• Call 911 and note the time the symptoms appeared. 
Unconscious Choking	• You may find an unconscious victim whose airway is blocked and you cannot get air into the victim, or a conscious choking victim may become unconsciousness.	• Apply the emergency action steps. • Give CPR. • Check for loose objects in the mouth and remove if found. 

- Remember to use universal precautions to protect yourself when administering CPR and First Aid.
- Never provide treatment other than that for which you are properly trained.

1205 Driver Qualification and Entry Level Driver Training

Training Requirement

Prior to driving a commercial vehicle, Pike employees must obtain a Class A Commercial Driver's License and should successfully complete this training.

Federal regulations require drivers of commercial vehicles to have entry level training that includes driver qualification, driver wellness, hours of service, and whistleblower protection.

An employee completes Driver Qualification and Entry Level Driver Training by passing a written exam, conducting a thorough pre-trip inspection, and completing a Commentary Driving session with a qualified instructor. The instructor's role is to proctor and grade the exam and evaluate the driver using a Commentary Driving Checklist. The employee should become familiar with the contents of the Driving section of this manual prior to the exam. There is also a Driver Training manual and Driver Training video available for review.

Trainer Instructions

- Review Training Objectives.
- Verify the trainee has obtained their CDL and has a valid medical card.
- Provide trainee instruction on Entry Level Driver Training.
- Complete a Verification of Entry-Level Driver Training form and return to Regulatory Compliance.
- Issue the trainee a Driver Training manual and provide instruction on studying and completing the exam.
- Grade the trainee's test.
- After the trainee has passed the test, observe them conduct a pre-trip inspection and ride with them in a commercial vehicle.
- Evaluate the trainee using a Commentary Driving Checklist.
- Send the exam and Commentary Driving Checklist to the Safety Department or via email to training@pike.com
- Ensure Regulatory Compliance has a complete Driver Qualification File on the employee. This includes:
  - Driver's application for employment;
  - Previous employment check;
  - Motor Vehicle Record (Initial);
  - Motor Vehicle Record (Annual);
  - Annual review of Motor Vehicle Record;
  - Annual Driver's Certification of Violations;
  - Commercial Driver's License;
  - Entry Level Driver Training Certificate if necessary;
  - Medical Certificate.
- Instruct the driver they are responsible for:
  - Ensuring Regulatory Compliance receives a copy of their license and medical card when they are issued and each time they are renewed.
  - Completing an annual Driver's Certification of Violations and ensuring it is received by Regulatory Compliance.
- The trainee is now qualified to drive a commercial vehicle.
- Explain the importance of safe driving and that Pike employees are also professional truck drivers.
- Encourage the trainee to ride with more experienced drivers and continue practicing Commentary Driving anytime they are with another employee for continuous on the job training.
- Ask for questions.

Training Objectives

- Upon completion of this training, trainees should:
  - Know DOT requirements including driver qualification, driver wellness, hours of service, and whistleblower protection.
  - Understand Pike's expectation to drive safely.
  - Understand the Materials of Trade and Hours of Service exemptions.
  - Know the characteristics of Pike commercial vehicles and how they handle differently than personal vehicles.
  - Be able to conduct a thorough pre-trip vehicle inspection.
  - Apply the five keys of decision driving every time they drive a vehicle.

Entry Level Driver Training

Driver Qualification
In order to operate a CMV, you must:

- Be at least 18 years of age (18 - 20: Intrastate Only, 21+: Interstate).
- Read and speak English well enough to converse with general public, understand traffic signs, respond to official inquiries, and fill out required reports.
- Have experience or training to safely operate the type of vehicle you will drive.
- Pass a physical exam.
- Have a valid license.
- Provide your employer a list of violations you have been convicted of in the previous 12 months.
- Have passed a road test.

You will be disqualified from driving for:

- Driving a CMV with alcohol concentration of 0.04 percent or more or refusing to undergo testing.
- Operating a CMV under the influence of a controlled substance.
- Transporting, possessing, or unlawfully using drugs.
- Leaving the scene of an accident involving a CMV.
- Committing a felony in a CMV.

Driver Wellness
Healthy drivers are safe and alert drivers. Follow these tips for good health:

- Cholesterol (desirable is less than 200 with LDL less than 130 and HDL 50 or higher).
- Blood Pressure (below 140 over 90).
- Watch Weight.
- Exercise.
- Alcohol and Drug Abuse.
- Stress and Fatigue.

Control by minimizing animal fat and dairy products, eating regular and healthy meals, limiting sugar, salt and sodium, avoiding smoking or drinking alcoholic beverages, getting enough of sleep, and exercising regularly.

Hours of Service

- Utility vehicles are exempt from hours of service regulations.
- Drivers of other vehicles are required to maintain a record of duty status.
    - Complete and keep for 7 days at which time it must be sent in within 13 days to be maintained for 6 months.

Whistleblower Protection
Whistleblower protection is in place to protect you from retaliation if you report CMV violations. Simply put, you can't be punished for reporting violations. Specifically, Pike cannot discharge, discipline, or discriminate against you regarding pay, terms, or privileges for taking any of the following actions:

- Filing a complaint, starting a proceeding, or testifying in a proceeding regarding a CMV violation.
- Refusing to operate a CMV if you would have violated regulations or operated an unsafe vehicle.

VERIFICATION OF ENTRY-LEVEL DRIVER TRAINING

In addition to passing the commercial driver's license (CDL) test, all CMV drivers employed by Pike Electric, LLC are required to receive the following training.
The purpose is to enhance the safety of CMV operations on our highways.

EMPLOYEE #:_____

DRIVER'S NAME _____

LAST 4 DIGITS OF SOCIAL SECURITY NO. XXX-XX-_____

COMMERCIAL DRIVERS LICENSE NO. _____

STATE _____

TYPE OF POWER UNIT _____TYPE OF TRAILER(S) _____

THIS IS TO CERTIFY THAT THE ABOVE-NAMED DRIVER WAS GIVEN A ROAD TEST UNDER MY SUPERVISION ON _____, 20___, CONSISTING OF APPROXIMATELY _____MILES OF DRIVING.

IT IS MY CONSIDERED OPINION THAT THIS DRIVER POSSESSES SUFFICIENT DRIVING SKILL TO OPERATE SAFELY THE TYPE OF COMMERCIAL MOTOR VEHICLE LISTED ABOVE.

_____
(PRINT NAME, TITLE, AND EMPLOYEE NUMBER OF EXAMINER)

_____
(SIGNATURE OF EXAMINER) (TITLE)

_____
(ORGANIZATION AND ADDRESS OF EXAMINER)

I CERTIFY THAT I HAVE BEEN TRAINED IN 1) DRIVER QUALIFICATON REQUIREMENTS; 2) HOURS OF SERVICE; 3) DRIVER WELLNESS AND 4) WHISTLEBLOWER PROTECTION, AND I UNDERSTAND THE TRAINING.

_____
(SIGNATURE OF DRIVER BEING CERTIFIED)

1206 Drugs and Alcohol

It is the policy of Pike to maintain a drug free workplace and safe working environment. The use of alcohol or controlled substances while on the job or on customer or Company property is strictly prohibited and shall be sufficient cause for corrective action in accordance with Federal and/or Pike regulations. Off-the job possession, buying, selling, distributing or manufacturing of controlled substances may be reason for termination of employment. Illegal activity with respect to alcohol may be reason for termination of employment. Should any provision in this policy conflict with applicable federal, state or local law, the conflicting provision of the applicable federal, state, or local law shall control.

Prohibited use of Alcohol

- Use while on the job;
- Use while performing field operation functions;
- Use during the 4 hours prior to performing field operation functions;
- Reporting for duty or remaining on duty to perform field operation functions with an alcohol concentration of 0.04 or greater;
- Use of alcohol for up to 8 hours following an accident or until the employee undergoes a post-accident test; or,
- Refusal to take or tampering with a required test.

Positive Alcohol Test

The use of alcohol on a job site, on customer property or on Company property will result in termination. Otherwise, if an alcohol test result is 0.04 or greater:

1. First time positive test of 0.04 or greater will result in employee being removed from the job without pay. Employee must complete, within six weeks, the prescribed education and/or treatment by a DOT qualified Substance Abuse Professional (SAP) before returning to work.
2. Second time positive test of 0.04 or greater will result in employee termination.

If an alcohol test result is 0.02 or greater but less than 0.04:

1. First time positive test of 0.02 or greater but less than 0.04 will result in the employee being removed from the job without pay for 24 hours.
2. Second time positive test of 0.02 or greater but less than 0.04 will result in 2 days off without pay.
3. Third time positive test of 0.02 or greater but less than 0.04 will result in employee termination.

Employees having a breath alcohol concentration of at least 0.02 but less than 0.04, shall be removed from duty requiring the driving of a commercial motor vehicle for at least 24 hours.

Prohibited use of Controlled Substances

- Use of any controlled substance, except when administered to an employee by, or under the instructions of, a licensed medical practitioner, who has advised the employee that the substance will not affect the employee's ability to safely operate a commercial motor vehicle or safely perform the duties assigned to the employee. (Under federal law, the use of marijuana or any Schedule I drug does not have a legitimate medical use in the United States.);
- Testing positive for controlled substances; or,
- Refusal to take, or tampering with, a required drug screen.
- Use of certain legally obtainable, non-prescription substances which may contain ingredients, such as hemp or hemp derivatives, which may trigger a positive drug test; and
- Use of any synthetic substance intended to mimic the effects of illegal substances, including but not limited to synthetic marijuana, “K-2”, “Spice”, “bath salts,” “Red X Dawn,” “Blaze” or any similar substance, is banned from all Company property. Any employee found to be in possession of such substance while on the job, or on customer or Company property, will be subject to disciplinary action, up to and including termination of employment.

Positive Controlled Substance Test

1. First time positive test for controlled substance abuse will result in employee being removed from the job without pay. Employee must complete, within six weeks, the prescribed education and/or treatment by a DOT qualified Substance Abuse Professional (SAP) before returning to work.
2. Second time positive test will result in termination.
3. Any refusal to undergo or tampering with a controlled substance test will be treated as a positive test.

If a controlled substance test is positive, the Medical Review Officer (MRO) will contact the employee. The employee may have the split-specimen tested at a second laboratory at the employee's expense. The employee has 72 hours to request the split-specimen be tested after notification.

Conditions for Testing

- Pre-Employment
- Random (Controlled Substances)
- Reasonable Suspicion
- Post-Accident
- Return-to-Duty
- Follow-Up

Multiple Positive Tests

Employees whose employment is terminated as a result of a second positive test may be reconsidered for employment after three (3) years from the date of termination. Any applicants under these circumstances will be required to provide proof in writing from the Substance Abuse Professional that the return to duty process has been completed prior to being rehired. Upon their return to work, they may be subject to random testing and any future positive test will result in termination of employment, in which case the employees will no longer be eligible for rehire.

On-the-Job Injury (Refer to Section 114 Post-Accident/Incident Procedures for reporting procedures.)

Employees who sustain an on-the-job injury requiring medical treatment are required to submit to a substance abuse screen. Exceptions:

- Employees requiring medical treatment due to contact with poisonous plants such as poison ivy, or due to insect or animal bites, will not be subject to screening.
- Employees with injuries resulting from repetitive motions will not be subject to screening.

Post-Accident Tests (Refer to Section 114 Post-Accident/Incident Procedures for reporting procedures.)

a) Employees are to notify the Risk Management/Claims Department as soon as possible if they are involved in accidents in a Company vehicle. The Risk Management/Claims Department will determine if the accident meets the criteria for a post-accident alcohol and/or drug screen using the criteria below. The Risk Management/Claims Department will contact Pike's Designated Employer Representative for scheduling post-accident alcohol and/or drug screens if necessary.

b) Per DOT regulations, when operating Pike commercial motor vehicles, all operators will be subject to DOT alcohol and substance abuse testing as a result of the following:
   - An accident involving a fatality.
   - An accident in which a Company driver receives a citation and one of the vehicles requires towing away from the scene.
   - Accident in which a Company driver receives a citation and one of the injured requires medical treatment away from the scene.

c) Pike requires all operators of Pike equipment, non-commercial motor vehicles, be subject to Non-DOT alcohol and substance abuse testing as a result of the following:
   - An accident involving a fatality.
   - An accident in which a Company driver receives a citation and one of the vehicles requires towing away from the scene.
   - Accident in which a Company driver receives a citation and one of the injured requires medical treatment away from the scene.

d) If an alcohol test has not been administered within 2 hours, the Regulatory Compliance Department shall prepare and maintain on file, a record stating the reason a test was not promptly administered.

e) If an alcohol test has not been administered within 8 hours, the Regulatory Compliance Department shall cease attempts to administer the test and prepare and maintain on file, a record stating the reason a test was not promptly administered.

f) If a drug test has not been administered within 32 hours, the Regulatory Compliance Department shall cease attempts to administer the test, and prepare and maintain a record stating the reasons why the test was not completed.

g) A driver who is subject to post-accident testing must remain available for testing or Pike may consider that the driver has refused testing. Any driver subject to post-accident testing must refrain from consuming alcohol for 8 hours following the accident, or until he/she submits to an alcohol test, whichever comes first.

Refusal to Submit

When employees or applicants refuse to submit to an alcohol and/or controlled substance test, this refusal shall be treated as a positive test. Refusal to submit to a test includes situations where an employee;

- Fails to provide an adequate amount of breath for an alcohol test.
- Fails to provide an adequate amount of urine within 3 hours after receiving notice for testing.
- Engages in conduct that obstructs the testing process.
- Leaves the test site after receiving notice for testing.

Pike's complete Drug and Alcohol Policy can be found in the Employee Handbook.

1207 Equipment Qualification

Training Requirement

This training serves as a Pike qualification for an employee to operate equipment and it must be completed for each piece of equipment an employee will operate. The training must be conducted by a Pike qualified operator that is a Qualified Person to conduct training. There is no additional training requirement to operate equipment unless deficiencies are identified through observations, audits, or incidents.

Notes:

- Certain equipment such as cranes and forklifts require specialized certifications.
- Employees undergoing on the job training for a piece of equipment can operate the equipment prior to being qualified if they are under the direct supervision of a certified operator.

Trainer Instructions

- Operators must have a minimum of 10 hours OJT operating each piece of equipment for which they will be qualified.
- Recommended training time is 30 minutes supplemented by 30 minutes of evaluation on equipment and ongoing OTJ training.
- Review Training Objectives with trainees.
- Cover material applicable to equipment in this manual.
- Cover Operator's Manual specific to the equipment.
- Question trainees throughout your discussion to ensure their understanding and ask for questions upon concluding the training.
- Observe trainee inspect, set up, and operate equipment.
- Complete a Pike Equipment Operator Evaluation and Qualification form for each trainee and each piece of equipment.

Training Objectives

- Upon completion of this training, trainees should be trained to an acceptable level of proficiency and will have demonstrated competence in inspection and safe operation of the equipment.

Pike Equipment Operator Evaluation and Qualification

Instructions

Each employee must be evaluated and qualified on each type of equipment they will operate. Both the employee and the evaluator must legibly print their name and employee number. The evaluator should then circle each type of equipment the employee is being evaluated on and the unit number for each equipment type on which the employee will be evaluated. The employee must then demonstrate a minimum level of acceptable proficiency by inspecting, setting up, and operating each type of equipment. Any item marked unacceptable means the employee is not qualified for the equipment type. Both the employee and the evaluator must sign the form.

Employee and Evaluator

Employee Name: _____ Employee Number: _____

Evaluator Name: _____ Evaluator Number: _____

Equipment

(circle all that apply)

Equipment Type	Evaluated On (Unit Number)	Equipment Type	Evaluated On (Unit Number)
All Terrain Telescopic Lift		Knuckle Boom	
Backhoe		Man Lift	
Backyard Machine		Material Handler Bucket	
Bucket Truck		Pressure Digger	
Digger Derrick		Skid Steer	
Dozer		Trackhoe	
Forklift			

Other (list below)

Equipment Type	Evaluated On (Unit Number)	Equipment Type	Evaluated On (Unit Number)

Evaluation

Criteria	Acceptable	Unacceptable
Employee is familiar with safe operating procedures.		
Employee can point out safety information, warnings, and equipment.		
Employee can perform a pre-operation inspection.		
Employee is familiar with equipment controls.		
Employee clears path of travel of equipment and components from other workers and equipment.		
Employee adheres to load ratings and capacities.		
Employee can properly set up equipment.		

Qualification and Signatures

Evaluator

By signing below, I verify this employee has been trained, evaluated, and is qualified to safety operate each type of equipment circled above.

Printed Name: _____ Signature: _____ Date: _____

Employee

By signing below, I verify I have been trained, evaluated, and am qualified to safety operate each type of equipment circled above.

Printed Name: _____ Signature: _____ Date: _____

1208 Hand Injury Prevention

Trainer Instructions:

- Recommended training time is 30 minutes.
- Review Training Objectives with trainees.
- Review PPE requirement for work gloves and recommendation they be worn during all work procedures.
- Review Knives and Cutting Tools in the Tools section of this manual.
- Make employees aware of any specific work glove requirements specific to the customer for which you are working.
- Discuss Kevlar glove option for glove purchases.
- Go over training material specifically discussing examples and asking for proper PPE and hand placement for each.
- Demonstrate proper work methods including cutting procedures and sharpening of knives.
- Have trainees demonstrate proper cutting procedures and sharpening of knives.
- If there is any equipment at the training location, ask trainees to point out potential pinch points and explain how to eliminate the risk of injury associated with those pinch points.
- Conclude training by asking for questions.

Training Objectives:

- Upon completion of this training, trainees should be familiar with types of injuries that typically occur to fingers and hands and how these injuries can be prevented. Specifically, trainees will understand PPE requirements, work methods, and proper tool use.

Training Material

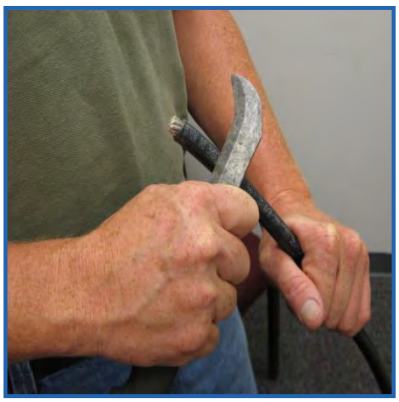
Overview

- Hands and fingers are one of, if not the most, commonly injured body parts for Pike employees. A very large majority of these injuries fall into two categories, cuts and mashed / caught between injuries. This training discusses examples of these injuries and how they can be prevented.

Cuts to Hands

- Result from:
  - Not paying attention.
  - No use of PPE such as work gloves.
  - Improper work methods and body positioning.
  - Improper handling of sharp objects and materials.
  - Incorrect use of tools.
  - Use of unapproved tools.
- Show below are examples of how cuts can occur to hands and fingers even during the simplest of tasks.

Only use approved tools. Typical pocket knives are not designed to skin wire.

BAD	EXCELLENT	BAD
Cut to right hand resulting in multiple stitches.	Shown below is an example of a work method utilized to prevent a cut.	Pictured below is a very hazardous situation.
		
Prevent this injury by wearing work gloves when handling material with sharp or jagged edges. Also use sound work methods and don't handle jagged edges. Pick this up from the bottom.	Broken porcelain is extremely sharp! Wear work gloves if you must handle broken porcelain but even better, eliminate the hazard by using another bell to handle the broken bell.	Always cut away from your body and wear work gloves when handling sharp or jagged objects.

Mashed / Caught Between Injuries to Hands

- Result from:
  - Placing your hands in a dangerous position.
  - Poor communication.
  - Not paying attention and focusing on your task.
  - Improper use of tools and equipment.
  - Use of tools and equipment lacking proper safeguards.
  - Not using proper equipment to perform the job.
  - Not identifying pinch points.
  - Not wearing protective work gloves.
- Shown below are examples of workers with their hands positioned in dangerous situations.




WHAT NOT TO DO

Think about the consequences of each hand position above, especially the picture on the right.

Actual Hand and Finger Injuries

- Cut tip of left index finger off while retracting second stage of digger derrick with finger in hole.
- Staph infection in right index finger when copper wire penetrated cuticle while cleaning off the back of truck.
- Laceration of right index finger from pocket knife.
- Cut to left index finger when finger caught between air compressor and line truck while attempting to manually hook ac to truck.
- Cut to right thumb picking up broken insulator.
- Burning and swelling in right index finger when hydraulic fluid injected into finger while checking leak on bucket truck.
- Cut left thumb skinning wire.
- Cut to left hand while rolling up rope when hand caught between rope and reel.
- Cut between right thumb and index finger from chainsaw.
- Fractured thumb when hand caught in outrigger being retracted.

Hand and Finger Injury Prevention

- Keep your hands out of the line of fire and out of pinch points.
- Wear work gloves when handling materials with sharp or jagged edges.
- Only use approved tools in safe working condition.
- Inspect tools, equipment, and materials prior to use.
- Utlize proper work methods including always cutting away from your body.
- Treat minor cuts and scratches to prevent infection as your hands are typically dirty.
- Ensure machine guards and other safety equipment are in place.

1209 Hazard Recognition and Mitigation

Trainer Instructions:

- Recommended training time is 30 minutes.
- Review Training Objectives with trainees.
- Cover Training material.
- Think of specific tasks (working an energized line, lowering an outrigger, skinning wire, etc.) and walk through the hazards associated with that task and how they should be mitigated.
- Conclude training by asking for questions.

Training Objectives:

- Upon completion of this training, trainees should be able to identify various types of hazards and understand how they should be mitigated using the most effective method.

Hazard Recognition and Mitigation Training Material

Definitions

- Hazard – A source or situation with the potential to cause harm.
- Risk – The likelihood a hazard will lead to harm.
- Hazard Recognition – Identifying sources or situations that may lead to harm.
- Hazard Mitigation – Eliminating or lessening the risk involved with a hazard to the fullest extent possible.

Types of Hazards

- Types of Hazards
    1. Visible
        - Hazards you can see such as a sharp knife or poison oak. These hazards can be easily overlooked because they are common. Mitigate visible hazards by planning and executing safe work.
    2. Invisible or Non-Obvious
        - A hazard that cannot be seen at all or that cannot easily be seen. Examples include electricity or a pin hole in a rubber glove. Mitigating invisible hazards involves inspecting tools and equipment and carefully planning your work.
    3. Environmental
        - Hazards resulting from your surroundings. These hazards can and will change throughout the day. Environmental hazards are mitigated by being aware of your surroundings and performing a pre/post-job briefing before work and as conditions change.
    4. Perception
        - Each individual views hazards differently because of filters (experience, knowledge, skill, training, attitude, stress level, values and motive). Perception hazards are best mitigated by performing a thorough hazard analysis as a group during a pre/post-job briefing and staying focused on the task at hand.
    5. Behavior
        - Hazards created because of human actions. Examples include not paying attention, standing in the line of fire and taking short cuts. Behavioral hazards are mitigated by following Pike's safety rules and work methods.

Hazard Mitigation

- Hazard Recognition should be an ongoing process before, during and after work.
- Preferred sequence of Hazard Mitigation
    1. At the source (remove the hazard)
        - Flag, tag, test and ground lines before considering them de-energized.
        - Lockout / Tagout practices.
    2. Along the path between the source and the worker
        - Covering up electrical lines to prevent incidental contact.
        - Fireproof screen when welding.
    3. At the worker
        - Wearing proper PPE.

1210 Knot Tying

Trainer Instructions:

- Recommended training time is 30 minutes.
- Review Training Objectives with trainees.
- Explain to trainees why knots are important and when each type of knot should be utilized.
- Give examples of situations in which lack of knot tying skills could be detrimental to the work being performed.
- Demonstrate how to tie each knot shown below.
- Have each trainee practice tying each knot until they have demonstrated an acceptable level of proficiency.

Training Objectives:

- Upon completion of this training, employees should know:
  - The importance of knots used in linework.
  - When different types of knots should be utilized.
  - How to properly tie knots used in linework.

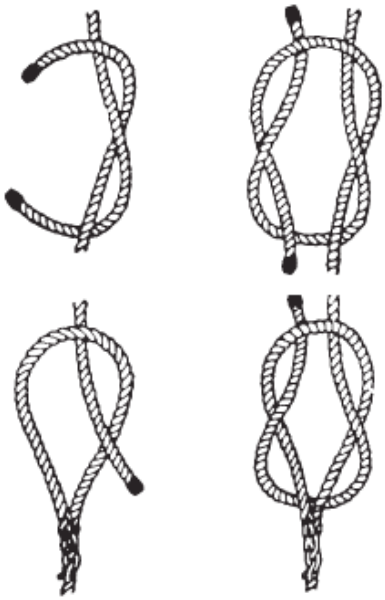
HALF HITCH

A half hitch is used to throw around the end of an object to guide it or keep it erect while hoisting. A half hitch is ordinarily used with another knot or hitch.

TWO HALF HITCHES

This knot is used in attaching a rope for anchoring or snubbing. It is easily and quickly made and untied.

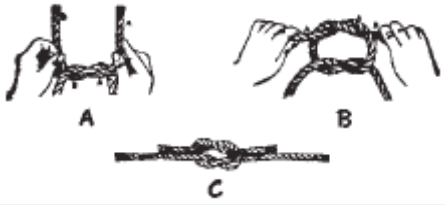
SQAURE KNOT



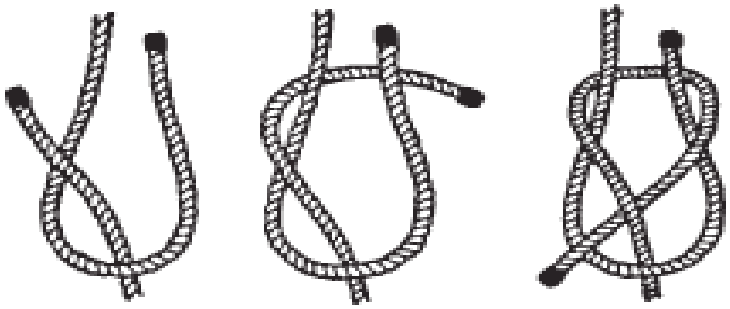
The square knot is used to tie two ropes together of approximately the same size. It will not slip and can usually be untied even after a heavy strain has been put on it. Linemen use the square knot to bind light leads, lash poles together on changeovers, on slings to raise transformers, and for attaching blocks to pole and crossarms.

Making a Square Knot

(A) Pass left end A over right end B and under.
(B)Pass right end B over left end A and under.
(C) Draw up the completed knot.



SINGLE SHEET BEND

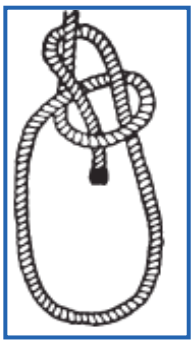


The single sheet bend is used in joining ropes, especially those of unequal size. It is more secure than a square knot but is more difficult to untie.

It is made by forming a loop in one end of a rope; the end of the other rope is passed up through the loop and underneath the end and standing part, then down through the loop thus formed.

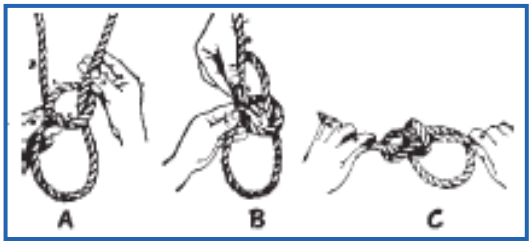
BOWLINE

The bowline is used to place a loop at the end of a line. It will not slip or pull tight. Linemen use the bowline to attach come-alongs (wire grips) to rope, to attach tail lines to hook ladders, and as a loose knot to throw on conductors to hold them in the clear while working on poles.



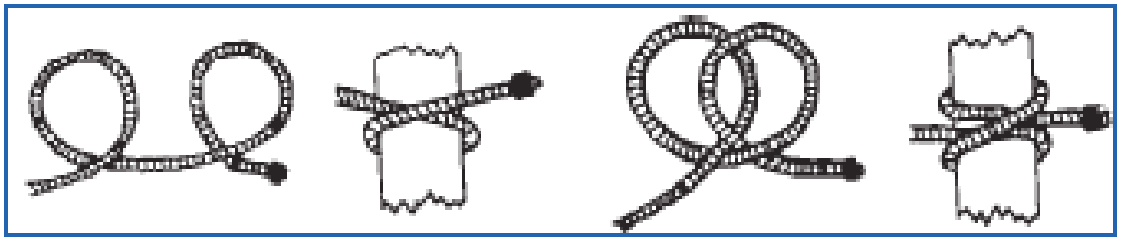
Method of Making Bowline Knot

A. Thread the blight from below.
B. Lead around standing part and back through the blight.
C. The completed bowline.



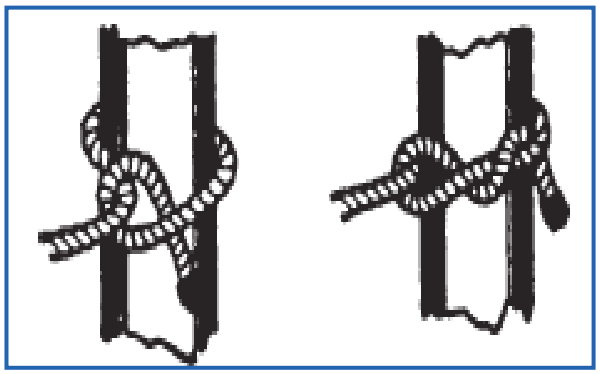
CLOVE HITCH

The clove hitch is used to attach a rope to an object such as a crossarm or pole where a knot that will not slip along the object is desired. Linemen use the clove hitch for side lines, temporary guys, and hoisting steel.



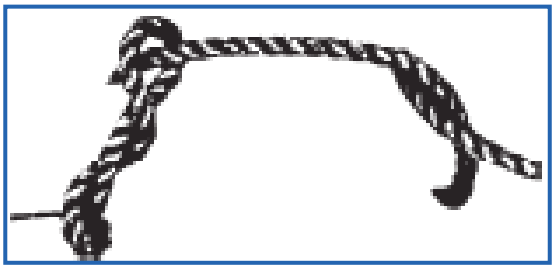
TIMBER HITCH

The timber hitch is used to attach a rope to a pole when the pole is to be towed by hand along the ground in places where it would be impossible to use a truck or its winch line to spot it. The timber hitch is sometimes used to send crossarms aloft. This hitch forms a secure temporary fastening which may be easily undone. It is similar to the half hitch, but is more secure. Instead of the end being passed under the standing part of the rope once, it is wound around the standing part three or four times.



ROPE TIMBER HITCH AND HALF HITCH

The timber hitch will not slip under a steady pull but may slip when slack. To make the timber hitch more secure, a single half hitch may be taken a little farther along the spar.



1211 Personal Hygiene

- Employees shall adequately secure hair and / or a beard when working near machinery, energized circuits or at any time when the beard or long hair could create a safety hazard.
- Personal cleanliness should be maintained by a daily change of clothes and regular bathing. This is important to minimize the risk of infection and sickness.
- Illnesses, including flu and colds, are caused by viruses spread through large droplets from coughs and sneezes that infect the nose, throat, and lungs. Stopping the spread of germs will keep you and others well. Healthy habits and personal hygiene can stop the spread of germs.
- Remaining healthy and reporting to work regularly is important. Here are some tips that will help you avoid contracting illnesses caused by the spread of germs.
  - Proper Hand Washing
    - This is the single most important thing you can do to protect yourself. Hands should be washed frequently and thoroughly, especially after sneezing, coughing, or coming in contact with potentially infectious surfaces such as bathroom counters or door handles. Proper hand washing involves scrubbing with soap and warm water for 15-20 seconds. If soap and water aren't available, alcohol based hand wipes or gel sanitizers are acceptable.
  - Cough Etiquette
    - When you cough or sneeze, cover your mouth and nose with a tissue, dispose of the tissue, and wash your hands. If no tissue is available, cover your cough or sneeze with the upper part of your shirt sleeve.
  - Avoid Touching Your Eyes, Nose, and Mouth
    - Touching an infectious surface with your hands will not make you sick. Touching an infectious surface with your hands and then touching your eyes, nose, or mouth will. Begin monitoring how often you touch your eyes, nose, or mouth and try to eliminate contact between hands and eyes, nose, and mouth.
  - Prepare Food Properly
    - Wash your hands immediately after handling raw meats or surfaces that have come in contact with raw meats such as cutting boards. Also, ensure food is cooked to the proper temperature and stored properly.
  - Avoid Contact with Wild Animals
    - Wild animals carry numerous infectious diseases. Avoid contacting them. If you are bitten, scratched, or rub against a wild animal, contact wildlife control or a physician immediately.
  - Get Flu Vaccinations
    - Pike recommends regular flu vaccinations making employees less susceptible to acquiring seasonal influenza.
  - Do Not Share Possibly Infected Surfaces with Others
    - Possibly infected surfaces could include food, utensils, towels, cigarettes, telephones, keyboards, and many others. This is especially true if the person with whom you are sharing may be sick. If these surfaces must be shared or are shared accidentally, wash your hands immediately.

1212 Regulatory Inspections

Any company such as Pike is subject to regulatory inspections from agencies such as OSHA. These inspections are typically conducted due to:

- Scheduled inspections.
- Employee complaints or concerns.
- Accident investigations.
- Special emphasis programs.

Pike employees frequently work on the side of roadways and other very public locations; conduct work associated with special emphasis programs such as excavations; and are considered construction workers. Be aware that Pike crews are subject to inspections and be familiar with the following procedures:

- Initially, it is the responsibility of the Foreman to represent the Company when a Compliance Officer arrives at a worksite to conduct an inspection. If a Foreman is temporarily away from the worksite, the crew members should advise the Compliance Officer that the Foreman is temporarily away and that the inspection should not begin until the Foreman returns. If the Foreman will be away for more than an hour, then whoever is temporarily in charge of the crew should speak on behalf of the Company and allow the inspection to begin. The Foreman or the person in charge should immediately advise the Corporate Safety Department and the Area Supervisor that an inspection is beginning.
- When a Compliance Officer arrives at the worksite to conduct an inspection, the Foreman should:
    - Treat the Compliance Officer cordially and in a professional, businesslike manner. First impressions are important and the Company is often judged by how the Foreman and crewmembers interact with the Compliance Officer.
    - Ask the Compliance Officer to show his or her credentials. If the Compliance Officer cannot produce credentials, do not consent to an inspection.
    - Get a copy of the Compliance Officer's business card or write down his or her name and telephone number.
    - Ask the Compliance Officer why this worksite was chosen for an inspection, what the purpose of the inspection is, what he or she intends to do that day, and how long he or she anticipates being on site.
    - If the inspection is being conducted as a result of a complaint, get a copy of the complaint. Limit the scope of the inspection to the complaint items, although a Compliance Officer is authorized to broaden the inspection to include anything else that is observed in plain view.
    - As soon as possible, notify the Company's Corporate Safety Director and Area Supervisor that a Compliance Officer is at the worksite to conduct an inspection.
    - Keep a list of every document that is requested. The Corporate Safety Department will be solely responsible for responding to all requests for documentation.
- Make sure that a Supervisor, Foreman, or an employee selected by the Foreman or Supervisor is with each Compliance Officer at all times that the Compliance Officer is at the worksite during the inspection. Take written notes of any pertinent comments or observations that the Compliance Officer makes and take photographs, videotape, or measurements of anything that the Compliance Officer photographs, videotapes, or measures. Remember that there is no such thing as off-the-record comments. Anything that is said during an inspection may be used as the basis for issuing a citation and/or for how the citation is characterized.
- The Company can elect to have someone present during any interview of a member of management. The term "management" does include Foremen and Supervisors. A designated member of management should always sit in on all management interviews. Agencies may interview hourly employees privately. Explain to all interviewees, both hourly and management, that they do not have to agree to have the interview either audiotaped or videotaped should that process make them uncomfortable. Also, they are not obligated to sign a statement that the Compliance Officer creates from the interview. If an employee elects to sign such a statement, the employee has a right to receive a copy of that statement and should get a copy at the conclusion of the interview.
- At the conclusion of each day's inspection, ask the Compliance Officer for an informal summary of his or her observations – primarily whether any apparent violations were observed – and ask what OSHA plans to do next. Report the status of the inspection to the Corporate Safety Department or your Supervisor.

1213 Safe Driving Policy

Purpose
This policy provides the guidelines to ensure safety to employees and the public when operating Pike motor vehicles.

Scope
This policy applies to Pike Gas Services employees subject to operating a Pike motor vehicle.

Procedure
During the annual Motor Vehicle Record (MVR) review or after a serious vehicle accident, Pike Gas Services will determine if the employee has committed or engaged in a Qualifying Event.

Qualifying Event
- Within the preceding 12 months, the company driver was convicted of driving 15 m.p.h. or more in excess of the posted speed limit or of speeding in a construction zone;
- Within the preceding 12 months, the company driver was convicted of driving under the influence of drugs or alcohol or the driver's license has been suspended for any reason;
- Within the preceding 12 months, the company driver was cited for violating hours of service regulations;
- Within the preceding 12 months, the company driver had 2 or more vehicle accidents or moving violations;
- Within the preceding 36 months, the driver had 3 or more vehicle accidents or moving violations;
- Within the preceding 12 months, the company driver was involved in a serious accident.

Serious Accident
The accident should be considered a "serious accident" when it meets the following criteria:
- A fatality;
- Bodily injury to a person who, as a result of the injury, immediately receives medical treatment away from the scene of the accident: or
- One or more motor vehicles incurring disabling damage as a result of the accident, requiring the motor vehicle(s) to be transported away from the scene by a tow truck or other motor vehicle.

Training

Drivers who meet the Qualifying Event criteria of this policy will be retrained. Training requirements consists of the following:
- Commentary Driving. Use the Pike Driver Commentary Driving Checklist form.
  - Training conducted by the employee's Foreman, General Foreman or Supervisor.
  - Must be completed within 30 days of notification.
  - Drivers not retrained within 30 days will be suspended from operating a company vehicle.
  - Send all completed paperwork to the Corporate Safety Department.

Protective & Marine Coatings

PIPECLAD® 2040
ABRASION-RESISTANT OVERCOAT

Revised: August 16, 2019

PRODUCT INFORMATION

PRODUCT DESCRIPTION

PIPECLAD 2040 Abrasion-Resistant Overcoat (ARO) is a dual layer powder system that provides an extremely robust protective coating to the outside of pipes. It is designed to be applied over fusion-bonded epoxy (FBE) coatings on the outside of pipes to provide optimum protection against corrosive elements and damage throughout storage, transit, construction and service of the pipeline, including during horizontal directional drilling.

PRODUCT CHARACTERISTICS

Color: Black or Brown

Moisture Content (CSA Z245.20 Section 12.4): <0.5%

Particle Size (CSA Z245.20 Section 12.5): Larger than 250 microns (10 mils) <0.2%
Larger than 150 microns (6 mils) <3.0%

Density (CSA Z245.20 Section 12.6): 1.83 ± 0.05

Recommended Coating Thickness:

Dry microns (mils) - **Minimum**	**Dry microns** (mils) - **Maximum**
254 (10)	**1,524** (60)

Other thicknesses may be used depending on application conditions and requirements. Contact your Sherwin-Williams representative for assistance.

Gel Times and Cure Times:

	Gel Time @ 204°C/400°F
Fast gel:	12 seconds ± 20%
Slow gel:	22 seconds ± 20%
	Cure Time @ 232°C/450°F
Fast gel:	45 seconds
Slow gel:	90 seconds

Shelf Life:	12 months if stored below 27°C (80°F).
Specific Gravity:	1.83 ± 0.05
Theoretical Coverage:	0.546 m^2/kg per mm (105 ft^2/lb per mil)
Operating Temperature Range:	-73°C (-100°F) to 110°C (230°F)
Quench Time:	Depends on pipe wall thickness, line speed and temperature.

PERFORMANCE CHARACTERISTICS

Test Name	Test Method		Results
Cathodic Disbondment	CSA Z245.20 Section 12.8	24 hours, -3.5V, 65°C	<1.0 mm avg.
		48 hours, -1.5V, 65°C	1.7 mm avg.
		28 days, -1.5V, 80°C	4.0 mm avg.
Dielectric Strength	ASTM D149, Breakdown Voltage		Typical Value >600V/mil
Flexibility	CSA Z245.20 Section 12.11, fixed mandrel bend, 0°C		<1.5° per pipe diameter length
Gouge Resistance	CSA Z245.20 Section 12.15, 50kg		5% at -30°C 11% at 50°C
Hot Water Resistance	CSA Z245.20 Section 12.14	24 hours, 75°C	1 Rating
		24 hours, 95°C	1 Rating
		48 hours, 75°C	1 Rating
		28 days, 75°C	1 Rating
		28 days, 95°C	1 Rating
Impact Resistance	CSA Z245.20 Section 12.12, 16 mm ball, 3.0J, -30°C		No holidays
Porosity	CSA Z245.20 Section 12.10, Cross Section		1 Rating
Volume Resistivity	ASTM D257, Through film, 500V		>1.0 x 10^{14} ohm-cm

continued on back

Protective & Marine Coatings

PIPECLAD® 2040
ABRASION-RESISTANT OVERCOAT

Revised: August 16, 2019

PRODUCT INFORMATION

ADDITIONAL INFORMATION

APPLICATION:
Factors such as plant capability, specifications, and pipe construction or characteristics can affect application conditions. Preheat substrate uniformly to 232-253°C (450-488°F). Apply corrosion coating by electrostatic spray or fluidized bed dipping. The ARO coating should be applied immediately after corrosion coating. Allow to cure by residual heat before quench, following the typical schedule.

SURFACE PREPARATION:
Remove all surface contamination before abrasive blasting. Blast clean using steel grit to SSPC SP-10-near-white metal with a minimum surface profile of 2 mils (50 microns).

STORAGE AND HANDLING:
Store below 27ºC (80ºF). Protect from temperatures above 33ºC (91ºF). If stored below the application room temperature, allow to warm to room temperature before opening. Refer to the safety data sheet for more information.

COATING REPAIR:
Damage less than 0.023 m^2 (36 in^2) - Repair using the Pipeclad 5000 patching system following the instructions on the data sheet. Pipeclad Patch Stick may be used if allowed by the pipe coating applicator and pipe owner.

DISCLAIMER

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Sherwin-Williams representative to obtain the most recent Product Data Information and Application Bulletin.

SAFETY PRECAUTIONS

Refer to the MSDS sheet before use.

Published technical data and instructions are subject to change without notice. Contact your Sherwin-Williams representative for additional technical data and instructions.

WARRANTY

The Sherwin-Williams Company warrants our products to be free of manufacturing defects in accord with applicable Sherwin-Williams quality control procedures. Liability for products proven defective, if any, is limited to replacement of the defective product or the refund of the purchase price paid for the defective product as determined by Sherwin-Williams. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY SHERWIN-WILLIAMS, EXPRESSED OR IMPLIED, STATUTORY, BY OPERATION OF LAW OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Scentinel® E Gas Odorant

Version 3.1 Revision Date 2020-03-09

According to Regulation (EC) No. 1907/2006, Regulation (EC) No. 2015/830

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

1.1

Product information

Product Name : Scentinel® E Gas Odorant
Material : 1123217, 1106808, 1086435, 1086434, 1095112, 1079767, 1064505, 1098464, 1098226, 1024677, 1024673, 1034741, 1024674, 1024676, 1024678, 1024780, 1024782, 1024781, 1024778, 1024783, 1036153, 1024779, 1024675, 1105014

EC-No.Registration number

Chemical name	CAS-No. EC-No. Index No.	Legal Entity Registration number
t-Butyl Mercaptan	75-66-1 200-890-2	Chevron Phillips Chemicals International NV 01-2119491288-26-0000
Isopropyl Mercaptan	75-33-2 200-861-4	Chevron Phillips Chemicals International NV 01-2119510881-44-0001
n-Propyl Mercaptan	107-03-9 203-455-5	Chevron Phillips Chemicals International NV 01-2120770275-52-0000

1.2

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

Relevant Identified Uses Supported : Manufacture
Distribution
Formulation
Use as an intermediate
Injection as odorant in fuels – industrial

1.3

Details of the supplier of the safety data sheet

Company : Chevron Phillips Chemical Company LP
Specialty Chemicals
10001 Six Pines Drive
The Woodlands, TX 77380

Local : Chevron Phillips Chemicals International N.V.

Airport Plaza (Stockholm Building)
Leonardo Da Vincilaan 19
1831 Diegem
Belgium

SDS Requests: (800) 852-5530
Technical Information: (832) 813-4862
Responsible Party: Product Safety Group
Email:sds@cpchem.com

1.4

Emergency telephone:

Health:
866.442.9628 (North America)
1.832.813.4984 (International)
Transport:
CHEMTREC 800.424.9300 or 703.527.3887(int'l)
Asia: CHEMWATCH (+612 9186 1132) China: 0532 8388 9090
EUROPE: BIG +32.14.584545 (phone) or +32.14583516 (telefax)
Mexico CHEMTREC 01-800-681-9531 (24 hours)
South America SOS-Cotec Inside Brazil: 0800.111.767 Outside Brazil: +55.19.3467.1600
Argentina: +(54)-1159839431

Responsible Department	:	Product Safety and Toxicology Group
E-mail address	:	SDS@CPChem.com
Website	:	www.CPChem.com

ODOR-FADE WARNING

A GAS LEAK CAN CAUSE A FIRE OR EXPLOSION RESULTING IN SERIOUS INJURY OR DEATH.

Be aware that the stenching chemical added to gas to make it detectable may not warn of a gas leak or the presence of propane or natural gas to all persons in every instance.

Instances where the odorant in an odorized gas may be undetectable include:

• Odor intensity may fade or be eliminated for a variety of chemical and physical causes, including the oxidation of rusting pipes, adsorption into or sticking onto the interior of pipes or appliances, or absorption into liquids.
• Contact with soil in underground leaks may de-odorize or remove odorant from the gas.
• Some people have a diminished ability, or inability to smell the stench. Factors that negatively affect a person's sense of smell include age, gender, medical conditions, and alcohol/tobacco usage.
• The stench of odorized gas may not awaken sleeping persons.
• Other odors may mask or hide the stench.
• Exposure to the odor for even a short period of time, may cause nasal fatigue, where a person can no longer smell the stench.

Gas detectors listed by the Underwriters Laboratories (UL) can be used as an extra measure of safety for detecting gas leaks, especially under conditions where the odorant alone may not provide an adequate warning. Gas detectors emit a loud, shrill sound when gas is present and do not depend on sense of smell. Because the odor intensity can fade or people may have problems with their sense of smell, we recommend installing, per manufacturer's instructions, one or more combustible gas detectors, in suitable locations to ensure adequate coverage to detect gas leaks.

Educate yourself, your employees, and your customers with the content of this warning and other important facts associated with the so-called "odor-fade phenomenon."

SECTION 2: Hazards identification

2.1

Classification of the substance or mixture
REGULATION (EC) No 1272/2008

Flammable liquids, Category 2	H225: Highly flammable liquid and vapor.
Skin sensitization, Sub-category 1B	H317: May cause an allergic skin reaction.
Short-term (acute) aquatic hazard, Category 1	H400: Very toxic to aquatic life.
Long-term (chronic) aquatic hazard, Category 2	H411: Toxic to aquatic life with long lasting effects.

2.2

Labeling (REGULATION (EC) No 1272/2008)

Hazard pictograms :

Signal Word : Danger

Hazard Statements :

H225	Highly flammable liquid and vapor.
H317	May cause an allergic skin reaction.
H400	Very toxic to aquatic life.
H411	Toxic to aquatic life with long lasting effects.

Precautionary Statements :

Prevention:

P210	Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P243	Take precautionary measures against static discharge.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response:

P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.

Storage:

P403 + P235	Store in a well-ventilated place. Keep cool.

Hazardous ingredients which must be listed on the label:
- 75-66-1 t-Butyl Mercaptan

Additional Labeling:

The following percentage of the mixture consists of ingredient(s) with unknown acute toxicity: 1 %
The following percentage of the mixture consists of ingredient(s) with unknown hazards to the aquatic environment: 1 %

SECTION 3: Composition/information on ingredients

3.1 - 3.2
Substance or Mixture

Synonyms : Mercaptan Mixture
Gas Odorant

Molecular formula : Mixture

Hazardous ingredients

Chemical name	CAS-No. EC-No. Index No.	Classification (REGULATION (EC) No 1272/2008)	Concentration [wt%]
t-Butyl Mercaptan	**75-66-1** **200-890-2**	Flam. Liq. 2; H225 Aquatic Acute 2; H401 Skin Sens. 1; H317 Aquatic Chronic 2; H411	75 - 80
Isopropyl Mercaptan	75-33-2 200-861-4	Flam. Liq. 2; H225 Skin Sens. 1B; H317 Aquatic Acute 1; H400 Aquatic Chronic 1; H410	13 - 18
n-Propyl Mercaptan	107-03-9 203-455-5	Flam. Liq. 2; H225 Acute Tox. 4; H302 Skin Sens. 1B; H317 Aquatic Acute 1; H400 Aquatic Chronic 1; H410	3 - 8

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

SECTION 4: First aid measures

4.1
Description of first-aid measures

General advice : Move out of dangerous area. Show this material safety data sheet to the doctor in attendance. Symptoms of poisoning may appear several hours later. Do not leave the victim unattended.

If inhaled : Move to fresh air. If unconscious, place in recovery position and seek medical advice. If symptoms persist, call a physician.

In case of skin contact : If skin irritation persists, call a physician. If on skin, rinse well with water. If on clothes, remove clothes.

In case of eye contact : Immediately flush eye(s) with plenty of water. Remove contact lenses. Protect unharmed eye. Keep eye wide open while rinsing. If eye irritation persists, consult a specialist.

If swallowed : Keep respiratory tract clear. Do NOT induce vomiting. Do not give milk or alcoholic beverages. Never give anything by mouth to an unconscious person. Take victim immediately to

hospital.

SECTION 5: Firefighting measures

Flash point	:	-18°C (0°F) estimated
Autoignition temperature	:	200°C (392°F)

5.1 Extinguishing media

Suitable extinguishing media	:	Dry chemical. Carbon dioxide (CO2). Alcohol-resistant foam.
Unsuitable extinguishing media	:	High volume water jet.

5.2 Special hazards arising from the substance or mixture

Specific hazards during fire fighting	:	Do not allow run-off from fire fighting to enter drains or water courses.

5.3 Advice for firefighters

Special protective equipment for fire-fighters	:	Wear self-contained breathing apparatus for firefighting if necessary.
Further information	:	Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations. For safety reasons in case of fire, cans should be stored separately in closed containments. Use a water spray to cool fully closed containers.
Fire and explosion protection	:	Do not spray on an open flame or any other incandescent material. Use only explosion-proof equipment. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapors). Keep away from open flames, hot surfaces and sources of ignition.
Hazardous decomposition products	:	Carbon oxides. Sulfur oxides.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions	:	Use personal protective equipment. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas.

6.2 Environmental precautions

Environmental precautions : Prevent product from entering drains. Prevent further leakage or spillage if safe to do so. If the product contaminates rivers and lakes or drains inform respective authorities.

6.3

Methods and materials for containment and cleaning up

Methods for cleaning up : Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

6.4

Reference to other sections

For additional details, see the Exposure Scenario in the Annex portion

SECTION 7: Handling and storage

7.1

Precautions for safe handling

Handling

Advice on safe handling : Avoid formation of aerosol. Do not breathe vapors/dust. Avoid exposure - obtain special instructions before use. Avoid contact with skin and eyes. For personal protection see section 8. Smoking, eating and drinking should be prohibited in the application area. Take precautionary measures against static discharges. Provide sufficient air exchange and/or exhaust in work rooms. Open drum carefully as content may be under pressure. Dispose of rinse water in accordance with local and national regulations. Persons susceptible to skin sensitization problems or asthma, allergies, chronic or recurrent respiratory disease should not be employed in any process in which this mixture is being used.

Advice on protection against fire and explosion : Do not spray on an open flame or any other incandescent material. Use only explosion-proof equipment. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapors). Keep away from open flames, hot surfaces and sources of ignition.

7.2

Conditions for safe storage, including any incompatibilities

Storage

Requirements for storage areas and containers : No smoking. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Observe label precautions. Electrical installations / working materials must comply with the technological safety standards.

SECTION 8: Exposure controls/personal protection

Chevron Phillips Chemical Company LP

Components	Basis	Value	Control parameters	Note
t-Butyl Mercaptan	Manufacturer	TWA	0,5 ppm,	

DNEL

Isopropyl Mercaptan	:	End Use: Workers Routes of exposure: Inhalation Potential health effects: Long-term systemic effects Value: 14,5 mg/m3 End Use: Workers Routes of exposure: Inhalation Potential health effects: Long-term local effects Value: 18,6 mg/m3 End Use: Workers Routes of exposure: Dermal Potential health effects: Long-term systemic effects Value: 2,1 mg/kg End Use: Workers Routes of exposure: Dermal Potential health effects: Acute local effects Value: 1,53 mg/cm2 End Use: Consumers Routes of exposure: Inhalation Potential health effects: Long-term systemic effects Value: 2,57 mg/m3 End Use: Consumers Routes of exposure: Inhalation Potential health effects: Long-term local effects Value: 3,3 mg/m3 End Use: Consumers Routes of exposure: Oral Potential health effects: Long-term systemic effects Value: 0,74 mg/kg
n-Propyl Mercaptan	:	End Use: Workers Routes of exposure: Inhalation Potential health effects: Long-term systemic effects Value: 14,5 mg/m3 End Use: Workers Routes of exposure: Inhalation Potential health effects: Long-term local effects Value: 18,6 mg/m3 End Use: Workers Routes of exposure: Dermal Potential health effects: Long-term systemic effects Value: 2,06 mg/kg End Use: Workers Routes of exposure: Dermal Potential health effects: Acute local effects Value: 1,53 mg/cm2 End Use: Consumers

Routes of exposure: Inhalation
Potential health effects: Long-term systemic effects
Value: 2,57 mg/m3

End Use: Consumers
Routes of exposure: Inhalation
Potential health effects: Long-term local effects
Value: 3,3 mg/m3

End Use: Consumers
Routes of exposure: Oral
Potential health effects: Long-term systemic effects
Value: 0,74 mg/kg

PNEC

Isopropyl Mercaptan : Fresh water
Value: 0 mg/l

Marine water
Value: 0 mg/l

Fresh water sediment
Value: 0,002 mg/kg

Marine sediment
Value: 0 mg/kg

Sewage treatment plant
Value: 8,805 mg/l

Soil
Value: 0 mg/kg

n-Propyl Mercaptan : Fresh water
Value: 0 mg/l

Marine water
Value: 0 mg/l

Fresh water sediment
Value: 0,001 mg/kg

Marine sediment
Value: 0 mg/kg

Sewage treatment plant
Value: 8,8 mg/l

Soil
Value: 0 mg/kg

8.2

Exposure controls
Engineering measures

Adequate ventilation to control airborned concentrations below the exposure guidelines/limits.

Consider the potential hazards of this material (see Section 2), applicable exposure limits, job activities, and other substances in the work place when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances.

Personal protective equipment

Respiratory protection	:	Wear a supplied-air NIOSH approved respirator unless ventilation or other engineering controls are adequate to maintain minimal oxygen content of 19.5% by volume under normal atmospheric pressure. Wear a NIOSH approved respirator that provides protection when working with this material if exposure to harmful levels of airborne material may occur, such as:. Air-Purifying Respirator for Organic Vapors. Use a positive pressure, air-supplying respirator if there is potential for uncontrolled release, exposure levels are not known, or other circumstances where air-purifying respirators may not provide adequate protection.
Hand protection	:	The suitability for a specific workplace should be discussed with the producers of the protective gloves. Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. Also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion, and the contact time. Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.
Eye protection	:	Eye wash bottle with pure water. Tightly fitting safety goggles.
Skin and body protection	:	Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place. Wear as appropriate:. Flame retardant antistatic protective clothing. Workers should wear antistatic footwear.
Hygiene measures	:	When using do not eat or drink. When using do not smoke. Wash hands before breaks and at the end of workday.

For additional details, see the Exposure Scenario in the Annex portion

SECTION 9: Physical and chemical properties

9.1

Information on basic physical and chemical properties

Appearance

Physical state	:	Liquid
Color	:	Clear
Odor	:	Repulsive

Safety data

Flash point	:	-18°C (0°F) estimated

Lower explosion limit	:	1,4 %(V)
Upper explosion limit	:	12,5 %(V)
Oxidizing properties	:	no
Autoignition temperature	:	200°C (392°F)
Thermal decomposition	:	No data available
Molecular formula	:	Mixture
Molecular weight	:	Not applicable
pH	:	Not applicable
Pour point	:	No data available
Boiling point/boiling range	:	57-60°C (135-140°F)
Vapor pressure	:	48,00 kPa at 38°C (100°F)
Relative density	:	0,81 at 16 °C (61 °F)
Water solubility	:	Negligible
Partition coefficient: n-octanol/water	:	No data available
Viscosity, kinematic	:	No data available
Relative vapor density	:	2 (Air = 1.0)
Evaporation rate	:	> 1 (N-Butyl Acetate = 1)
Percent volatile	:	> 99 %

SECTION 10: Stability and reactivity

10.2

Chemical stability : This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

10.3

Possibility of hazardous reactions

Hazardous reactions : Hazardous reactions: Hazardous polymerization does not occur.

Further information: No decomposition if stored and applied as directed.

Hazardous reactions: Vapors may form explosive mixture with air.

10.4
Conditions to avoid : Not applicable.

10.5
Materials to avoid : May react with oxygen and strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.

Thermal decomposition : No data available

10.6
Hazardous decomposition products : Carbon oxides
Sulfur oxides

Other data : No decomposition if stored and applied as directed.

SECTION 11: Toxicological information

11.1
Information on toxicological effects

Scentinel® E Gas Odorant
Acute oral toxicity : LD50: > 5.000 mg/kg
Method: Acute toxicity estimate

Acute inhalation toxicity

t-Butyl Mercaptan : LC50: 98,3 mg/l
Exposure time: 4 h
Species: Rat
Sex: male and female
Test atmosphere: vapor
Method: OECD Test Guideline 403

LC50: 81,9 mg/l
Exposure time: 4 h
Species: Rat
Sex: male
Test atmosphere: vapor
Method: OECD Test Guideline 403

LC50: 60,9 mg/l
Exposure time: 4 h
Species: Mouse
Sex: male
Test atmosphere: vapor
Method: OECD Test Guideline 403

Isopropyl Mercaptan LC50: > 32,24 mg/l
Exposure time: 4 h
Species: Rat

Sex: male and female
Test atmosphere: vapor
Method: OECD Test Guideline 403
Test substance: yes
An LC50/inhalation/4h/rat could not be determined because no mortality of rats was observed at the maximum achievable concentration.

n-Propyl Mercaptan

LC50: > 5,67 mg/l
Exposure time: 4 h
Species: Rat
Sex: male and female
Test atmosphere: vapor
Method: OECD Test Guideline 403
An LC50/inhalation/4h/rat could not be determined because no mortality of rats was observed at the maximum achievable concentration.

Acute dermal toxicity

Isopropyl Mercaptan : LD50: > 2.000 mg/kg
Species: Rat
Sex: male

n-Propyl Mercaptan

LD50: > 2.000 mg/kg
Species: Rabbit
Sex: male and female
Method: OECD Test Guideline 402

Scentinel® E Gas Odorant
Skin irritation : May cause skin irritation and/or dermatitis.

Scentinel® E Gas Odorant
Eye irritation : May cause irreversible eye damage.

Scentinel® E Gas Odorant
Sensitization : Causes sensitization.

Repeated dose toxicity

t-Butyl Mercaptan : Species: Rat, Male and female
Sex: Male and female
Application Route: Inhalation
Dose: 9, 97, 196 ppm
Exposure time: 13 wks
Number of exposures: 6 hrs/d, 5 d/wk
NOEL: > 196 ppm

	Species: Rat, Male and female Sex: Male and female Application Route: oral gavage Dose: 10, 50, 200 mg/kg bw/day Exposure time: 42-53 days Number of exposures: Daily NOEL: 50 mg/kg bw/day Lowest observable effect level: 200 mg/kg bw/day Method: OECD Guideline 422 Species: Rat, Male and female Sex: Male and female Application Route: Inhalation Dose: 25.1, 99.6, 403.4 ppm Exposure time: 13 wks Number of exposures: 6 hrs/d, 5 d/wk NOEL: 99.6 ppm Lowest observable effect level: 403.4 ppm Method: OECD Guideline 413 Target Organs: Liver, Kidney, Blood, Upper respiratory tract Information given is based on data obtained from similar substances.
Isopropyl Mercaptan	Species: Rat, male and female Sex: male and female Application Route: Inhalation Exposure time: 13 wks Number of exposures: 6hrs/d, 5 d/wk NOEL: 0,367 mg/l 99.6 ppm Lowest observable effect level: 1,488 mg/l 403.4 ppm Method: OECD Test Guideline 413 Target Organs: Liver, Kidney, Upper respiratory tract, Blood Information given is based on data obtained from similar substances. Species: Rat, male and female Sex: male and female Application Route: oral gavage Dose: 10, 50, 200 mg/kg bw/day Exposure time: 42-53 days Number of exposures: Daily NOEL: 50 mg/kg Lowest observable effect level: 200 mg/kg Method: OECD Guideline 422 Target Organs: Liver, Blood Information given is based on data obtained from similar substances. Species: Rat, male and female Sex: male and female Application Route: Inhalation Exposure time: 13 wks Number of exposures: 6hrs/d, 5 d/wk NOEL: >= 196 ppm Method: OECD Test Guideline 413 Target Organs: Kidney, Upper respiratory tract, Blood Information given is based on data obtained from similar substances.
n-Propyl Mercaptan	Species: Rat, male and female

Sex: male and female
Application Route: Inhalation
Dose: 9, 97, 196 ppm
Exposure time: 13 wks
Number of exposures: 6 hrs/d, 5 d/wk
NOEL: 196 ppm
Method: OECD Test Guideline 413
Information given is based on data obtained from similar substances.

Genotoxicity in vitro

t-Butyl Mercaptan : Test Type: Mouse lymphoma assay
Metabolic activation: with and without metabolic activation
Result: negative

Test Type: Sister Chromatid Exchange Assay
Metabolic activation: with and without metabolic activation
Result: negative

Test Type: Ames test
Metabolic activation: with and without metabolic activation
Result: negative

Isopropyl Mercaptan Test Type: reverse mutation assay
Test system: Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative

Test Type: Mouse lymphoma assay
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 490
Result: negative

Test Type: Micronucleus test
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 487
Result: negative

n-Propyl Mercaptan Test Type: Ames test
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative

Test Type: Cytogenetic assay
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 473
Result: negative

Test Type: Mouse lymphoma assay
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476
Result: negative
Remarks: Information given is based on data obtained from similar substances.

Genotoxicity in vivo

t-Butyl Mercaptan : Test Type: Mouse micronucleus assay
Species: Mouse
Dose: 1250, 2500, 5000 mg/kg
Method: Mutagenicity (micronucleus test)
Result: negative

Reproductive toxicity

t-Butyl Mercaptan : Species: Rat
Sex: male and female
Application Route: oral gavage
Dose: 10, 50, 200 mg/kg bw/day
Number of exposures: Daily
Test period: 42 -53 days
Method: OECD Guideline 422
NOAEL Parent: 200 mg/kg bw/day
NOAEL F1: 50 mg/kg bw/day
No adverse effects expected

Isopropyl Mercaptan Species: Rat
Sex: male and female
Application Route: oral gavage
Dose: 10, 50, 200 mg/kg/bw
Exposure time: 42 d
Number of exposures: Daily
Method: OECD Guideline 422
NOAEL Parent: >= 200 mg/kg
NOAEL F1: 50 mg/kg
Information given is based on data obtained from similar substances.
No adverse effects expected

Developmental Toxicity

t-Butyl Mercaptan : Species: Mouse
Application Route: Inhalation
Dose: 11, 99, 195 ppm
Exposure time: GD 6-16
Number of exposures: 6 hrs/d
NOAEL Teratogenicity: > = 195 ppm
NOAEL Maternal: > = 195 ppm

Species: Rat
Application Route: Inhalation
Dose: 11, 99, 195 ppm
Exposure time: GD6-19
Number of exposures: 6 hrs/d
NOAEL Teratogenicity: > =195 ppm
NOAEL Maternal: > = 195 ppm

Species: Rat
Application Route: oral gavage
Dose: 10, 50, 200 mg/kg bw/day
Exposure time: 42-53 days
Number of exposures: Daily
NOAEL Teratogenicity: 50 mg/kg bw /day
NOAEL Maternal: 200 mg/kg bw /day

Isopropyl Mercaptan Species: Rat

Application Route: Inhalation
Dose: 11, 99, 195 ppm
Exposure time: 6h/d
Test period: GD 9 - 19
Method: OECD Guideline 414
NOAEL Teratogenicity: >= 195 ppm
NOAEL Maternal: >= 195 ppm
Information given is based on data obtained from similar substances.

Species: Mouse
Application Route: Inhalation
Dose: 11, 99, 195 ppm
Exposure time: 6h/d
Test period: GD 9 - 19
Method: OECD Guideline 414
NOAEL Teratogenicity: >= 195 ppm
NOAEL Maternal: >= 195 ppm
Information given is based on data obtained from similar substances.

Scentinel® E Gas Odorant
Aspiration toxicity : May be harmful if swallowed and enters airways.
Substances known to cause human aspiration toxicity hazards or to be regarded as if they cause human aspiration toxicity hazard.

CMR effects

t-Butyl Mercaptan : Carcinogenicity: Not available
Mutagenicity: Did not show mutagenic effects in animal experiments.
Teratogenicity: Did not show teratogenic effects in animal experiments.
Reproductive toxicity: No toxicity to reproduction

Isopropyl Mercaptan Carcinogenicity: Not available
Mutagenicity: In vitro tests did not show mutagenic effects
Reproductive toxicity: No evidence of adverse effects on sexual function and fertility, or on development, based on animal experiments.

n-Propyl Mercaptan Carcinogenicity: Not available
Mutagenicity: In vitro tests did not show mutagenic effects
Reproductive toxicity: No evidence of adverse effects on sexual function and fertility, or on development, based on animal experiments., No toxicity to reproduction

Scentinel® E Gas Odorant
Further information : Concentrations substantially above the TLV value may cause narcotic effects. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
Solvents may degrease the skin.

SECTION 12: Ecological information

12.1

Toxicity

Toxicity to fish

t-Butyl Mercaptan	:	LC50: 34 mg/l Exposure time: 96 h Species: Oncorhynchus mykiss (rainbow trout) semi-static test Method: OECD Test Guideline 203
Isopropyl Mercaptan		LC50: 34 mg/l Exposure time: 96 h semi-static test Analytical monitoring: yes Method: OECD Test Guideline 203 Information given is based on data obtained from similar substances.
n-Propyl Mercaptan		LC50: 1,3 mg/l Exposure time: 96 h Species: Pimephales promelas (fathead minnow) semi-static test Analytical monitoring: yes Test substance: yes Method: OECD Test Guideline 203 Toxic to aquatic organisms.

Toxicity to daphnia and other aquatic invertebrates

t-Butyl Mercaptan	:	EC50: 6,7 mg/l Exposure time: 48 h Species: Daphnia magna (Water flea) static test Method: OECD Test Guideline 202
Isopropyl Mercaptan		EC50: 0,25 - 0,5 mg/l Exposure time: 48 h Species: Daphnia magna (Water flea) static test Test substance: yes Method: OECD Test Guideline 202
n-Propyl Mercaptan		EC50: 70 µg/l Exposure time: 48 h Species: Daphnia magna (Water flea) Analytical monitoring: yes Test substance: yes Method: OECD Test Guideline 202 Very toxic to aquatic organisms.

Toxicity to algae

t-Butyl Mercaptan	:	EC50: 24 mg/l Exposure time: 72 h Species: Pseudokirchneriella subcapitata (green algae) Method: OECD Test Guideline 201
Isopropyl Mercaptan		ErC50: 21,9 mg/l Exposure time: 72 h Species: Pseudokirchneriella subcapitata (green algae) static test Method: OECD Test Guideline 201
n-Propyl Mercaptan		ErC50: 3 mg/l

Exposure time: 72 h
Species: Pseudokirchneriella subcapitata (algae)
Growth inhibition Method: OECD Test Guideline 201
Information given is based on data obtained from similar substances.

M-Factor

propane-2-thiol	:	M-Factor (Acute Aquat. Tox.)	1
		M-Factor (Chron. Aquat. Tox.)	1

M-Factor

propane-1-thiol	M-Factor (Acute Aquat. Tox.)	10
	M-Factor (Chron. Aquat. Tox.)	10

Toxicity to bacteria

Isopropyl Mercaptan	:	EC50: 880,5 mg/l Exposure time: 3 h Respiration inhibition Method: OECD Test Guideline 209
n-Propyl Mercaptan		EC50: 880,5 mg/l Exposure time: 3 h Respiration inhibition Method: OECD Test Guideline 209 Information given is based on data obtained from similar substances.

12.2
Persistence and degradability

Biodegradability	:	Expected to be biodegradable

12.3
Bioaccumulative potential
Elimination information (persistence and degradability)

Bioaccumulation

t-Butyl Mercaptan	:	Bioconcentration factor (BCF): 12 Bioaccumulation is unlikely.
Isopropyl Mercaptan	:	This material is not expected to bioaccumulate.
n-Propyl Mercaptan	:	This material is not expected to bioaccumulate.

12.4
Mobility in soil

Mobility

t-Butyl Mercaptan	:	The product will be dispersed amongst the various environmental compartments (soil/ water/ air).

Isopropyl Mercaptan : Disperses rapidly in air.

n-Propyl Mercaptan : Disperses rapidly in air.

12.5

Results of PBT and vPvB assessment

Results of PBT assessment

t-Butyl Mercaptan : Non-classified PBT substance, Non-classified vPvB substance

Isopropyl Mercaptan : Non-classified PBT substance, Non-classified vPvB substance

n-Propyl Mercaptan : Non-classified PBT substance, Non-classified vPvB substance

12.6

Other adverse effects

Additional ecological information : An environmental hazard cannot be excluded in the event of unprofessional handling or disposal., Very toxic to aquatic life., Toxic to aquatic life with long lasting effects.

Ecotoxicology Assessment

Short-term (acute) aquatic hazard

t-Butyl Mercaptan : Toxic to aquatic life.

Isopropyl Mercaptan : Very toxic to aquatic life.

n-Propyl Mercaptan : Very toxic to aquatic life.

Long-term (chronic) aquatic hazard

t-Butyl Mercaptan : Toxic to aquatic life with long lasting effects.

Isopropyl Mercaptan : Very toxic to aquatic life with long lasting effects.

n-Propyl Mercaptan : Very toxic to aquatic life with long lasting effects.

SECTION 13: Disposal considerations

13.1

Waste treatment methods

The information in this SDS pertains only to the product as shipped.

Use material for its intended purpose or recycle if possible. This material, if it must be discarded, may meet the criteria of a hazardous waste as defined by US EPA under RCRA (40 CFR 261) or other State and local regulations. Measurement of certain physical properties and analysis for regulated components may be necessary to make a correct determination. If this material is classified as a hazardous waste, federal law requires disposal at a licensed hazardous waste disposal facility.

Product : The product should not be allowed to enter drains, water courses or the soil. Do not contaminate ponds, waterways or ditches with chemical or used container. Send to a licensed waste management company.

Contaminated packaging : Empty remaining contents. Dispose of as unused product. Do not re-use empty containers. Do not burn, or use a cutting torch on, the empty drum.

For additional details, see the Exposure Scenario in the Annex portion

SECTION 14: Transport information

14.1 - 14.7

Transport information

The shipping descriptions shown here are for bulk shipments only, and may not apply to shipments in non-bulk packages (see regulatory definition).

Consult the appropriate domestic or international mode-specific and quantity-specific Dangerous Goods Regulations for additional shipping description requirements (e.g., technical name or names, etc.) Therefore, the information shown here, may not always agree with the bill of lading shipping description for the material. Flashpoints for the material may vary slightly between the SDS and the bill of lading.

US DOT (UNITED STATES DEPARTMENT OF TRANSPORTATION)

UN3336, MERCAPTANS, LIQUID, FLAMMABLE, N.O.S., (TERTIARY BUTYL MERCAPTAN, ISOPROPYL MERCAPTAN), 3, II

IMO / IMDG (INTERNATIONAL MARITIME DANGEROUS GOODS)

UN3336, MERCAPTANS, LIQUID, FLAMMABLE, N.O.S., (TERTIARY BUTYL MERCAPTAN, ISOPROPYL MERCAPTAN), 3, II, (-18°C), MARINE POLLUTANT, (TERTIARY BUTYL MERCAPTAN, ISOPROPYL MERCAPTAN)

IATA (INTERNATIONAL AIR TRANSPORT ASSOCIATION)

UN3336, MERCAPTANS, LIQUID, FLAMMABLE, N.O.S., (TERTIARY BUTYL MERCAPTAN, ISOPROPYL MERCAPTAN), 3, II

ADR (AGREEMENT ON DANGEROUS GOODS BY ROAD (EUROPE))

UN3336, MERCAPTANS, LIQUID, FLAMMABLE, N.O.S., (TERTIARY BUTYL MERCAPTAN, ISOPROPYL MERCAPTAN), 3, II, (D/E), ENVIRONMENTALLY HAZARDOUS, (TERTIARY BUTYL MERCAPTAN, ISOPROPYL MERCAPTAN)

RID (REGULATIONS CONCERNING THE INTERNATIONAL TRANSPORT OF DANGEROUS GOODS (EUROPE))

UN3336, MERCAPTANS, LIQUID, FLAMMABLE, N.O.S., (TERTIARY BUTYL MERCAPTAN, ISOPROPYL MERCAPTAN), 3, II, ENVIRONMENTALLY HAZARDOUS, (TERTIARY BUTYL MERCAPTAN, ISOPROPYL MERCAPTAN)

ADN (EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY INLAND WATERWAYS)

UN3336, MERCAPTANS, LIQUID, FLAMMABLE, N.O.S., (TERTIARY BUTYL MERCAPTAN, ISOPROPYL MERCAPTAN), 3, II, ENVIRONMENTALLY HAZARDOUS

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

SECTION 15: Regulatory information

15.1

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

Commission Regulation (EU) 2015/830 of 28 May 2015 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

Water contaminating class (Germany) : WGK 3 highly water endangering

15.2

Chemical Safety Assessment

Components	:	2-methylpropane-2-thiol	A Chemical Safety Assessment has been carried out for this substance.	200-890-2

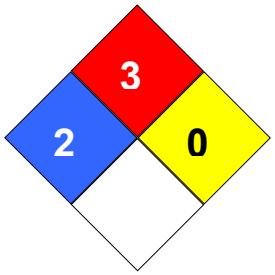
Major Accident Hazard Legislation : 96/82/EC Update: 2003
Highly flammable
7b
Quantity 1: 5.000 t
Quantity 2: 50.000 t

Notification status

Europe REACH	:	This mixture contains only ingredients which have been registered according to Regulation (EU) No. 1907/2006 (REACH).
Switzerland CH INV	:	On the inventory, or in compliance with the inventory
United States of America (USA) TSCA	:	On or in compliance with the active portion of the TSCA inventory
Canada DSL	:	All components of this product are on the Canadian DSL
Australia AICS	:	On the inventory, or in compliance with the inventory
New Zealand NZIoC	:	On the inventory, or in compliance with the inventory
Japan ENCS	:	On the inventory, or in compliance with the inventory
Korea KECI	:	A substance(s) in this product was not registered, notified to be registered, or exempted from registration by CPChem according to K-REACH regulations. Importation or manufacture of this product is still permitted provided the Korean Importer of Record has themselves notified the substance.
Philippines PICCS	:	On the inventory, or in compliance with the inventory
China IECSC	:	On the inventory, or in compliance with the inventory
Taiwan TCSI	:	On the inventory, or in compliance with the inventory

SECTION 16: Other information

NFPA Classification : Health Hazard: 2
Fire Hazard: 3
Reactivity Hazard: 0



Further information

Legacy SDS Number : 93850

Significant changes since the last version are highlighted in the margin. This version replaces all previous versions.

The information in this SDS pertains only to the product as shipped.

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.

Key or legend to abbreviations and acronyms used in the safety data sheet			
ACGIH	American Conference of Government Industrial Hygienists	LD50	Lethal Dose 50%
AICS	Australia, Inventory of Chemical Substances	LOAEL	Lowest Observed Adverse Effect Level
DSL	Canada, Domestic Substances List	NFPA	National Fire Protection Agency
NDSL	Canada, Non-Domestic Substances List	NIOSH	National Institute for Occupational Safety & Health
CNS	Central Nervous System	NTP	National Toxicology Program
CAS	Chemical Abstract Service	NZIoC	New Zealand Inventory of Chemicals
EC50	Effective Concentration	NOAEL	No Observable Adverse Effect Level
EC50	Effective Concentration 50%	NOEC	No Observed Effect Concentration
EGEST	EOSCA Generic Exposure Scenario Tool	OSHA	Occupational Safety & Health Administration
EOSCA	European Oilfield Specialty Chemicals Association	PEL	Permissible Exposure Limit
EINECS	European Inventory of Existing Chemical Substances	PICCS	Philippines Inventory of Commercial Chemical Substances
MAK	Germany Maximum Concentration Values	PRNT	Presumed Not Toxic
GHS	Globally Harmonized System	RCRA	Resource Conservation Recovery Act
>=	Greater Than or Equal To	STEL	Short-term Exposure Limit
IC50	Inhibition Concentration 50%	SARA	Superfund Amendments and Reauthorization Act.
IARC	International Agency for Research on Cancer	TLV	Threshold Limit Value
IECSC	Inventory of Existing Chemical Substances in China	TWA	Time Weighted Average
ENCS	Japan, Inventory of Existing and	TSCA	Toxic Substance Control Act

	New Chemical Substances		
KECI	Korea, Existing Chemical Inventory	UVCB	Unknown or Variable Composition, Complex Reaction Products, and Biological Materials
<=	Less Than or Equal To	WHMIS	Workplace Hazardous Materials Information System
LC50	Lethal Concentration 50%		

Full text of H-Statements referred to under sections 2 and 3.

H225	Highly flammable liquid and vapor.
H302	Harmful if swallowed.
H317	May cause an allergic skin reaction.
H400	Very toxic to aquatic life.
H401	Toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
H411	Toxic to aquatic life with long lasting effects.

Annex

1. Short title of Exposure Scenario: **Manufacture**

Main User Groups	:	**SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites
Sector of use	:	**SU3, SU8, SU9:** Industrial Manufacturing (all), Manufacture of bulk, large scale chemicals (including petroleum products), Manufacture of fine chemicals
Process category	:	**PROC1:** Use in closed process, no likelihood of exposure **PROC3:** Use in closed batch process (synthesis or formulation) **PROC8b:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities **PROC15:** Use as laboratory reagent
Environmental release category	:	**ERC1, ERC4:** Manufacture of substances, Industrial use of processing aids in processes and products, not becoming part of articles
Further information	:	Manufacture of the substance or use as a process chemical or extraction agent. Includes recycling/ recovery, material transfers, storage, maintenance and loading (including marine vessel/barge, road/rail car and bulk container), sampling and associated laboratory activities

2.1 Contributing scenario controlling environmental exposure for:ERC1, ERC4: Manufacture of substances, Industrial use of processing aids in processes and products, not becoming part of articles

Product characteristics

Viscosity, dynamic	:	1,6 mPa.s at 20 °C

Environment factors not influenced by risk management

Flow rate	:	18.000 m3/d
Dilution Factor (River)	:	10
Dilution Factor (Coastal Areas)	:	100

Other given operational conditions affecting environmental exposure

Number of emission days per year	:	365
Emission or Release Factor: Water	:	0 %
Emission or Release Factor: Soil	:	0,01 %
Remarks	:	Emission or Release Factor: Air : < 0.001 %

Technical conditions and measures / Organizational measures

Air	:	Treat air emission to provide the required removal efficiency of (%): (Effectiveness: > 99,9 %)
Remarks	:	Wastewater emission controls are not applicable as there is no direct release to wastewater.
Remarks	:	Prevent environmental discharge consistent with regulatory requirements.

Conditions and measures related to municipal sewage treatment plant

Flow rate of sewage treatment plant effluent : 2.000 m3/d

Remarks : Not applicable as there is no release to wastewater.

Conditions and measures related to external treatment of waste for disposal

Waste treatment : External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste

Recovery Methods : External recovery and recycling of waste should comply with applicable local and/or national regulations.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC3, PROC8b, PROC15: Use in closed process, no likelihood of exposure, Use in closed batch process (synthesis or formulation), Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities, Use as laboratory reagent

Organizational measures to prevent /limit releases, dispersion and exposure

Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374.

3. Exposure estimation and reference to its source

Environment

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value type	Level of Exposure	Risk characterization ratio
ERC1, ERC4	EUSES		Freshwater		0,413 ng/L	0,000062
			Marine water		0,0348 ng/L	0,000052
			Freshwater sediment		1,7 ng/kg	0,000146
			Marine sediment		0,143 ng/kg	0,000123
			Soil		0,514 ng/kg	0,000074

ERC1: Manufacture of substances

ERC4: Industrial use of processing aids in processes and products, not becoming part of articles

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

RMMs and OCs are described in adequate documentation at site level and efficiency is checked on a regular basis.When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted PNECs and the resulting risk characterization ratios are expected to be less than 1.

1. Short title of Exposure Scenario: **Distribution**

Main User Groups	:	**SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites
Sector of use	:	**SU3:** Industrial Manufacturing (all)
Process category	:	**PROC1:** Use in closed process, no likelihood of exposure **PROC2:** Use in closed, continuous process with occasional controlled exposure **PROC3:** Use in closed batch process (synthesis or formulation) **PROC4:** Use in batch and other process (synthesis) where opportunity for exposure arises **PROC8a:** Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities **PROC8b:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities **:** Transfer of substance or preparation into small containers (dedicated filling line, including weighing) **PROC15:** Use as laboratory reagent
Environmental release category	:	**ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7:** Manufacture of substances, Formulation of preparations, Formulation in materials, Industrial use of processing aids in processes and products, not becoming part of articles, Industrial use resulting in inclusion into or onto a matrix, Industrial use resulting in manufacture of another substance (use of intermediates), Industrial use of reactive processing aids, Industrial use of monomers for manufacture of thermoplastics, Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers, Industrial use of substances in closed systems
Further information	:	Loading (including marine vessel/barge, rail/road car and IBC loading) and repacking (including drums and small packs) of substance, including its sampling, storage, unloading distribution and associated laboratory activities.

2.1 Contributing scenario controlling environmental exposure for:ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7: Manufacture of substances, Formulation of preparations, Formulation in materials, Industrial use of processing aids in processes and products, not becoming part of articles, Industrial use resulting in inclusion into or onto a matrix, Industrial use resulting in manufacture of another substance (use of intermediates), Industrial use of reactive processing aids, Industrial use of monomers for manufacture of thermoplastics, Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers, Industrial use of substances in closed systems

Product characteristics

Viscosity, dynamic	:	1,6 mPa.s at 20 °C

Environment factors not influenced by risk management

Flow rate	:	18.000 m3/d
Dilution Factor (River)	:	10
Dilution Factor (Coastal Areas)	:	100

Other given operational conditions affecting environmental exposure

Number of emission days per year	:	300
Emission or Release Factor: Air	:	0,01 %
Emission or Release Factor: Water	:	0,001 %
Emission or Release Factor: Soil	:	0,001 %

Technical conditions and measures / Organizational measures

Air	:	Treat air emission to provide the required removal efficiency of (%): (Effectiveness: > 99,9 %)
Water	:	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): (Effectiveness: 99,9 %)
Remarks	:	Negligible wastewater emissions as process operates without water contact.

Conditions and measures related to municipal sewage treatment plant

Flow rate of sewage treatment plant effluent	:	2.000 m3/d
Remarks	:	Not applicable as there is no release to wastewater.

Conditions and measures related to external treatment of waste for disposal

Waste treatment	:	External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste

Recovery Methods	:	External recovery and recycling of waste should comply with applicable local and/or national regulations.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15: Use in closed process, no likelihood of exposure, Use in closed, continuous process with occasional controlled exposure, Use in closed batch process (synthesis or formulation), Use in batch and other process (synthesis) where opportunity for exposure arises, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities, Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing), Use as laboratory reagent

Organizational measures to prevent /limit releases, dispersion and exposure

Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374.

3. Exposure estimation and reference to its source

Environment

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value type	Level of Exposure	Risk characterization ratio

ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7	EUSES		Freshwater		0,107 µg/L	0,016
			Marine water		0,10 µg/L	0,149
			Freshwater sediment		0,44 µg/kg	0,0379
			Marine sediment		0,411 µg/kg	0,354
			Soil		1,63 µg/kg	0,236

ERC1: Manufacture of substances
ERC2: Formulation of preparations
ERC3: Formulation in materials
ERC4: Industrial use of processing aids in processes and products, not becoming part of articles
ERC5: Industrial use resulting in inclusion into or onto a matrix
ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)
ERC6b: Industrial use of reactive processing aids
ERC6c: Industrial use of monomers for manufacture of thermoplastics
ERC6d: Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers
ERC7: Industrial use of substances in closed systems

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

RMMs and OCs are described in adequate documentation at site level and efficiency is checked on a regular basis.When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted PNECs and the resulting risk characterization ratios are expected to be less than 1.

1. Short title of Exposure Scenario: **Formulation**

Main User Groups	:	**SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites
Sector of use	:	**SU3, SU 10:** Industrial Manufacturing (all), Formulation [mixing] of preparations and/ or re-packaging (excluding alloys)
Process category	:	**PROC1:** Use in closed process, no likelihood of exposure **PROC2:** Use in closed, continuous process with occasional controlled exposure **PROC3:** Use in closed batch process (synthesis or formulation) **PROC4:** Use in batch and other process (synthesis) where opportunity for exposure arises **:** PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) **PROC8a:** Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities **PROC8b:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities **:** Transfer of substance or preparation into small containers (dedicated filling line, including weighing) **PROC15:** Use as laboratory reagent
Environmental release category	:	**ERC2:** Formulation of preparations

Further information :

Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tabletting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities.

2.1 Contributing scenario controlling environmental exposure for:ERC2: Formulation of preparations

Product characteristics

Viscosity, dynamic : 1,6 mPa.s at 20 °C

Environment factors not influenced by risk management

Flow rate : 18.000 m3/d
Dilution Factor (River) : 10
Dilution Factor (Coastal Areas) : 100

Other given operational conditions affecting environmental exposure

Number of emission days per year : 365
Emission or Release Factor: Air : 0,25 %
Emission or Release Factor: Water : 0,001 %
Emission or Release Factor: Soil : 0,01 %

Technical conditions and measures / Organizational measures

Air : Treat air emission to provide the required removal efficiency of (%): (Effectiveness: > 99,8 %)
Water : Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): (Effectiveness: 99,9 %)
Remarks : Negligible wastewater emissions as process operates without water contact.

Conditions and measures related to municipal sewage treatment plant

Flow rate of sewage treatment plant effluent : 2.000 m3/d
Remarks : Not applicable as there is no release to wastewater.

Conditions and measures related to external treatment of waste for disposal

Waste treatment : External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste

Recovery Methods : External recovery and recycling of waste should comply with applicable local and/or national regulations.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC15: Use in closed process, no likelihood of exposure, Use in closed, continuous process with occasional controlled exposure, Use in closed batch process (synthesis or formulation), Use in batch and other process (synthesis) where opportunity for exposure arises, Mixing or blending in batch processes for formulation of mixtures and articles (multistage and/or significant contact) Industrial setting;, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities, Transfer of substance or

preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing), Use as laboratory reagent

Organizational measures to prevent /limit releases, dispersion and exposure
Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

3. Exposure estimation and reference to its source

Environment

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value type	Level of Exposure	Risk characterization ratio
ERC2	EUSES		Freshwater		0,0395 µg/L	0,00589
			Marine water		0,0367 µg/L	0,0548
			Freshwater sediment		0,162 µg/kg	0,0140
			Marine sediment		0,151 µg/kg	0,130
			Soil		1,71 µg/kg	0,248

ERC2: Formulation of preparations

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

RMMs and OCs are described in adequate documentation at site level and efficiency is checked on a regular basis.When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted PNECs and the resulting risk characterization ratios are expected to be less than 1.

1. Short title of Exposure Scenario: **Use as an intermediate**

Main User Groups	:	**SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites
Sector of use	:	**SU3, SU8, SU9:** Industrial Manufacturing (all), Manufacture of bulk, large scale chemicals (including petroleum products), Manufacture of fine chemicals
Process category	:	**PROC1:** Use in closed process, no likelihood of exposure **PROC2:** Use in closed, continuous process with occasional controlled exposure **PROC3:** Use in closed batch process (synthesis or formulation) **PROC4:** Use in batch and other process (synthesis) where opportunity for exposure arises **PROC8a:** Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities

		PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities **PROC15:** Use as laboratory reagent
Environmental release category	:	**ERC6a:** Industrial use resulting in manufacture of another substance (use of intermediates)
Further information	:	Use of substance as an intermediate (not related to Strictly Controlled Conditions). Includes recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container).

2.1 Contributing scenario controlling environmental exposure for:ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)

Product characteristics

Viscosity, dynamic	:	1,6 mPa.s at 20 °C

Environment factors not influenced by risk management

Flow rate	:	18.000 m3/d
Dilution Factor (River)	:	10
Dilution Factor (Coastal Areas)	:	100

Other given operational conditions affecting environmental exposure

Number of emission days per year	:	300
Emission or Release Factor: Air	:	0,5 %
Emission or Release Factor: Water	:	1,0 %
Emission or Release Factor: Soil	:	0,1 %

Technical conditions and measures / Organizational measures

Air	:	Treat air emission to provide the required removal efficiency of (%): (Effectiveness: > 99,5 %)
Water	:	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): (Effectiveness: 99 %)
Remarks	:	Negligible wastewater emissions as process operates without water contact.

Conditions and measures related to municipal sewage treatment plant

Flow rate of sewage treatment plant effluent	:	2.000 m3/d
Remarks	:	Not applicable as there is no release to wastewater.

Conditions and measures related to external treatment of waste for disposal

Waste treatment	:	External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste

Recovery Methods	:	External recovery and recycling of waste should comply with applicable local and/or national regulations.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15: Use in closed process, no likelihood of exposure,

Use in closed, continuous process with occasional controlled exposure, Use in closed batch process (synthesis or formulation), Use in batch and other process (synthesis) where opportunity for exposure arises, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities, Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities, Use as laboratory reagent

Organizational measures to prevent /limit releases, dispersion and exposure

Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374.

3. Exposure estimation and reference to its source

Environment

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value type	Level of Exposure	Risk characterization ratio
ERC6a	EUSES		Freshwater		0,178 µg/L	0,0266
			Marine water		0,167 µg/L	0,249
			Freshwater sediment		0,732 µg/kg	0,0631
			Marine water		0,685 µg/kg	0,590
			Soil		2,52 µg/kg	0,364

ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

RMMs and OCs are described in adequate documentation at site level and efficiency is checked on a regular basis.When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted PNECs and the resulting risk characterization ratios are expected to be less than 1.

1. Short title of Exposure Scenario: **Injection as odorant in fuels – industrial**

Main User Groups	:	**SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites
Sector of use	:	**SU3:** Industrial Manufacturing (all)
Process category	:	**PROC1:** Use in closed process, no likelihood of exposure **PROC2:** Use in closed, continuous process with occasional controlled exposure **PROC3:** Use in closed batch process (synthesis or formulation) **PROC8a:** Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities **PROC8b:** Transfer of substance or preparation (charging/

		discharging) from/ to vessels/ large containers at dedicated facilities **PROC15:** Use as laboratory reagent
Environmental release category	:	**ERC7:** Industrial use of substances in closed systems
Further information	:	Covers injection as odourant in fuel and includes activities associated with its transfer, use, equipment maintenance and handling of waste.

2.1 Contributing scenario controlling environmental exposure for:ERC7: Industrial use of substances in closed systems

Product characteristics

Viscosity, dynamic	:	1,6 mPa.s at 20 °C

Environment factors not influenced by risk management

Flow rate	:	18.000 m3/d
Dilution Factor (River)	:	10
Dilution Factor (Coastal Areas)	:	100

Other given operational conditions affecting environmental exposure

Number of emission days per year	:	365
Emission or Release Factor: Air	:	0,25 %
Emission or Release Factor: Water	:	0,001 %
Emission or Release Factor: Soil	:	0 %

Technical conditions and measures / Organizational measures

Air	:	Treat air emission to provide the required removal efficiency of (%): (Effectiveness: > 99,8 %)
Water	:	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): (Effectiveness: 99,9 %)
Remarks	:	Soil emission controls are not applicable as there is no direct release to soil.
Remarks	:	Negligible wastewater emissions as process operates without water contact.
Remarks	:	Wastewater emissions generated from equipment cleaning with water.

Conditions and measures related to municipal sewage treatment plant

Flow rate of sewage treatment plant effluent	:	2.000 m3/d
Remarks	:	Not applicable as there is no release to wastewater.

Conditions and measures related to external treatment of waste for disposal

Waste treatment	:	External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste

Recovery Methods	:	External recovery and recycling of waste should comply with applicable local and/or national regulations.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC15: Use in closed process, no likelihood of exposure, Use in

closed, continuous process with occasional controlled exposure, Use in closed batch process (synthesis or formulation), Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities, Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities, Use as laboratory reagent

Organizational measures to prevent /limit releases, dispersion and exposure

Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374.

3. Exposure estimation and reference to its source

Environment

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value type	Level of Exposure	Risk characterization ratio
ERC7	EUSES		Freshwater		0,0324 µg/L	0,00484
			Marine water		0,0301 µg/L	0,0449
			Marine sediment		0,124 µg/kg	0,107
			Freshwater sediment		0,133 µg/kg	0,0115
			Soil		1,61 µg/kg	0,233

ERC7: Industrial use of substances in closed systems

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

RMMs and OCs are described in adequate documentation at site level and efficiency is checked on a regular basis.When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted PNECs and the resulting risk characterization ratios are expected to be less than 1.