AERIAL LIFTS

Purpose

The purpose of this program is to define the requirements for safely operating an aerial lift device owned, leased or operated by a Arrow S Energy Operating Employee.

Scope

This policy shall cover all aerial lift devices used by Arrow S Energy Operating (the company) employees. When work is performed by a contractor on a company site, the contractor's program shall take precedence. However, this program may be adopted for use by contractors who do not have a formal aerial lifts Program.

Key Responsibilities

Supervisors

- Shall ensure that all aerial devices are properly operated by trained personnel.
- Shall ensure that aerial lift devices are designed and constructed in conformance with applicable requirements of the American National Standards for "Vehicle Mounted Elevating and Rotating Work Platforms" ANSI A92.2-1969, including appendix.

Employees

- Shall follow all aspects of this program.
- Shall inspect aerial lifts prior to use
- Shall operate aerial lifts as prescribed by the manufacturer

Procedure

- Aerial lifts may be "field modified" for uses other than those intended by the manufacturer provided the modification has been certified in writing by the manufacturer or by an equivalent entity.
- Lift controls shall be tested each day prior to use to determine that such controls are in safe working conditions. Tests shall be made at the beginning of each shift during which the equipment is to be used to determine that the brakes and operating systems are in proper working condition.
- Only authorized persons shall operate an aerial lift and boom and basket according to the load limits specified by the manufacturer.
- Aerial lifts shall have a working back-up alarm audible above the surrounding noise level, or the vehicle is backed up only when an observer (spotter) signals that it is safe to do so.
- The minimum clearance between electrical lines and any part of the aerial lift equipment shall be 10 feet for lines rated 50 kV or below.
- Fall restraint PPE shall be worn as per the aerial lift manufacturer recommendation.
- All employees who operate an aerial lift device shall be trained in the safe operation of the specific device they will operate.

BENZENE AWARENESS

Purpose

The purpose of this program is to define work practices, administrative procedures and engineering controls to protect employees exposed to benzene concentrations above the OSHA action level. This plan shall be implemented and kept current by the HSE Director as required to reflect the most recent exposure monitoring data.

Scope

This program covers all employees who may be exposed to benzene while performing duties for the company. When work is performed by a contractor on a company site, the contractor's program shall take precedence. However, this program may be adopted for use by contractors who do not have a formal Benzene Awareness Program.
Although benzene exposure during routine activity in production and storage areas is well below the PEL, the cleaning of tanks and performing maintenance work in contaminated areas does have a potential for higher then average Benzene levels.

Definitions

- **Action Level-** means an airborne concentration of benzene of 0.5 ppm calculated as an 8-hour time-weighted average.
- **Benzene-** a toxic, colorless liquid or gaseous material. Benzene has an aromatic odor, is not soluble in water and is flammable.
- **Employee exposure-** exposure to airborne benzene that would occur if the employee were not using respiratory protective equipment.
- **Health Effects-** Short-term overexposure may cause irritation of eyes, nose and skin; breathlessness, irritability, euphoria, headache, dizziness or nausea. Long term effects may result in blood disorders such as leukemia and anemia.

Key Responsibilities

Site Supervisor or Designee

- Ensure personnel are aware of work that has the potential of exposure to benzene.
- Ensure individuals responsible for monitoring areas of exposure are properly trained.
- Ensure personnel receive documented medical surveillance exams when required.
- Ensure that emergency exams are performed if an overexposure or suspected overexposure occurs.

Supervisors

- Ensure employees have the appropriate personal protective equipment (PPE) and are properly trained in its use and care.
- Ensure employees comply with the benzene control program.

Safety Director or Designee

- In coordination with the site supervisor, develop and implement project/task specific benzene control procedures prior to the start of activities that may include exposure to benzene.

- Coordinate monitoring activities, ensuring monitoring equipment is in proper working order and, as necessary, modifying the benzene control procedures to reflect exposure monitoring data.
- Maintain the benzene control program, notify management of any regulatory changes and ensure compliance with regulatory and program requirements.
- Coordinate training activities.
- Coordinate the medical surveillance program, including maintenance of medical records and administration of exams.
- Ensure fire extinguishers shall always be readily available where benzene is used/stored. Benzene liquid is highly flammable, and vapors may form explosive mixtures in air. Fire extinguishers must be readily available in areas where benzene is used or stored.

Employees

- Comply with the benzene control program.
- Comply with the medical surveillance program and attend examinations as/if required.
- Maintain respiratory protection equipment in good working order and notify the supervisor or safety advisor of any problems prior to starting work.
- Review safety data sheets or consult with the supervisor to identify any container with benzene containing material.
- Report exposures resulting in any symptoms immediately.

Procedure

Permissible Exposure Limits

The time-weighted average limit (TWA) for benzene is:

- 8-hour TWA 1 ppm
- 12-hour TWA 0.67 ppm

The short-term exposure limit (STEL) for benzene is 5 ppm.

Regulated Areas

- Arrow S Energy Operating shall establish regulated areas wherever airborne concentration of benzene exceeds or can reasonably be expected to exceed the PEL or STEL.
- Arrow S Energy Operating will control access to regulated areas and limit access to authorized personnel.
- Smoking is prohibited in areas where benzene is used or stored. The following signage shall be posted in all regulated areas when the potential exists for benzene vapors to be more than the PEL:

DANGER – BENZENE REGULATED AREA - CANCER CAUSING AGENT - FLAMMABLE - NO SMOKING - AUTHORIZED PERSONNEL ONLY – RESPRITORY PROTECTION REQUIRED

Methods of Compliance

- The benzene control program shall be written and implemented to comply with OSHA regulation 29 CFR 1910.1028 (Benzene).

- This written program is intended to reduce employee exposure to or below the PEL primarily by means of engineering and work practice controls to ensure compliance with the benzene control program and federal and state requirements.

Exposure Monitoring

Exposure monitoring shall be performed for the 8-hour and 12-hour TWAs or for the 15-minute STEL exposure when:

- Regulated areas are established.
- An emergency occurs that could require a regulated area.
- A change in the production, process, control equipment, personnel or work practices may result in new or additional exposure to benzene.
- Cleanup of a spill, leak repair, or rupture occurs.
- If the monitoring required reveals employee exposure at or above the action level but at or below the TWA, Arrow S Energy Operating shall repeat the monitoring for each employee at least every year.
- If the initial monitoring reveals employee exposure to be below the action level Arrow S Energy Operating may discontinue the monitoring.
- If the monitoring reveals that employee exposures, as indicated by at least two consecutive measurements taken at least 7 days apart, are below the action level Arrow S Energy Operating may discontinue to monitor.
- Direct reading detection instruments (Drager CMS is recommended) will be used where benzene vapors are expected to be present at levels above the PEL.

Medical Surveillance

- Arrow S Energy Operating shall make available a medical surveillance program for employees who are or may be exposed to benzene at or above the action level 30 or more days per year; for employees who are or may be exposed to benzene at or above the PELs 10 or more days per year; for employees who have been exposed to more than 10 ppm of benzene for 30 or more days in a year prior to the effective date of the standard when employed by their current employer.
- Notification of monitoring results shall be provided to employees in writing within 15 working days of receipt of results.

Personal Protective Equipment

- PPE will be selected based on its ability to prevent absorption, inhalation and ingestion.
- PPE will reflect the needs of the employee based on work conditions, amount and duration of exposure and other known environmental factors but shall contain as a minimum; boots, proper eye protection, gloves, sleeves, aprons and others as determined.
- PPE shall be provided and worn when appropriate to prevent eye contact and limit dermal exposure to liquid benzene. PPE must meet the requirements of 29 CFR 1910.133 and be provided at no cost to the employee(s).

Respiratory Protection

- A respiratory protection program shall be established in accordance with 29 CFR 1910.134. Respiratory protection is required:
    - During the time necessary to implement engineering controls or work practices.

- When engineering and work practices are not feasible.
- In emergencies.

Approved respirators shall be selected according to airborne concentrations of benzene or condition of use.

- 0 to 0.67 ppm – no respirator required.
- 0.67 to 6.7 ppm – half-mask respirator with OV cartridges.
- 6.7 to 33 ppm – full-face respirator with OV cartridges.
- Greater than 33 ppm – No Arrow S Energy Operating employee shall enter a space containing more than 33 ppm. A contractor trained to perform work in areas of high Benzene concentrations shall be utilized in such cases.

Recordkeeping

- Medical surveillance records shall be maintained for 30 years after termination of employment.
- Exposure and medical monitoring records shall be made available to affected employees or their representatives and to OSHA upon request.

Communication of Benzene Hazards

- Signs and labels shall be posted at entrances of regulated areas
- The benzene control program shall be updated by the Arrow S Energy Operating safety director
- Project site specific safety plans and emergency action plans shall be updated by the safety advisor and made available to project staff prior to beginning work at high benzene concentration sites.

BLOODBORNE PATHOGENS

Purpose

Arrow S Energy Operating is committed to providing a safe and healthful work environment for our employees and through this plan we eliminate or minimize the possibility of infection.

Scope

This program addresses the minimum federal requirements of all occupational exposure to blood or other potentially infectious materials (examples of potentially infectious materials include bodily fluids containing hepatitis B, HIV, etc.). This program applies to all locations where the potential for exposure to bloodborne pathogens exists and for full-time, part-time, contract, temporary and per diem employees. When work is performed by a contractor on a company site, the contractor's program shall take precedence. However, this program may be adopted for use by contractors who do not have a formal Bloodborne Pathogen Exposure Control Plan.

Key Responsibilities

Exposure Control Officer (HSE Director)
Has overall responsibility for developing and implementing the Exposure Control Procedure for all facilities.

Site Project Manager and Supervisors
Site project manager and supervisors are responsible for exposure control in their respective areas.

Employees

- Know what tasks they perform that have occupational exposure.
- Plan and conduct all operations in accordance with regulatory requirements.
- Develop good personal hygiene habits.

Procedure

Training
Training shall be provided at the time of initial assignment to tasks where occupational exposure may take place, and at least annually thereafter. Annual training for all employees shall be provided within one year of their previous training. Training shall include:

- What bloodborne pathogens are; how to protect themselves from exposure
- Methods of warnings (signs, labels, etc.)
- The OSHA requirements of bloodborne pathogens
- The Hepatitis B vaccine shall be made available to all employees that have occupational exposure at no cost to the employee(s).
- The HSE Director shall be trained in Health Insurance Portability and Accountability Act HIPAA requirements upon assignment of the director position.

Biohazard Label

Training records shall be maintained for 3 years from the date on which the training occurred and shall include at least the following:

- Outline of training program contents.

- Name of person conducting the training.
- Names and job titles of all persons attending the training.
- Date of training.

Availability of Procedure to Employees
All employees will have access to a copy of the exposure control plan located at Arrow S Energy Operating Office

Reviews and Update of the Procedure
The procedure is reviewed annually and updated whenever we establish new functional positions within our operations that may involve exposure to biohazards and/or as federal or state regulations change.

Exposure Determination

- There are no job classifications in which some or all employees have occupational exposure to bloodborne pathogens that may result from the performance of their routine duties.
- All Arrow S Energy Operating employees work in the Denver office within a three to four minute radius of prompt medical attention and so there are no company designated employees who are trained to render first aid and basic life support. Some employees may have current first aid training and so rendering first aid or basic life support in the event of an injury does provide the possibility of exposure to employees to bloodborne pathogens. In such a case those individuals will be required to adhere to this program.
- All minor first aid injuries occurring within company operations or on company time require self-rendered first aid. No employee is allowed to render first aid to a minor injury of another employee where bloodborne pathogens could be transferred.
- In addition, no medical sharps or similar equipment is provided to, or used by, employees rendering first aid or basic life support.
- This exposure determination has been made without regards to the Personal Protective Equipment that may be used by employees.

Methods of Compliance

Universal Precautions
When differential between body fluids is difficult or impossible, all body fluids will be considered potentially infectious.

Work Practice Controls

- Personal hygiene and sharps practices controls shall be used to eliminate or minimize exposure of bloodborne or body fluid transfer to other workers.
- Containers for contaminated reusable sharps are not provided by the company at any work site or company controlled or owned property.
- Workers who utilize sharps for personal reasons are expected to dispose of such sharps materials in accordance with all applicable laws.
- First aid stations must be stocked with medical grade disposable gloves.
- Following any contact of body areas with blood or any other infectious materials, employees wash their hands and any other exposed skin with soap and water as soon as possible.

- Hand washing facilities shall be available. If hand washing facilities are not feasible Arrow S Energy Operating will provide either an appropriate antiseptic hand cleanser in conjunction with cloth/paper towels or antiseptic towelettes.
- Food and drink are not kept in refrigerators, freezers, on countertops or in other storage areas where potentially infectious materials are present.
- All equipment or environmental surfaces shall be cleaned and decontaminated after contact with blood or other infectious materials.
- Bloodborne pathogens kits are located in company offices and are to be used only in emergency situations by the trained caregiver. Once the seal is broken on kit and any portion has been used it is not to be reused. Bloodborne Pathogen Kits shall be ordered and replaced promptly.
- Biohazard bags are identified by stickers and located in the first aid area.

Personal Protective Equipment (PPE)

Company employees shall adhere to the following practices when using their personal protective equipment:

- When the possibility of occupational exposure is present, PPE such as gloves, gowns, etc. is to be provided at no cost to the employees.
- All PPE shall be of the proper size and readily accessible.
- Any garments penetrated by blood or other infectious materials must be removed and disposed of immediately.
- All potentially contaminated personal protective equipment must be removed prior to leaving a work area.
- Gloves must be worn whenever employees anticipate hand contact with potentially infectious materials or when handling or touching contaminated items or surfaces.
- Disposable gloves must be replaced as soon as practical after contamination or if they are torn, punctured or otherwise lose their ability to function as an "exposure barrier".
- Any PPE exposed to bloodborne pathogens shall be disposed of properly.
- PPE should be cleaned, laundered & properly disposed of if contaminated.
- Arrow S Energy Operating will repair and replace PPE as needed to maintain its effectiveness.

Housekeeping

Our staff employs the following practices:

- All equipment and surfaces are cleaned and decontaminated after contact with blood or other potentially infectious materials.
- Protective coverings (such as plastic trash bags or wrap, aluminum foil or absorbent paper) are removed and replaced.
- All trash containers, pails, bins, and other receptacles intended for use routinely are inspected, cleaned and decontaminated as soon as possible if visibly contaminated.
- Potentially contaminated broken glassware is picked up using mechanical means (such as dustpan and brush, tongs, forceps, etc.).

Cleaning Up of Infectious Substance

The following is the protocol for trained individuals to clean up blood spills in the workplace:

- Block off the area so no other people come into contact with the spill.
- Put on gloves and other PPE.
- Wipe up as much of the spill as possible with absorbent towels. Always work from the outside of the spill and move inward to avoid any spread.
- Pour a 10% bleach mixture (1 part bleach to 9 parts water) over the entire affected area.
- Let the bleach sit for 20 minutes.
- Use fresh paper towels to wipe up all of the bleach and remaining spill.
- If there are any sharp objects that need to be picked up, don't use your hands. Use a broom and dustpan to safely remove anything that could cut your skin.
- Disposable clean-up materials including all PPE should go into a sealed container or plastic bag labeled as biohazard to warn anyone who comes into contact with the bag that it contains human waste that could be hazardous or harmful. Double-bag if necessary.
- Dispose of infectious waste in compliance with the local department of health guidelines.
- When you are finished, thoroughly wash hands with soap and water.
- Exposure incidents shall be reported to the Arrow S Energy Operating safety advisor and documented in the company incident notification system.

Post-Exposure and Follow Up

Post-Exposure Evaluation & Follow-Up

In the event of an incident where exposure to bloodborne pathogens occurs, there will be an investigation of the circumstances surrounding the exposure incident and making sure that our employees receive medical consultation and immediate treatment.

The Arrow S Energy Operating HSE Director will prepare a documented investigation of any bloodborne pathogens exposure to prevent similar incidents from occurring in the future. The company will provide an exposed employee with the following confidential information:

- Documentation regarding the routes of exposure and circumstances under which the exposure incident occurred.
- Identification of the source individual (unless not feasible or prohibited by law).

Once these procedures have been completed, an appointment is arranged for the exposed employee with a qualified healthcare professional to discuss the employee's medical status. This includes an evaluation of any reported illnesses, as well as any recommended treatment.

Information Provided to the Healthcare Professional

- A copy of the Biohazards Standard.
- A description of the exposure incident.

Healthcare Professional's Written Opinion

After the consultation, the healthcare professional provides our facility with a written opinion evaluating the exposed employee's situation. We, in turn, furnish a copy of this opinion to the exposed employee. The written opinion will contain only the following information:

- Whether Hepatitis B Vaccination is indicated for the employee.
- Whether the employee has received the Hepatitis B Vaccination.
- Confirmation that the employee has been informed of the results of the evaluation.
- Confirmation that the employee has been told about any medical conditions resulting from the exposure incident which require further evaluation or treatment.
- All other findings or diagnoses will remain confidential and will not be included in the written report.

Recordkeeping

Accurate medical records for each employee with occupational exposure must be maintained for the term of employment plus 30 years and shall include at least the following:

- Employee's name, Social Security number and Arrow S Energy Operating employee number if applicable.
- Employee's Hepatitis B vaccination status, including vaccination dates.
- All results from examinations, medical testing and follow-up procedures, including all health care professional's written opinions.
- Information provided to the health care professional.
- Any Hepatitis B Vaccine Declinations.

Medical records will be maintained as confidential and access by affected employees will be upon request within 15 working days.

VACCINATION DECLINATION FORM

Date:_____

Employee Name: _____

Employee ID#: _____

I understand that due to my occupational exposure to blood or other potential infectious materials I may be at risk of acquiring Hepatitis B virus (HBV) infection. I have been given the opportunity to be vaccinated with Hepatitis B vaccine, at no charge to myself. However, I decline the Hepatitis B vaccination currently. I understand that by declining this vaccine, I continue to be at risk of acquiring Hepatitis B, a serious disease. If, in the future, I continue to have occupational exposure to blood or other potentially infectious materials and I want to be vaccinated with hepatitis B vaccine, I can receive the vaccination series at no charge to me.

_____ _____

Employee Signature Date

_____ _____

Facility Representative Signature Date

POST-EXPOSURE EVALUATION AND FOLLOW-UP CHECKLIST

The following steps must be taken, and information transmitted, in the case of an employee's exposure to bloodborne pathogens:

ACTIVITY	COMPLETION DATE
Employee furnished with documentation regarding exposure incident.	_____
Source individual identified. (_____) Source individual	_____
Appointment arranged for employee with healthcare professional. (_____) Professional's name	_____

Documentation forwarded to healthcare professional

_____ Bloodborne Pathogens Standard
_____ Description of exposed employee's duties
_____ Description of exposure incident, including routes of exposure

COMPRESSED GAS CYLINDERS

Purpose:

The purpose of this program is to prevent injury from compressed gas cylinders and to establish requirements for handling, lifting and storing compressed gas cylinders safely.

Scope

This program covers all employees who handle, transport and/or use compressed gas cylinders while performing duties for the company. When work is performed by a contractor on a company site, the contractor's program shall take precedence. However, this program may be adopted for use by contractors who do not have a formal Compressed Gas Cylinder Program

Key Responsibilities

Managers/Supervisors

- Shall ensure that all employees are aware of the proper handling, storage and use requirements for compressed gas cylinders.
- Shall ensure that initial training is conducted for all new employees and that retraining is conducted when employee behaviors suggest that retraining is warranted.

Employees

- Shall follow all requirements regarding the safe handling, storage and use of compressed gas cylinders.

Procedure

General

Cylinders shall not be accepted, stored or used if evidence of denting, bulging, pitting, cuts, neck or valve damage is observed. If damage is observed:

- The cylinder must be taken out of service.
- The cylinder's owner shall be notified to remove the cylinder from the premises.
- If owned, the cylinder shall be de-pressured and inspected as required by this program.

Cylinder Identification

Gas identification shall be stenciled or stamped on the cylinder or a label used. No compressed gas cylinder shall be accepted for use that does not legibly identify its content by name.

Handling

Valve caps must be secured onto each cylinder before moving or storage.

Secure the cylinder in a blanket when being lifted by mechanical means. Slings, ropes or electromagnets are prohibited to be used for lifting compressed gas cylinders.

The preferred means to move compressed gas cylinders is with a cart, carrier or with a helper.

Compressed gas cylinders must not be allowed to strike each other.

When a cylinder cap cannot be removed by hand the cylinder shall be tagged "Do Not Use" and returned to the designated storage area for return to vendor.

Storing
All cylinders must be secured upright in a safe, dry, well-ventilated area that limits corrosion and deterioration.

- Cylinders must be secured by means that will prevent the cylinder from falling.
- When securing the cylinder, the restraints shall not be attached to electrical conduit or process piping.

Empty and non-empty cylinders shall be stored separately. All stored cylinders shall be capped.

Oxygen cylinders must be stored a minimum of 20 feet from combustible gas cylinders or areas where there may be open flame or arcing. Cylinders may also be stored where the oxygen is separated from combustible gas cylinders by a 5 foot or higher wall with a fire resistance rating of 30 minutes.

Storage areas for full and empty cylinders must be designated and labeled. Cylinders should be stored in assigned places away from elevators, stairs or gangways.

Use
Cylinders must be equipped with the correct regulators. Regulators and cylinder valves should be inspected for grease, oil, dirt and solvents. Only tools provided by the supplier should be used to open and close cylinder valves.

Never force or modify connections.

Only regulators and gauges shall be used within their designated ratings.

The use of a pressure-reducing regulator is required at the cylinder, unless the total system is designed for the maximum cylinder pressure.

Valves must be closed when cylinders are not in use.

Cylinders shall not be used as rollers or supports.

Cylinders shall not be placed where they can come in contact with electrical circuits.

Cylinders must be protected from sparks, slag or flame from welding, burning or cutting operations.

Empty cylinders must be returned to designated storage areas as soon as possible after use.

Inspection of Compressed Gas Cylinders
Supervisors and welders shall determine that compressed gas cylinders under their control are in a safe condition to the extent that this can be determined by visual inspection. Visual and other inspections shall be conducted as prescribed in the Hazardous Materials Regulations of the Department of Transportation (49 CFR parts 171-179 and 14 CFR part 103). Where those regulations are not applicable, visual and other inspections shall be conducted in

accordance with Compressed Gas Association Pamphlets C-6-1968 and C-8-1962. Some elements include, but are not limited to:

- Hoses and connections should be inspected regularly for damage.
- Hoses should be stored in cool areas and protected from damage.
- Cylinders shall be visually inspected prior to charging, before each use and at least annually.
- All inspections and testing must be documented.

High Pressure Cylinders are those cylinders marked for service pressures of 900 psi and greater.

High pressure cylinders shall be taken out of service and submitted for re-qualification testing when any of the following conditions are identified by visual inspection:

- Cuts, dings, gouges, dents, bulges, pitting, neck damage, or evidence of exposure to fire.
- The cylinders shall be inspected and retested according to the requirements stated in 49 CFR 180.205 and .209.
- Re-qualification of non-damaged cylinders shall be conducted per the schedule in 49 CFR 180.209.

Low Pressure Cylinders are those cylinders marked for service pressures of less than 900 psi.

Low pressure cylinders fall into two categories, those requiring requalification and those that do not require re-qualification. Low pressure cylinders that do not require re-qualification shall be taken out of service and condemned when any of the following conditions are identified during inspection:

- The tare weight of the cylinder is less than 90% of the stamped on weight of the cylinder.
- Observed pitting, dents, cuts, bulging, gouges or evidence of exposure to fire.

Low pressure cylinders subject to re-qualification shall be taken out of service, inspected and retested when visual inspection identifies any of the following conditions:

- Dents, bulges, pitting or neck damage.

Re-qualification of non-damaged cylinders shall be conducted per the schedule in 49 CFR 180.209.

Leaking Cylinders

Leaking cylinders should be moved promptly to an isolated, well-ventilated area, away from ignition sources. Soapy water should be used to detect leaks. If the leak is at the junction of the cylinder valve and cylinder, do not try to repair it. Contact the supplier and ask for response instructions.

Transportation

Cylinders must be transported in a vertical secured position using a cylinder basket or cart and must not be rolled. Regulators should be removed and cylinders capped before movement. Cylinders should not be dropped or permitted to strike violently and protective caps are not used to lift cylinders.

Empty Cylinder Marking

Cylinders should be marked as "MT" and dated when empty. Never mix gases in a cylinder and only professionals should refill cylinders. Empty cylinders must be handled as carefully as when filled.

Engineering Controls

Engineering controls such as emergency shutoff switches, gas cabinets and flow restrictors should be used wherever possible to control hazards. Emergency eyewash facilities should be present where corrosive gases or materials are used.

CONFINED SPACES

Purpose

The purpose of this program is to ensure the safety of all employees and contractors working for Arrow S Energy Operating (the company) and to comply with all regulations that pertain to confined spaces.

Scope

This program covers all employees and other workers that may be involved in confined space entry. When work is performed by a contractor or consultant on a company site, the contractor's program shall take precedence. However, this program may be adopted for adapted by contractors who do not have a formal Confined Space Program.

Definitions

Acceptable Entry Conditions - the conditions that must exist in a confined space to allow entry and to ensure that employees involved with a confined space entry can safely enter, and work, within the space.

Attendant - an individual stationed outside one or more Confined spaces who monitors the authorized Entrants and who performs all Attendant's duties assigned in the Arrow S Energy Operating Confined Spaces Program. Attendants must have sufficiently completed and fully understands the Confined Space training and is approved by the HSE Director to work in a confined space as an Attendant.

Authorized Entrant - an individual who is authorized by Arrow S Energy Operating to enter a confined space. Entrants must have sufficiently completed and fully understands the Confined Space training and is approved by the HSE Manager to work in a confined space as an Authorized Entrant.

Blanking or Blinding - the absolute closure of a pipe, line, or duct by the fastening of a solid plate (such as a spectacle blind or a skillet blind) that completely covers the bore and that is capable of withstanding the maximum pressure of the pipe, line, or duct with no leakage beyond the plate.

Confined Space

- A space that is large enough and so configured that an employee can bodily enter and perform assigned work;
- Has limited or restricted means for entry or exit (for example, tanks, vessels, coolers, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry); and
- Is not designed for continuous occupancy.

Double Block and Bleed - the closure of a line, duct, or pipe by closing and locking or tagging two in-line valves and by opening and locking or tagging a drain or vent valve in the line between the two closed valves.

Emergency - any occurrence (including any failure of hazard control or monitoring equipment) or an event internal or external to the confined space that could endanger Entrants.
Engulfment - the surrounding and effective capture of a person by a liquid or finely divided (flowable) solid substance that can be aspirated 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.

Entry - the action by which a person passes through an opening into a confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the Entrant's body breaks the plane of an opening into the space.

Entry Permit – means the written or printed document that is provided by Arrow S Energy Operating to allow and control entry into a confined space that contains the information specified in this program.

Entry Supervisor - the person responsible for determining if acceptable entry conditions are present at a confined space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry as required by this section.

- Entry Supervisors must have sufficiently completed and fully understands the Confined Space training and is approved by the HSE Manager to work in a confined space.
- An Entry Supervisor also may serve as an Attendant or as an authorized Entrant, as long as that person is trained and equipped as required by this section for each role he or she fills. Also, the duties of Entry Supervisor may be passed from one individual to another during the course of an entry operation.
- The Entry Supervisor is responsible to test and monitor the atmosphere conditions.

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 confined 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), (0% is normal).
- Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent, (20.9 % is normal).
- Any other atmospheric condition that is immediately dangerous to life or health. (Ex.-H2S 10%, 0% is normal).
- Note: For air contaminants for which OSHA has not determined a dose or permissible exposure limit, other sources of information, such as Safety Data Sheets that comply with the Hazard Communication Standard, published information, and internal documents can provide guidance in establishing acceptable atmospheric conditions.

Hot Work Permit - the written authorization to perform operations (for example, riveting, welding, cutting, burning, and heating) capable of providing a source of ignition.

Immediately Dangerous to Life or Health (IDLH) - any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with an individual's ability to escape unaided from a confined space.

- Note: Some materials -- hydrogen fluoride gas and cadmium vapor, for example -- may produce immediate transient effects that, even if severe, may pass without medical attention, but are followed by sudden, possibly fatal collapse 12-72 hours after exposure. The victim "feels normal" from recovery from transient effects until collapse. Such materials in hazardous quantities are considered to be “immediately dangerous to life or health”.

Inerting - the displacement of the atmosphere in a permit space by a non-combustible gas (such as nitrogen) to such an extent that the resulting atmosphere is non-combustible. This procedure produces an IDLH oxygen deficient atmosphere.

Isolation - the process by which a confined space is removed from service and completely protected against the release of energy and material into the space by such means as: Blanking or Blinding; misaligning or removing sections of lines, pipes, or ducts; a Double Block and Bleed system; lockout or tagout of all sources of energy; or blocking or disconnecting all mechanical linkages.

Line Breaking - the intentional opening of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic material, an inert gas, or any fluid at a volume, pressure, or temperature capable of causing injury.

Non-Permit Confined Space - A confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.

Oxygen deficient atmosphere - an atmosphere containing less than 19.5 percent oxygen by volume.

Oxygen enriched atmosphere - an atmosphere containing more than 23.5 percent oxygen by volume.

Permit-Required Confined Space - a confined space that has one or more of the following characteristics:

- Contains or has a potential to contain a hazardous atmosphere.
- Contains a material that has the potential for engulfing an Entrant.
- Has an internal configuration such that an Entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section.
- Contains any other recognized serious safety or health hazard.

Permit System - the employer's written procedure for preparing and issuing permits for entry and for returning the confined space to service following termination of entry.

Prohibited Condition - any condition in a confined space that is not allowed by the permit during the period when entry is authorized.

Rescue Service - the personnel designated to rescue employees from Permit-Required Confined Spaces.

Retrieval System - the equipment (including a retrieval line, chest or full-body harness, wristlets, if appropriate, and a lifting device or anchor) used for non-entry rescue of persons from confined spaces.

Testing - the process by which the hazards that may confront Entrants of a confined space are identified and evaluated. Testing includes specifying the tests that are to be performed in the permit space.

Responsibilities

Managers/Supervisor

- Shall ensure that all employees have been trained and fully understand the requirements of this program.
- Shall provide the necessary equipment to comply with these requirements and ensure that all employees are trained on its use.
- Shall ensure that all confined space assessments have been conducted and documented.

- Shall ensure that provisions and procedures are in place for the protection of employees from external hazards including but not limited to pedestrians, vehicles and other barriers and by use of the pre-entry checklist verifying that conditions in the permit space are acceptable for entry during its duration.
- Shall ensure that all Permit-Required Confined Spaces permits are posted.
- Shall ensure an annual review of the program including all entry permits issued during that annual period.
- Shall ensure that confined spaces are identified properly as either a Non-Permit Confined Space or a Permit-Required Confined Space.
- Shall ensure that all confined spaces that have been identified as "no entry" have signs that state, "DANGER-DO NOT ENTER".
- Shall ensure signs have been posted at all Permit-Required Confined Space areas that state, "DANGER – PERMIT ENTRY CONFINED SPACE" along with the proper warning word such as "ASPHYXIANT, FLAMMABILITY or TOXIC HAZARD"
- Shall file all permits at the area offices for review. Permits shall be kept on file for one year.

Affected Employees, Consultants and Contractor Workers

- Shall attend Confined Space Entry training commensurate with their duties and when duties change as required.
- Shall comply with all aspects of this program at a minimum.
- Authorized Entrants, Attendants and Entry Supervisors may be any Arrow S Energy Operating employee, consultant or contract worker that is authorized by management to work in a confined space setting and that has been trained and is proficient in the understanding of program requirements.

Authorized Entry Supervisor Duties

- Shall have a tailgate safety meeting, with all workers to be involved in the confined space entry and review the job to be performed and what safety concerns may be present- a meeting form is available at www.arrowsenergy.com/hse.
- Shall confirm that all isolation, Lock/out and Tag/outs have been completed prior to entry into a confined space.
- Shall ensure that the requirements of this program are followed and maintained.
- Shall test all atmosphere conditions prior to entry and shall complete and maintain the confined space permit form and have it accessible for review on the job site at all times.
- Shall notify the Arrow S Energy Operating authorized supervisor of entry into a confined space and notify the supervisor of any changes that may occur during an entry.
- If the confined space poses a hazard that cannot be eliminated, the Entry Supervisor must arrange for rescue services or by using a non-entry rescue system.
- If the confined space poses no hazards to the Entrants, the Entry Supervisor can reclassify the confined space to a Non-Permit Confined Space.
- A stand-by rescue team is not required to be on site for Non-Permit Confined Space entries.

Authorized Attendant Duties

- Knows the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.
- Is aware of possible behavioral effects of hazard exposure in authorized Entrants.

- Continuously maintains communication and an accurate count of authorized Entrants in the confined space and ensures that the means used to identify authorized Entrants, and accurately identifies who is in the confined space.
- Remains outside the confined space during entry operations until relieved by another Attendant.
- Arrow S Energy Operating has procedures to be used by a single attendant monitoring several confined spaces during an emergency. If more than one confined space is to be monitored by a single attendant, the program must include the means and procedures that will be used in order to enable the attendant to respond to emergencies in one or more permit spaces that he/she is monitoring without distraction from all responsibilities. This will include radio communications with emergency responders or other methods of summoning aid, directing entrants to leave the confined spaces, etc. The procedures shall be on the confined space permit.
- Monitors activities inside and outside the confined space to determine if it is safe for Entrants to remain in the space and orders the authorized Entrants to evacuate the confined space immediately under any of the following conditions:
    - If the Attendant detects a Prohibited Condition;
    - If the Attendant detects the behavioral effects of hazard exposure in an authorized Entrant;
    - If the Attendant detects a situation outside the space that could endanger the authorized Entrants;
    - If the Attendant cannot effectively and safely perform all the duties required.
- Summon rescue and other emergency services as soon as the Attendant determines that authorized Entrants may need assistance to escape from confined space hazards.
- Takes the following actions when unauthorized persons approach or enter a confined space while entry is underway:
    - Warn the unauthorized persons that they must stay away from the confined space;
    - Advise the unauthorized persons to exit the confined space immediately, if they have entered the space;
    - Inform the authorized Entrants and the Entry Supervisor if unauthorized persons have entered the confined space.
- Performs no duties that might interfere with the Attendant's primary duty to monitor and protect the authorized Entrants.

Authorized Entrant Duties

- Knows the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;
- Uses appropriate personal protective equipment properly, e.g., face and eye protection, and other forms of barrier protection such as gloves aprons, coveralls, and breathing equipment;
- Is aware of possible behavioral effects of hazard exposure in Authorized Entrants;
- Shall witness and verify calibrated air monitoring data and if approved, sign off, before entry is made.
- Is entitled to request additional monitoring at any time.
- Maintain communication with the Attendants to enable the Attendant to monitor the Entrants status as well as to alert the Entrant to evacuate if needed; and
- Exit from confined spaces as soon as possible when ordered by an Attendant or Entry Supervisor, when the Entrant recognizes the warning signs or symptoms of an exposure exists, or when a prohibited condition exists, or when an alarm is activated.

Procedure

Non-Permit Confined Space Entry

If testing of the confined space atmosphere is within acceptable limits without the use of forced air ventilation and the space is properly isolated, the space can be entered by following the requirements for Level I confined space entry.

- Entrants and/or their representative shall be given the opportunity to observe and participate in the air monitoring process.
- Entrants shall review and sign the confined space permit.

Employees may enter and work in the confined space as long as LEL, O2, and toxicity hazards remain at safe levels.

- Complete the Arrow S Energy Operating Confined Space Entry Permit to document that there are no confined space hazards. Make this certification available to all personnel entering the space.
- A trained Attendant must always be outside the confined space. The Attendant must monitor the authorized Entrants for the duration of the entry operation.

Exception: The Attendant requirements for Level I confined space entry may be exempted, if the job assessment is performed and has determined that there are no inherent dangers to allow single person entry.

- This provision is intended to permit field operations to enter crankcases, shallow valve boxes, cellars, excavations, etc. without an Attendant being present and all other aspects of the entry permit complied with.
- When there are changes in the use and configuration of a confined space that might increase the hazards to the Entrants (e.g., using epoxy coating on a tank floor, welding, painting, etc.), re-evaluate the space. If necessary, reclassify the space as a Permit-Required Confined Space.
- Continuously monitor the confined space atmosphere to ensure that it is still safe.
- The space must not contain a hazardous atmosphere while personnel are inside.
- If a hazardous atmosphere is detected during an entry, personnel must immediately evacuate the space.
- Re-evaluate the space to determine how the hazardous atmosphere developed.
- The Entry Supervisor shall cancel the entry permit.
- Take action to protect personnel before any subsequent activity to re-enter the space takes place.
- Reissue the Arrow S Energy Operating Confined Space Entry Permit before allowing Entrants to re-enter the space.
- If necessary, reclassify the space as a Permit-Required Confined Space.
- Ensure that vehicle or other equipment exhaust does not enter the space.

Permit-Required Confined Space Entry

If the space is properly isolated and results of air monitoring are above acceptable parameters without local exhaust ventilation in operation, classify the entry as a Permit-Required Confined Space.

- Complete the Arrow S Energy Operating Confined Space Entry Permit before proceeding with work in a Permit-Required Confined Space.
- Entrants and/or their representative shall be given the opportunity to observe and participate in the air monitoring process.
- Entrants shall review and sign the confined space permit.

- At least one trained Attendant must always be outside the Permit-Required Confined Space.
- The Attendant must monitor the authorized Entrants for the duration of the entry operation.
- Only Authorized Entrants may enter a Permit-Required Confined Space.
- All Entrants must sign in and out on the entry permit when entering and leaving a Permit-Required Confined Space.
- The back of the permit or a sign-in sheet must be used for this purpose.
- Post signs and barricades outside all Permit-Required Confined Spaces to notify personnel that a confined space entry is in progress and unauthorized entry is prohibited.
- Conditions must be continuously monitored where Entrants are working to determine that acceptable conditions are maintained during entry.
- If a hazardous atmosphere is detected during an entry, personnel must immediately evacuate the space.
    - The Entry Supervisor shall cancel the entry permit.
    - Re-evaluate the space to determine how the hazardous atmosphere developed.
    - Take action to protect personnel before any subsequent activity to re-enter the space takes place.
    - Re-issue the Arrow S Energy Operating Confined Space Entry Permit before allowing Entrants to re-enter the space.
    - Employees or their representatives are entitled to request additional monitoring at any time.
- The permit must be terminated when the entry operations are complete or when permit conditions change (i.e., hazardous air monitoring results are noted, unsafe behaviors are observed, etc.).
- The minimum rescue equipment required for Permit-Required Confined Space entry is covered in the Rescue & Emergency section of this program.
- Permit-Required Confined Space entry operations will be reviewed when Arrow S Energy Operating believes that the requirements of this confined space program may not adequately protect personnel.
- If deficiencies are found in the program, the program will be revised, and personnel will be trained in the new revisions before subsequent entries are authorized.

Pre-Job Planning and Space Preparation

The Entry Supervisor must determine that the confined space is properly isolated by blinding, disconnecting, and/or by following local Lockout/Tagout procedures.

The Entry Supervisor must discuss with all Entrants the hazards of the space, communication methods and emergency procedures during the confined space entry.

Eliminate any condition making it unsafe to open the equipment to atmosphere.

Promptly guard the opening to prevent an accidental fall through the opening and to protect each employee working in the space from foreign objects entering the space.

If applicable, wash, steam, ventilate or degas the confined space to properly free it of possible contaminants. Vent vapors to a safe location.

Do not allow unauthorized personnel to enter a confined space. Barricade and/or guard all confined spaces to prevent entry of unauthorized Entrants.

If performing hot work in the confined space, precautions must be taken consistent with the Arrow S Energy Operating Hot Work Permit procedure.

Ensure that vehicle or other equipment exhaust does not enter the space.

Pre-Entry Safety Meeting
The Entry Supervisor must declare when the confined space is ready for entry.

The Entry Supervisor shall hold a pre-entry safety meeting to discuss all requirements and procedures with all authorized Entrant(s) and Attendant(s) involved with the entry. He/she will discuss other concerns such as previous contents, vessel coating, PPE required etc., during this meeting.
The Entry Supervisor must coordinate entry operations when employees of more than one company are working simultaneously in the confined space. This coordination is necessary so that one company's work does not endanger the employees of another company.

Equipment
Check all work equipment to ensure that it has the proper safety features and is approved for the locations where it will be used. The Entry Supervisor shall ensure that all equipment is properly maintained in a safe condition and that Entrants use the equipment properly.

The following equipment must be considered and may be required when entering a confined space:

- Atmospheric Testing and Monitoring Equipment.
- Barriers, Shields, and Signs – Post signs and barricades outside all Permit-Required Confined Spaces to notify personnel that a confined space entry is in progress and unauthorized entry is prohibited. Any signs used must state "Danger – Permit Entry Confined Space" along with the proper warning word such as "Asphyxiant, Flammability or Toxic Hazard". All barricades must be capable of preventing a person from inadvertently walking into or kicking an object into the space.
- Communications Equipment – Only use intrinsically safe equipment in areas where a hazardous atmosphere may exist. Use a communication system that will keep the Attendant in constant, direct communication with the Entrant(s) working in the confined space. Also, use a communication system that allows the Attendant to summon help from rescue or emergency service.
- Entry and Exit Equipment – (For example: ladders may be needed for safe entry and exit).
- Lighting Equipment – Needed for safe entry, work within the space and exit. Lighting equipment used in the confined space must be certified safe for the location.
- Portable electric lighting used in wet and/or other conductive locations (drums, tanks, vessels) must be operated at 12 volts or less. 120 volt lights may be used if protected by a ground-fault circuit interrupter.
- Personal Protective Equipment – Ensure that personnel wear the required personal protective equipment. For respiratory protection requirements, refer to the Respiratory Protection Program.
- Rescue and Emergency Equipment – Except if provided by outside rescue services.
- The Attendants must also have an approved first aid kit.
- Vacuum Trucks – When used, trucks must be properly grounded or bonded to prevent static sparks.
- Ventilating Equipment – Local exhaust air movers used to obtain acceptable atmospheric entry conditions (e.g., Copus air movers).
- Other – Any other equipment necessary for safe entry into and rescue from permit required confined spaces.

Air Monitoring

- Before an employee enters the space, the internal atmosphere shall be tested, with a calibrated direct-reading instrument, for oxygen content, for flammable gases and vapors, and for potential toxic air contaminants, in that order. Monitoring of the space must inform the entrants of the potential hazards and results and they must participate in the permit review and signing.
- Air shall be periodically tested while continuous ventilation is applied.
- Any employee, who enters the space, or that employee's authorized representative, shall be provided an opportunity to observe the pre-entry testing required by this paragraph.
- Employees or their representatives are entitled to request additional air monitoring at any time.

Ventilation

Continuous forced air ventilation must be used and tested as follows:

- An employee may not enter the space until the forced air ventilation has eliminated any hazardous atmosphere;
- The forced air ventilation shall be so directed as to ventilate the immediate areas where an employee is or will be present within the space and shall continue until all employees have left the space;
- The air supply for the forced air ventilation shall be from a clean source and may not increase the hazards in the space.
- The atmosphere within the space shall be periodically tested as necessary to ensure that the continuous forced air ventilation is preventing the accumulation of a hazardous atmosphere. Any employee, who enters the space, or that employee's authorized representative, shall be provided with an opportunity to observe the periodic testing and may request additional monitoring at any time.
- If a hazardous atmosphere is detected during entry each employee shall leave the space immediately and the space shall be evaluated to determine how the hazardous atmosphere developed; and measures shall be implemented to protect employees from the hazardous atmosphere before any subsequent entry takes place.

Multiple Employer Procedure

In order not to endanger the employees of any other employer, the Entry Supervisor shall:

- Verify that all contractor employees have been trained in confined space and that all contractor employees fully understand the Arrow S Energy Operating procedures pertaining to Confined Space.
- Inform the contractor that the workplace contains permit spaces and that permit space entry is allowed only through compliance with a permit space program meeting the requirements of this section.
- Apprise the contractor of the elements, including the hazards identified and the employees experience with the space, that make the space in question a permit space.
- Inform the contractor of any precautions or procedures that Arrow S Energy Operating has implemented for the protection of employees in or near permit spaces where contractor personnel will be working.
- Coordinate entry operations with the contractor/s, when the personnel of multiple companies will be working in or near confined spaces.
- Debrief the contractor/s at the conclusion of the entry operations regarding the permit space program followed and regarding any hazards confronted or created in confined spaces during entry operations.
- In addition to complying with the confined space requirements that apply to all employees; each contractor, who is retained to perform permit space entry operations, shall:

- Obtain any available information regarding confined space hazards and entry operations from the Arrow S Energy Operating authorized Entry Supervisor
- Coordinate entry operations with the Arrow S Energy Operating authorized Entry Supervisor, when workers of multiple companies will be working in or near permit spaces.
- Inform Arrow S Energy Operating of the confined space program that the contractor will follow and of any hazards confronted or created in the confined space, either through a debriefing or during the entry operation.

Rescue and Emergency Services

General

Rescue service must be on-site for immediately dangerous to life and health (IDLH) conditions while work is being performed. Rescue services must be either:

- Provided by the host facility,
- Provided by an outside service which is given an opportunity to examine the entry site, practice rescue and decline as appropriate, or
- Provided by Arrow S Energy Operating by selecting a rescue team that is equipped and trained to perform the needed rescue services.
- The Attendant shall order the other Entrants not to move the injured nor allow untrained or unauthorized workers into the space that are not trained to handle a confined space rescue.
- Safety Data Sheet's for substances that an injured Entrant was exposed to must be provided to the medical facility treating the injured worker.

Permit-Required Confined Space Rescue:

- When the Attendant becomes aware of the need for rescue, the Attendant shall immediately summon the onsite rescue team by the agreed upon communication method, verbally, radio or cell phone, without leaving the vicinity of the confined space.
- The Attendant shall prevent unauthorized personnel from attempting a rescue.
- After the rescue team has been notified, the Attendant shall alert the Entry Supervisor of the emergency via the same communication methods.
- The preferred means of providing rescue service is through the use of a qualified outside rescue service vendor or by using a or by using a non-entry rescue system. The third party rescue service vendor must be:
    - Informed of the hazards that they may confront during a rescue;
    - Provided access to the Permit-Required Confined Space to examine the entry site, practice rescue, and decline as appropriate.
    - Access to the space allows the rescue service and local supervision to jointly develop appropriate rescue plans.
    - If the host operator is designated to provide rescue services for Arrow S Energy Operating, the agreement of services must be included in contract for the job.
- If Arrow S Energy Operating employees are to perform Permit-Required Confined Space rescues, they must be:
    - Provided and trained in the use of the proper personal protective equipment necessary to make the rescue;

- Provided PPE at no cost
- Trained to perform the assigned duties;
- Required to practice making rescues at least once every 12 months;
- Trained in basic first aid and CPR.
- A minimum of one member of the rescue team must hold a current certification in first aid and CPR.

Non-entry Rescue

- To facilitate non-entry rescue, an Entrant must be attached to a retrieval system whenever he/she enters a Permit-Required Confined Space with a vertical depth of more than 5 feet.
- The retrieval equipment is not required if it will increase the overall risk of the entry, e.g., creating an entanglement hazard, or will not contribute to the rescue of the Entrant.
- Each Entrant shall use a full body harness equipped with a "D" ring located between the shoulders or above the head.
- Wristlets may be used instead of the full body harness, if the use of the full body harness is not feasible or creates a greater hazard *and* that using wristlets is the safest and most effective alternative.
- The retrieval line must be attached to the "D" ring and the other end of the retrieval line attached to a retrieval device or fixed point located outside the space so that rescue can begin as soon as the rescuer becomes aware that rescue is necessary.

Issuance/Reviewing of Permit

Only when all pre-entry requirements are satisfied, the Entry Supervisor shall issue a completed and signed confined space permit. The confined space permit is valid for one shift. The confined space permit can be found at www.arrowsenergy.com/hse.

In the event of any unauthorized entry, employee complaints, a hazard not covered by the permit, the occurrence of an injury or near miss the entry permit shall be cancelled and a review shall be conducted to provide employee protection and for revising the program prior to authorizing subsequent entries.

An annual review of this program, using the cancelled permits retained within 1 year after each entry shall be conducted by the HSE Director to revise the program as necessary, to ensure that employees are protected. If no confined space entries were performed during a 12-month period, no review is necessary.

Termination and Closing or Cancelling of Permits

The Entry Supervisor shall terminate the confined space permit, at the end of the job operation, at the end of the shift or when the Entry Supervisor or Attendant determine that conditions in or near the confined space have changed and is hazardous to the Entrants.

The Entry Supervisor shall, at the conclusion of entry operation, close out the permit and provide the safety department the original copy of the Confined Space Permit.

Training

Training shall be provided so that all employees whose work is regulated by this program acquire the understanding, knowledge, and skills necessary for the safe performance of the duties assigned to them.

Training shall be provided to each affected employee, before the employee is first assigned duties under this program, if a new hazard has been created or special deviations have occurred and before there is a change in assigned duties.

The employee shall be retrained:

- Whenever there is a change in confined space operations that presents a hazard about which an employee has not previously been trained.
- Whenever the supervisor has reason to believe either that there are deviations from the permit space entry procedures required by this section or that there are inadequacies in the employee's knowledge or use of these procedures.

The training shall establish employee proficiency in the duties required by this program and shall introduce new or revised procedures, as necessary.

The supervisor shall certify that the training required by this program has been accomplished.

- The certification shall contain each employee's name, the signatures or initials of the trainers, and the dates of training.
- The certification shall be available for inspection by employees, their authorized representatives, management, clients and the safety department.

Confined Space Entry Permits

The following Confined Space Permits can be found at www.arrowsenergy.com/hse in the “Permits” tab:

- Non-Permit Required Confined Space Entry Permit
- Permit Required Confined Space Entry Permit

ARROW S ENERGY OPERATING

A CONTROLLING EMPLOYER

Purpose

The purpose of this program is to outline the efforts by which Arrow S Energy Operating (the company) will develop, implement and manage the safety readiness of all field operations company wide.

Scope

Arrow S Energy Operating is an operator who contracts other employers to execute operations, perform work, and maintain general supervisory authority over their respective worksite, including the obligation to correct safety and health violations created by the contractor or its employees. This control has been established by contract or, in the absence of explicit contractual provisions, by the exercise of control in practice. Arrow S Energy Operating expects all contractors to follow the requirements of the established MSA or other service contract that has been put in place. With exception to the Arrow S Energy Operating safety orientation/s, and in some cases the Arrow S Energy Operating Emergency Response Training, Arrow S Energy Operating will not place additional burdensome safety requirements on contract workers or their employers unless where lawfully appropriate. Because Arrow S Energy Operating will not use company employees outside of the scope and execution of field management activities, the Company retains contractors who demonstrate a high level of knowledge of the various applicable operational and safety standards and a high level of trade expertise to manage and carry out all services in a safe manner.

Definitions

Controlling Employer- an employer who has general supervisory authority over the worksite, including the power to correct safety and health violations itself or require others to correct them. Control can be established by contract or, in the absence of explicit contractual provisions, by the exercise of control in practice.

Reasonable Care- A controlling employer must exercise reasonable care to prevent and detect violations on the site. The extent of the measures that a controlling employer must implement to satisfy this duty of reasonable care is less than what is required of an employer with respect to protecting its own employees and third parties from the risks associated with the contractor's work.

Reasonable Care:

Arrow S Energy Operating will exercise reasonable care to prevent and detect violations on company owned or controlled sites. The extent of the measures that the company will implement to satisfy the duty of reasonable care is less than what is required of a consultant or contractor with respect to protecting its own employees and third parties from the risks associated with the contractor's work. This means that Arrow S Energy Operating is not normally required to inspect for hazards as frequently or to have the same level of knowledge of the applicable standards or of trade expertise as the consultants or contractors it has hired.

Factors Relating to Reasonable Care

Factors that affect how frequently and closely the company will inspect to meet its standard of reasonable care include:

a. The scale of the project.
b. The nature and pace of the work, including the frequency in which the hazards change as the work progresses.

c. History of Incident/ near miss occurrence.
d. How much the company knows both about the safety history and safety practices of the contractor it controls as well as the contractors' level of expertise.
e. More frequent inspections will be conducted if the contractor has a history of non-compliance, at the beginning of a project, if Arrow S Energy Operating has never before worked with the contractor, and/or Arrow S Energy Operating is not aware of the compliance history of a contractor.
f. Less frequent inspections may be appropriate where the company sees strong indications that the contractor has implemented effective safety and health efforts. The most important indicator of an effective safety and health effort by the contractor is a consistently high level of compliance both in practice and in assessment performance. Other indicators include the use of an effective, graduated system of enforcement for non-compliance with safety and health requirements coupled with regular jobsite safety meetings and safety training.
g. Each time a Arrow S Energy Operating safety assessment is completed, the items identified as deficiencies will be:
    - documented and stored in the Company document management system
    - communicated to the contractor
    - followed up on to ensure correction

Evaluating Reasonable Care

At a minimum, Arrow S Energy Operating will utilize a contractor to execute the company reasonable care program and its effectiveness in preventing and discovering violations on an annual basis. Three areas of focus will be assessed to determine the effectiveness of the program:

a) Assess operations to identify regulatory compliance deficiencies.
b) Do contractors have effective system for promptly correcting recognized or identified hazards;
c) Do contractors enforce compliance with safety and health requirements with an effective, graduated system of remediation and follow-up inspections.

Maintaining a Safe Workplace:

Arrow S Energy Operating has a specific contractual right to control safety on any company owned or controlled interests. The company itself can prevent or correct a violation of items under company control and command, as well as the right to require contractors to prevent or correct violations of items under their control and command. The source of this ability is made through explicit contractual authority that requires the contractor to adhere to safety and health requirements and to correct violations under their control.

EXCAVATION & TRENCHING

Purpose

The purpose of this procedure is to protect employees from safety hazards that may be encountered during work in trenches and excavations.

Scope

Because this procedure meets the minimum regulatory requirements, the requirements of this procedure must be met when work is performed on a Arrow S Energy Operating (the company) site. However, this program may be adopted for use by contractors who do not have a formal excavation and trenching program.

Key Responsibilities

Management shall determine which employees within his/her operation is required to receive competent person training.

Management shall select a training facility or use an in-house qualified trainer to supply the training.

Competent Person - One who is capable of identifying existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous, or dangerous to employees and who has authorization to take prompt corrective measures to eliminate them.

Employees are required to follow all duties as specified in this procedure.

Procedures

Competent Person Duties
The competent person or their designee shall have the following duties:

Protective Systems or Equipment

- Monitoring water removal equipment and operations.
- Removal of workers if conditions dictate.
- Atmospheric testing.
- Inspecting excavations subject to runoff from heavy rains to determine need for diversion ditches, dikes, or other suitable protection.
- Determining cave-in potential to assess need for shoring or other protective system.
- Examining damaged material or equipment used for protective systems to determine its suitability for continued use.
- Classifying soil and rock deposits, by both visual analysis and by testing, to determine appropriate protection; re-classifying, if necessary, based on changing conditions.
- Determining the appropriate slope of an excavation to prevent collapse due to surcharge loads from stored material or equipment, operating equipment, adjacent structures, or traffic, and assuring that such slope is achieved.

Inspecting Trench and Protective Systems

- Inspections prior to entry and authorizing immediate removal of employees from the hazardous area where

evidence of possible cave-in, failure of protective systems, hazardous atmospheres, or other hazardous conditions exists.

Unsafe Access/Egress

- Structural ramps used for access or egress of equipment must be designed by a competent person qualified in structural design.

Buried Utilities and Pre-work Site Inspection

- A One Call locate must be performed prior to excavation activities.
- The approximate location of subsurface installations, such as sewer, telephone, fuel, electric, water lines, or any other subsurface installations that reasonably may be expected to be encountered during excavation work, shall be determined by the excavator prior to opening an excavation.
- Excavation shall be done in a manner that does not endanger the underground installations or the employees engaged in the work.
- Utilities left in place shall be protected by barricades, shoring, suspension or other means as necessary to protect employees.

General Requirements

Safe Means of Access/Egress

- A safe means of access/egress (e.g. ladders, ramps, stairs, etc.) shall be provided for workers entering and exiting an excavation.
- The safe means of egress shall be located in trench excavations that are 4 feet or more in depth so as to require no more than 25 feet of lateral travel for employees.

Structural Ramps

- Structural ramps used solely by employees as a means of access or egress from excavations shall be designed by a competent person.
- Ramps and runways constructed of two or more structural members shall have the structural members connected together to prevent movement or displacement.
- Structural members used for ramps and runways shall be of uniform thickness.
- Cleats or other appropriate means used to connect runway structural members shall be attached to the bottom of the runway or shall be attached in a manner to prevent tripping.
- Structural ramps used in place of steps shall be provided with cleats or other surface treatments on the top surface to prevent slipping.

Ladders

- When portable ladders are used, the ladder side rails shall extend a minimum of 3 feet above the upper surface of the excavation.
- Ladders shall have nonconductive side rails if work will be performed near exposed energized equipment or systems.
- Ladders will be inspected prior to use for signs of damage or defects. Damaged ladders will be removed from service and marked with "Do Not Use" until repaired.
- Ladders shall be used only on stable and level surfaces unless secured. Ladders placed in any location where they can be displaced by workplace activities or traffic shall be secured, or barricades shall be used to keep these activities away from the ladder.
- Non-self-supporting ladders shall be positioned so that the foot of the ladder is one-quarter of the working length away from the support.

- Employees shall not be allowed to carry any object or load while on the ladder that could cause them to lose their balance and fall.

Protection from Vehicular Traffic and Falling Loads

- Employees exposed to public vehicular traffic shall be provided with, and shall wear, warning vests or other suitable garments marked with or made of reflectorized or high-visibility material.
- No employee shall be permitted underneath loads (or where loads may fall) handled by lifting or digging equipment.
- Employees shall be required to stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling materials.
- Operators may remain in the cabs of vehicles being loaded or unloaded when the vehicles provide adequate protection for the operator during loading and unloading operations.

Barriers and Walkways

- Barriers shall be used around excavations and/or trenches.
- 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.
- Where employees or equipment are required or permitted to cross over excavations over 6-feet in depth and wider than 30 inches, walkways or bridges with standard guardrails shall be provided.
- Wells, holes, pits, shafts and all similar hazardous excavations shall be effectively barricaded or covered and posted as necessary to prevent unauthorized access. All temporary excavations of this type shall be backfilled as soon as possible.

Atmospheric Testing

- The atmosphere of excavations and trenches shall be tested for air contaminants (oxygen, flammable gases, etc.) in excavations over 4 feet deep or if a hazardous atmosphere exists or could reasonably be expected to exist, prior to workers entering. A hazardous atmosphere could be expected, for example, in excavations in landfill areas, in excavations in areas where hazardous substances are stored nearby, or in excavations near or containing gas pipelines.
- Adequate precautions shall be taken to prevent employee exposure to atmospheres containing less than 19.5 percent oxygen and other hazardous atmospheres. These precautions include providing proper respiratory protection or forced ventilation of the workspace.
- Arrow S Energy Operating will ensure safe operation of internal combustion engines in excavations or shafts. Whenever internal combustion engine-driven equipment is operated inside a shaft, a ventilation system shall be provided.
- When controls are used that are intended to reduce the level of atmospheric contaminants to acceptable levels, continuous air monitoring will be performed. The device used for atmospheric monitoring shall be equipped with an audible and visual alarm.
- Atmospheric testing will be performed using a properly calibrated direct reading gas monitor. Direct reading gas detector tubes or other acceptable means may also be used to test potentially toxic atmospheres.

Personal Protective Equipment

- All employees working in trenches or excavations shall wear approved hard-hats and steel toed shoes or boots.
- Employees exposed to flying fragments, dust, or other materials produced by drilling, sawing, sanding, grinding and similar operations shall wear approved safety glasses with side shields.
- Employees exposed to hazards produced by, or performing, welding, cutting, or brazing operations shall wear approved spectacles or a welding face shield or helmet.

- Employees entering bell-bottom pier holes or other similar deep and confined footing excavations shall wear a harness with a lifeline securely attached to it. The lifeline shall be separate from any line used to handle materials and shall be individually attended at all times while the employee wearing the lifeline is in the excavation.
- Employees shall wear approved gloves or other suitable hand protection.
- Employees using, or working in the immediate vicinity of, hammer drills, masonry saws, jackhammers or similar high noise producing equipment shall wear suitable hearing protection.

Procedures for Rescue and Equipment Needs

- Emergency rescue equipment, such as breathing apparatus, a safety harness and line, or a basket stretcher, shall be readily available where hazardous atmospheric conditions exist or may reasonably be expected to develop during work in an excavation. This equipment shall be attended when in use.
- Only personnel that have received approved training and have appropriate equipment shall attempt retrieval that would require entry into a hazardous atmosphere.

Procedures for Accidental Contact with Energized Utilities

To protect against electrical shock injury in the event of contact between equipment or vehicles and an energized utility, remember the following:

- The operator should remain inside the cab.
- All other personnel should keep away from the equipment, vehicle, cables, ropes, and load, since the ground around the unit might be energized.
- If the line has not been severed, the operator should try to remove the unit from contact by moving it in the reverse direction from that which caused the contact.
- If the unit cannot be moved away from contact, the operator should remain inside cab until the lines have been de-energized.
- If the operator must leave the equipment because of a more immediate hazard, then this person must jump clear from the unit and shuffle their feet in small steps.
- Secure the area and do not let anyone except emergency rescue personnel go near the energized equipment.

When a equipment or a vehicle contacts a power line, the rigger, ground crews or nearby observers are most likely to be affected. The operator sitting in the cab is at the same electrical potential as the equipment. When a boom truck contacts a power line, the operator, who is usually standing on the ground, is most likely to be affected. Any other worker who may be standing near the equipment will also be affected.

Everyone around the unit must be very careful to not touch any part of the equipment and the ground at the same time. If this contact is made, an electrocution injury can result.

If an operator must leave the equipment, or a worker needs to get away from an energized crane, shuffle your feet in very small steps. After a power line contact, the current flows outward through the ground in a ripple pattern. Areas of high and low electrical potential fields circle the energized equipment like ripples in a pond after a stone hits the surface. If a worker steps from an area of high electrical potential to an area of low electrical potential, electricity can flow through their legs causing injury or death. This is why small shuffles of your feet during an escape is the key to staying alive.

If one of your coworkers is hit by the electricity, remember, the power flowing through the ground could easily injure and kill you. Then, instead of one victim, there will be two, or three. No matter what you think or feel, you can't go near the energized worker until you know the power is off. Remember, you can't be sure that the power is off just

by looking at the victim or power line. Rely only on emergency response professionals and/or utility company personnel to assist with a rescue.

Protection of Employees from Accumulation of Water

- Employees shall not work in excavations in which there is accumulated water unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation.
- If water is controlled or prevented from accumulating by the use of water removal equipment, the water removal equipment and operation shall be monitored by a competent person trained in the use of the equipment.
- If excavation work interrupts the natural drainage of surface water (such as streams), other suitable means shall be used to prevent surface water from entering the excavation. Precautions shall also be taken to provide adequate drainage of the area adjacent to the excavation.
- The competent person shall inform workers of the precautions or procedures that are to be followed if water accumulates or is accumulating in an excavation.

Protecting 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.
- The competent person will determine if the excavation work could affect the stability of adjoining buildings, walls, sidewalks or other structures.
- Excavation below the level of the base or footing of any foundation or retaining wall that could be reasonably expected to pose a hazard to employees shall not be permitted.

Protection of Employees from Falling Objects and Loose Rocks or Soil

- Removal of Excavation Hazards: All surface encumbrances that are located so as to create a hazard to employees shall be removed or supported, as necessary, to safeguard employees. 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.
- Employees shall be protected from excavated materials, equipment or other materials that could pose a hazard by falling or rolling into excavations.
- Spoil piles or other materials are stored two feet or more from the edge of the excavation. Protection shall be provided by placing and keeping materials or equipment at least 2 feet from the edge of excavations, or by the use of retaining devices that are sufficient to prevent materials or equipment from falling or rolling into excavations or by a combination of both if necessary.
- Materials piled, grouped or stacked near the edge of an excavation must be stable and self-supporting.

Stabilization of Soil

- Soil classifications must be determined by testing and protective systems designed according to soil classifications.
- The most stable type of soil is Type A. It is dense and heavy and consists primarily of clay.
- Type B has a medium level of stability and is made of soils such as silt, sandy loam, and medium clay.
- The least stable soil is Type C, which consists of gravel, loamy sand, and soft clay.
- Employees are restricted from being in the shield or trench box when installing or removing. The shield or trench box must be designed to resist calculated trench forces.

Daily Inspection

- 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.
- The inspection shall be conducted by the competent person prior to the start of work and as needed throughout the shift. Inspections shall also be made after every rainstorm or other hazard increasing occurrence. These inspections are only required when employee exposure can be reasonably anticipated.
- Where the competent person finds evidence of a situation that could result in a possible cave-in, failure of protective systems, hazardous atmosphere, or other hazardous conditions, exposed employees shall be immediately removed from the hazardous area until precautions have been taken to assure their safety.
- There shall be a written log of all inspections conducted. This log shall include the date, work site location, results of the inspection, and a summary of any action taken to correct existing hazards.

Requirements for Training

- Workers shall be provided training on excavation/trenching.
- Training shall be performed before the employee is assigned duties in excavations.
- Retraining will be performed whenever work site inspections conducted by the competent person or Arrow S Energy Operating management indicates that an employee does not have the necessary knowledge or skills to safely work in or around excavations.
- Training records shall include the date(s) of the training program, the instructor(s) of the training program, a copy of the written material presented, and the names of the employee(s) to whom the training was given.

Excavation Permit

In order to insure the requirements of this procedure are met, a permit shall be completed prior to the commencement of any excavation.

FALL PROTECTION

Purpose

The purpose of this program is to provide fall protection procedures to prevent injury to employees while performing work assignments at elevated levels.

Scope

This procedure applies to all Arrow S Energy Operating (the company) employees working at a height of 4 feet for oil and gas exploration operations, and 6 feet for construction operations where guardrails or nets are not utilized. This program may be adopted for use by contractors who do not have their own fall protection program.

Definitions

Anchorage- a secure point of attachment for lifelines, lanyards or deceleration devices.

Buckle- any device for holding the body harness closed around the employee's body.

Carabineer- same as Snaphook

Deceleration device- any mechanism, such as a rope grab, rip-stitch lanyard, specially-woven lanyard, tearing or deforming lanyards, automatic self-retracting lifelines/lanyards, etc., which serves to dissipate a substantial amount of energy during a fall arrest, or otherwise limit the energy imposed on an employee during fall arrest.

Deceleration distance- the additional vertical distance a falling employee travels, excluding lifeline elongation and free fall distance, before stopping, from the point at which the deceleration device begins to operate. It is measured as the distance between the location of body harness attachment point (D-ring) before a fall and the location of that attachment point after the employee comes to a full stop.

Lanyard- a flexible line of rope, wire rope, or strap which generally has a connector at each end for connecting the body harness to a deceleration device, lifeline, or anchorage.

Lifeline- means a component consisting of a flexible line for connection to an anchorage at one end to hang vertically (vertical lifeline), or for connection to anchorages at both ends to stretch horizontally (horizontal lifeline), and which serves as a means for connecting other components of a personal fall arrest system to the anchorage.

Personal fall arrest system- means a system used to arrest an employee in a fall from a working level. It consists of an anchorage, connectors, a body harness and may include a lanyard, deceleration device, lifeline, or suitable combinations of these.

Positioning device system- means a body harness system rigged to allow an employee to be supported on an elevated vertical surface, such as a wall, and work with both hands free while leaning.

Rope grab- means a deceleration device which travels on a lifeline and automatically, by friction, engages the lifeline and locks to arrest the fall of an employee.

Self-retracting lifeline/lanyard- means a deceleration device containing a drum-wound line which can be slowly extracted from, or retracted onto, the drum under slight tension during normal employee movement, and which, after onset of a fall, automatically locks the drum and arrests the fall.

Snaphook- means a connector comprised of a hook-shaped member with a normally closed keeper, or similar arrangement, which may be opened to permit the hook to receive an object and, when released, automatically closes to retain the object.

Fall Protection Components

Figure A

Figure B

1. Tie-off Point
2. Lifeline
3. Rope Grab
4. Shock Absorbing Lanyard
5. Cross-Arm Strap
6. Retractable Lifeline
7. Full-Body Harness
8. Restraining Belt
9. Restraining Lanyard
10. Carabineer

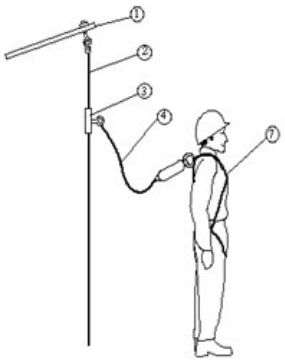


Figure C

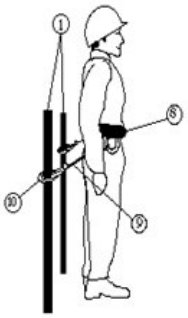


Figure D

Responsibilities

Supervisors
The Supervisor shall ensure that all persons assigned to work at elevated levels, exceeding 4 feet in all operations except construction where the rule is 6 feet or more above lower levels, and where guardrails or nets are not utilized, shall be protected by personal fall protection equipment.

- Supervisors shall make exposure determinations and consider the extent to which scaffolds, ladders or vehicle mounted work platforms can be used.
- Ensure that fall protection equipment is available and in safe working condition.
- Provide for emergency rescue in the event of a fall.

Employees
Employees shall use the fall protection equipment as required by this program and:

- Understand the potential hazards of working at elevated levels as well as gaining access to and from elevated work locations.
- Inspect such equipment before each use and report defective equipment immediately to their supervisor.

Procedure

The following are minimum standards for employee personal fall protection systems:

- All D-rings must be a minimum of 2¼ inches (inside diameter).
- All snap hooks shall not allow pressure to be applied to the gate in the opening direction.
- No pelican hooks on lanyards should be used as a primary connection.
- Connectors shall be drop forged, pressed or formed steel, or made of equivalent materials.
- Connectors shall have a corrosion-resistant finish, and all surfaces and edges shall be smooth to prevent damage to interfacing parts of the system.
- D-rings and snap hooks shall have a minimum tensile strength of 5,000 pounds.
- D-rings and snap hooks shall be proof-tested to a minimum tensile load of 3,600 pounds without cracking, breaking, or taking permanent deformation.
- Snap hooks shall be sized to be compatible with the member to which they are connected, to prevent unintentional disengagement of the snap hook. Only locking type snap hooks shall be used for fall prevention.
- Horizontal lifelines shall be designed, installed, and used, under the supervision of a qualified person, as part of a complete personal fall arrest system, which maintains a safety factor of at least two.
- Lanyards and vertical lifelines shall have a minimum breaking strength of 5,000 pounds. Where vertical lifelines are used, each employee shall be attached to a separate lifeline.
- Lifelines shall be protected against being cut or abraded.
- Self-retracting lifelines and lanyards which automatically limit free fall distance to 2 feet or less shall be capable of sustaining a minimum tensile load of 3,000 pounds applied to the device with the lifeline or lanyard in the fully extended position.
- Self-retracting lifelines and lanyards which do not limit free fall distance to 2 feet or less, rip stitch lanyards, and tearing and deforming lanyards shall be capable of sustaining a minimum tensile load of 5,000 pounds applied to the device with the lifeline or lanyard in the fully extended position.

- Anchorages used for attachment of personal fall arrest equipment shall be independent of any anchorage being used to support or suspend platforms and capable of supporting at least 5,000 pounds per employee attached, or shall be designed, installed, and used as part of a complete personal fall arrest system which maintains a safety factor of at least two and under the supervision of a qualified person.
- Systems used by an employee having a combined person and tool weight more than 310 pounds shall be modified to provide proper protection for such heavier loads.
- The attachment point of the body harness shall be in the center of the wearer's back near shoulder level, or above the wearer's head, except when climbing.
- Body harnesses and components shall be used only for employee protection and not to hoist materials.
- Personal fall arrest systems and components subjected to impact loading shall be immediately removed from service and shall not be used again for employee protection until inspected and determined by a competent person to be undamaged and suitable for reuse.
- Provide for prompt rescue of employees in the event of a fall or shall assure the employees are able to rescue themselves.
- Personal fall arrest systems shall be inspected prior to each use for wear, damage and other deterioration, and defective components shall be removed from service.
- Personal fall arrest systems shall not be attached to guardrail systems, nor shall they be attached to hoists unless prior approval is obtained from a competent person.
- When a personal fall arrest system is used at hoist areas, it shall be rigged to allow the movement of the employee only as far as the edge of the walking/working surface.

Stopping a Fall
The arresting force on an employee stopped by a fall shall be limited to a maximum arresting force of 1,800 pounds when wearing a body harness.

The fall arrest system shall be rigged such that an employee can neither free fall more than 4 feet, nor contact any lower level.

The fall arrest system shall bring an employee to a complete stop and limit maximum deceleration distance an employee travels to 3.5 feet.

The fall arrest system shall have enough strength to withstand twice the potential impact energy of an employee free falling 4 feet, or the free fall distance permitted by the system, whichever is less.

Protection from Falling Objects
When employees are required to work in the near vicinity of others working with materials, tools, or equipment at elevated levels, barricades around the immediate area of the overhead work shall be erected to prohibit employees from entering the barricaded area.

Employees performing work at elevated levels shall keep tools, materials, and equipment away from the edge to keep potential objects from falling over the side. Where practical, tools and loose items shall be secured with rope, wire, etc. to keep them from falling.

Portable Ladders
Three-point climbing is required while ascending/descending ladders. While on ladders, both hands and one foot, or both feet and one hand shall always be in contact with the ladder.

Tools required to perform a task shall be transported by a mechanical carrier such as a tag line, suspended bucket or tool belt.

- Tools shall not be carried by hand while climbing.
- Hands must be free to grip the ladder.
- Tools shall not be carried in clothing pockets.
- Tools shall be pulled up to the job site only after reaching the area of work.

When work is to be performed from straight/extension ladders, fall protection shall be utilized when heights exceed 4 feet in all activities except construction where the rule is 6 feet.

Straight ladders shall be tied off at the top to prevent them from moving. A second person shall steady the ladder at the base while it is being tied off at the top by another employee. Do not tie off fall protection equipment to the ladder.

Storage
A dedicated storage area shall be provided for the storage of fall protection equipment and all components. The storage area shall keep the equipment clean, dry, and free from oils, chemicals, paints, and excessive heat.

Inspections
Fall protection equipment shall be inspected before each use for wear, damage, other deterioration, or other defects. The type of equipment that should be inspected includes but is not limited to:

- Full Body Harnesses
- Lanyards
- Tie Off Adapters
- Anchorage Plates
- Hooks and Carabiners
- Self-Retracting Lifelines

Elevated Personnel Platforms
Work performed, regardless of the nature of the work, from personnel platforms raised by forklifts, cranes, scissor lifts, etc., shall require the use of a full body harness and shall be connected to the platform.

Prompt Rescue of an Employee in the Event of a Fall
The supervisor shall provide for prompt rescue of employees in the event of a fall or shall assure the employees are able to rescue themselves.

The pre-planning stage prior to the beginning of each elevated work assignment shall be evaluated by the supervisor to provide rescue of employees involved in a fall.

Working Without Fall Protection
This option is available only to employees engaged in leading edge work who can demonstrate that it is infeasible, or it creates a greater hazard to use conventional fall protection equipment. A Site Specific Fall Protection Plan shall be developed in such cases and conform to the following provisions, and be approved in writing by the HSE Director:

- The fall protection plan shall be prepared by a qualified supervisor and developed specifically for the site where the leading-edge work is being performed.
- The fall protection plan shall document the reasons why the use of conventional fall protection systems (guardrail systems, personal fall arrest systems, or safety net systems) are infeasible or why their use would create a greater hazard.
- The fall protection plan shall identify each location where conventional fall Protection methods cannot be used.
- These locations shall then be classified as controlled access zones.

Controlled Access Zones
When used to control access to areas where leading edge or other operations are taking place the controlled access zone shall be defined by a control line or by any other means that restricts access.

When control lines are used, they shall be erected not less than 4 feet (1.8 m) nor more than 25 feet (7.7 m) from the unprotected or leading edge.

The control line shall extend along the entire length of the unprotected or leading edge and shall be approximately parallel to the unprotected or leading edge.

The control line shall be connected on each side to a guardrail system or wall.

- Control lines shall consist of ropes, wires, tapes, or equivalent materials.
- Each line shall be flagged or otherwise clearly marked at not more than 6-foot (1.8 m) intervals with high-visibility material.
- Each line shall be rigged and supported in such a way that its lowest point (including sag) is not less than 39 inches (1 m) from the walking/working surface and its highest point is not more than 45 inches (1.3 m).
- Each line shall have a minimum breaking strength of 200 pounds.

Only employees engaged in the related work shall be permitted in the controlled access zone.

Safety Monitoring System
When the use of conventional fall protection equipment is deemed infeasible or the use of this equipment creates a greater hazard, a safety monitoring person shall be assigned by the supervisor.

The safety monitoring person shall be a competent person to monitor the safety of other employees. The competent person shall be assigned to:

- Recognize fall hazards;
- Warn employees if they are unaware of fall hazard or are acting in an unsafe manner;
- Be on the same working surface and in visual contact of working employees;
- Stay close enough for verbal communication; and
- Not have other assignments that would take his/her attention from the monitoring function.

Training

Employees are provided training on fall protection. A training program shall be provided for each employee who might be exposed to fall hazards. Training shall enable each employee to recognize the hazards of falling and shall

train each employee in the procedures to follow to minimize these hazards and proper inspections and maintenance procedures.

Retraining is performed as necessary. Retraining shall be provided when the following are noted:

- Deficiencies in training,
- Workplace changes
- When fall protection equipment is modified.

Fall protection training is documented. Written certification records showing participants, training dates and signatures of attendees must be maintained.

FIRE PREVENTION

Purpose

The purpose of this Fire Prevention Plan is to eliminate the causes of fire, prevent loss of life and property by fire, and to comply with the Occupational Safety and Health Administration's (OSHA) standard on fire prevention, 29 CFR 1910.39. It provides Arrow S Energy Operating (the company) employees and contractors with information and guidelines that will assist them in recognizing, reporting, and controlling fire hazards.

Scope

This program represents the minimum federal requirements and so it is expected that Arrow S Energy Operating contractors meet the requirements of this plan at a minimum. This plan applies to all Arrow S Energy Operating employees and all Arrow S Energy Operating locations. This program may be adopted for use by contractors who do not have a formal Fire Prevention Plan.

Background

- Arrow S Energy Operating is committed to minimizing the threat of fire to employees, contractors, visitors, and property. Arrow S Energy Operating complies with all applicable laws, regulations and codes pertaining to fire prevention. The company's separate Emergency Action Plan spells out the procedures for responding to fires while this Fire Prevention Plan serves to reduce the risk of fires at company Locations in the following ways:
- Identifies materials that are potential fire hazards and their proper handling and storage procedures;
- Distinguishes potential ignition sources and the proper control procedures of those materials;
- Describes fire protection equipment and/or systems used to control fire hazards;
- Identifies persons responsible for maintaining the equipment and systems installed to prevent or control ignition of fires;
- Identifies persons responsible for the control and accumulation of flammable or combustible material;
- Describes good housekeeping procedures necessary to insure the control of accumulated flammable and combustible waste material and residues to avoid a fire emergency; and
- Provides training to employees with regard to fire hazards to which they may be exposed.

Responsibilities

Fire safety is everyone's responsibility. All employees and contractors should know how to prevent and respond to fires and are responsible for adhering to company policy regarding fire emergencies.

Management

Management determines the Arrow S Energy Operating fire prevention and protection policies. Management will provide adequate controls to provide a safe workplace and will provide adequate resources and training to its employees to encourage fire prevention and the safest possible response in the event of a fire emergency. It is an expectation that contractors provide the same to their workers.

Plan Administrator
The HSE Director shall manage the Fire Prevention Plan for Arrow S Energy Operating and shall maintain all records pertaining to the plan. The Plan Administrator shall also:

- Develop and administer the Arrow S Energy Operating fire prevention training program.
- Ensure that fire control equipment and systems are properly maintained.
- Control fuel source hazards.

Supervisors
Supervisors are responsible for ensuring that employees receive appropriate fire safety training, and for notifying the HSE Director when changes in operation increase the risk of fire. Supervisors are also responsible for enforcing Arrow S Energy Operating fire prevention and protection policies.

Employees/ Contractor Employees
All employees shall:

- Complete all required training before working without supervision.
- Conduct operations safely to limit the risk of fire.
- Report potential fire hazards to their supervisors.
- Follow fire emergency procedures.

Plan Implementation

Good Housekeeping
To limit the risk of fires, employees shall take the following precautions:

- Minimize the storage of combustible materials.
- Make sure that locations, doors, hallways, stairs, and other exit routes are kept free of obstructions.
- Dispose of combustible waste in covered, airtight, metal containers.
- Use and store flammable materials in well-ventilated areas away from ignition sources.
- Use nonflammable cleaning products.
- Keep incompatible (i.e., chemically reactive) substances away from each other.
- Perform “hot work” (i.e., welding or working with an open flame or other ignition sources) in controlled and well-ventilated areas.
- Keep equipment in good working order (i.e., inspect electrical wiring and appliances regularly and keep motors and machine tools free of dust and grease.)
- Ensure that heating units are safeguarded.
- Report all oil or gas leaks immediately. The site supervisor shall ensure that all gas leaks are repaired immediately upon notification.
- Repair and clean up combustible or flammable liquid leaks immediately.
- Keep work areas free of dust, lint, sawdust, scraps, and similar material.
- Do not rely on extension cords if wiring improvements are needed and take care not to overload circuits with multiple pieces of equipment.
- Ensure that required hot work permits are obtained when required.
- Turn off electrical equipment when not in use.

Maintenance

The site manager will ensure that equipment is maintained according to manufacturers' specifications. Arrow S Energy Operating will also comply with requirements of the National Fire Protection Association (NFPA) codes for specific equipment. Only properly trained individuals shall perform maintenance work.
The following equipment is subject to the maintenance, inspection, and testing procedures:

- Equipment installed to detect fuel leaks, control heating, and control pressurized systems;
- Portable fire extinguishers, automatic sprinkler systems, and fixed extinguishing systems;
- Detection systems for smoke, heat, or flame;
- Fire alarm systems; and
- Emergency backup systems and the equipment they support.

Types of Hazards

The following sections address the major workplace fire hazards at Arrow S Energy Operating's facilities and the procedures for controlling the hazards.

Electrical Fire Hazards
Electrical system failures and the misuse of electrical equipment are leading causes of workplace fires. Fires can result from loose ground connections, wiring with frayed insulation, or overloaded fuses, circuits, motors, or outlets. To prevent electrical fires, employees shall:

- Make sure that worn wires are replaced.
- Use only appropriately rated fuses.
- Never use extension cords as substitutes for wiring improvements.
- Use only approved extension cords [i.e., those with the Underwriters Laboratory (UL) or Factory Mutual (FM) label].
- Check wiring in hazardous locations where the risk of fire is especially high.
- Check electrical equipment to ensure that it is either properly grounded or double insulated.
- Ensure adequate spacing while performing maintenance.

Portable Heaters
All portable heaters shall be approved by the office manager. Portable electric heaters shall have tip-over protection that automatically shuts off the unit when it is tipped over. There shall be adequate clearance between the heater and combustible furnishings or other materials at all times.

Office Fire Hazards
Fire risks are not limited to Arrow S Energy Operating's field facilities. Fires in offices have become more likely because of the increased use of electrical equipment, such as computers, printers and fax machines. To prevent office fires, employees shall:

- Avoid overloading circuits with office equipment.
- Turn off nonessential electrical equipment at the end of each workday.
- Keep storage areas clear of rubbish.
- Ensure that extension cords are not placed under carpets.

- Ensure that trash and paper set aside for recycling is not allowed to accumulate.

Cutting, Welding, and Open Flame Work

The site manager will ensure the following:

- All necessary hot work permits have been obtained prior to work beginning when required.
- Cutting and welding are done by authorized personnel in designated cutting and welding areas whenever possible.
- Adequate ventilation is provided.
- Torches, regulators, pressure-reducing valves, and manifolds are UL listed or FM approved.
- Oxygen-fuel gas systems are equipped with listed and/or approved backflow valves and pressure-relief devices.
- Cutting or welding is prohibited in sprinklered areas while sprinkler protection is out of service.
- Cutting or welding is prohibited in areas where explosive atmospheres of gases, vapors, or dusts could develop from residues or accumulations in confined spaces.
- Cutting or welding is prohibited on metal walls, ceilings, or roofs built of combustible sandwich-type panel construction or having combustible covering.
- Confined spaces such as tanks are tested to ensure that the atmosphere is not over ten percent of the lower flammable limit before cutting or welding in or on the tank.
- Small tanks, piping, or containers that cannot be entered are cleaned, purged, and tested before cutting or welding on them begins.
- Fire watch has been established.

Flammable and Combustible Materials

The HSE Director shall regularly evaluate the presence of combustible materials at Arrow S Energy Operating (see Drilling and Production safety assessments).

Certain types of substances can ignite at relatively low temperatures or pose a risk of catastrophic explosion if ignited. Such substances obviously require special care and handling.

1. Class A combustibles.

   These include common combustible materials (wood, paper, cloth, rubber, and plastics) that can act as fuel and are found in non-specialized areas such as offices.

   To handle Class A combustibles safely:

   a) Dispose of waste daily.
   b) Keep trash in metal-lined receptacles with tight-fitting covers (metal wastebaskets that are emptied every day do not need to be covered).
   c) Keep work areas clean and free of fuel paths that could allow a fire to spread.
   d) Keep combustibles away from accidental ignition sources.
   e) Store paper stock in metal cabinets.
   f) Store rags in metal bins with self-closing lids.
   g) Do not order excessive amounts of combustibles.
   h) Make frequent inspections to anticipate fires before they start.
   i) Water, multi-purpose dry chemical (ABC), and halon 1211 are approved fire extinguishing agents for Class A combustibles.

2. Class B combustibles.

These include flammable and combustible liquids (oils, greases, tars, oil-based paints, and lacquers), flammable gases, and flammable aerosols.

To handle Class B combustibles safely:

a) Use only approved pumps, taking suction from the top, to dispense liquids from tanks, drums, barrels, or similar containers (or use approved self-closing valves or faucets).
b) Do not dispense Class B flammable liquids into containers unless the nozzle and container are electrically interconnected by contact or by a bonding wire. Either the tank or container must be grounded.
c) Store, handle, and use Class B combustibles only in approved locations where vapors are prevented from reaching ignition sources such as heating or electric equipment, open flames, or mechanical or electric sparks.
d) Do not use a flammable liquid as a cleaning agent inside a building (the only exception is in a closed machine approved for cleaning with flammable liquids).
e) Do not use, handle, or store Class B combustibles near exits, stairs, or any other areas normally used as exits.
f) Do not weld, cut, grind, or use unsafe electrical appliances or equipment near Class B combustibles.
g) Do not generate heat, allow an open flame, or smoke near Class B combustibles.
h) Know the location of and how to use the nearest portable fire extinguisher rated for Class B fire.

Water should not be used to extinguish Class B fires of flammable liquids. Water can cause the burning liquid to spread, making the fire worse. To extinguish a fire caused by flammable liquids, exclude the air around the burning liquid. The following fire-extinguishing agents are approved for Class B combustibles: carbon dioxide, multi-purpose dry chemical (ABC), halon 1301, and halon 1211. (NOTE: Halon has been determined to be an ozone-depleting substance and is no longer being manufactured. Existing systems using halon can be kept in place.)

Smoking

Smoking is prohibited in all Arrow S Energy Operating buildings. Certain outdoor areas may also be designated as no smoking areas. The areas in which smoking is prohibited outdoors are identified by NO SMOKING signs.

Training

The HSE Director shall present basic fire prevention training to all employees upon employment, and shall maintain documentation of the training, which includes:

- Review of 29 CFR 1910.38, including how it can be accessed;
- This Fire Prevention Plan, including how it can be accessed;
- Good housekeeping practices;
- Proper response and notification in the event of a fire;
- Instruction on the use of portable fire extinguishers (as determined by company policy in the Emergency Action Plan); and
- Recognition of potential fire hazards.

Supervisors shall train employees about the fire hazards associated with the specific materials and processes to which they are exposed and will maintain documentation of the training. Employees will receive this training:

- At their initial assignment;
- Annually; and
- When changes in work processes necessitate additional training.

Program Review

The HSE Director shall review this Fire Prevention Plan at least annually for necessary changes.

FIRST AID

Purpose

The purpose of this program is to establish the minimum first aid supplies, equipment and actions necessary to properly respond in the event of an injury and to comply with federal regulations, OSHA's 29 CFR 1910.151 standard.

Scope

This program is applicable to all Arrow S Energy Operating (the company) employees while engaged in work on behalf of the company. In the absence of an infirmary, clinic, or hospital in near proximately to the workplace which is used for the treatment of all injured employees, a person or persons shall be adequately trained to render first aid. When work is performed by a contractor on a company site, the contractor's program shall take precedence. However, this program may be adopted for use by contractors who do not have a formal First Aid Program.

Responsibilities

All workers:

- Are responsible for using first aid materials in a safe and responsible manner.

HSE Director:

- Is responsible for corresponding with the Red Cross or an equivalent body to keep employee training levels current.
- Ensure the telephone numbers of the physicians, hospitals, or ambulances to be used are available for all areas where work is being performed on behalf of the company.

Site supervisor:

- Ensure adequate first aid supplies and equipment are easily accessible when required.
- Ensure that a minimum of one employee, with a valid first aid training certificate, shall always be present to render first aid if medical assistance is not available within 3-4 minutes of the job site.
- Ensure that prompt medical attention provisions have been made prior to commencement of a project, including transportation in case of serious injury.

Requirements

Medical Response

All minor first aid cases such as small wounds, including minor scrapes, burns and cuts, or other small injuries, which most often have no lasting consequences are to be self-rendered. Because of the risks presented by certain bloodborne pathogens, no employee is allowed to render aid to the minor injuries of other employees.

In the absence of an infirmary, clinic, hospital, or physician, that is reasonably accessible in terms of time and distance to the worksite, which is available for the treatment of injured employees, a person who has a valid certificate in first-aid shall be available at the worksite to render first aid. A valid certificate in first-aid training must be obtained from the U.S. Bureau of Mines, the American Red Cross or equivalent training that can be verified by documentary evidence.

Employees authorized to render first aid will always observe universal precautions. (Universal Precautions means that the aid giver treats all bodily fluids as if they were contaminated).

If 911 is not available refer to the list of posted phone numbers for prearranged medical response providers. All Arrow S Energy Operating authorized first responders shall have a cell phone as a means of communications, otherwise handheld radios or telephones shall be used as a means of communication.

Supplies and Equipment
First aid supplies shall be easily accessible when required. Always follow the manufacturer's instructions when using the supplies in the first aid kit.

All Arrow S Energy Operating first aid kits contain appropriate items determined to be adequate for the environment in which they are used and if on a field site are stored in a weatherproof container with individual contents sealed in original packaging from the manufacturer for each type of item. Bulk containers with unpackaged individual medication such as ibuprofen are not allowed in company first aid kits.

Site managers are responsible to ensure the availability of adequate first aid supplies and to periodically reassess the availability for supplies and to adjust inventories. First Aid kits are to be inspected:

- On the first working day of each month to verify that they are fully stocked and that no expiration dates have been exceeded, and
- Before being sent out to the field, and
- Replace any items that have exceeded their expiration dates or that have been depleted.

Where the eyes or body of any person may be exposed to injurious corrosive materials, a safety shower and/or eye wash (suitable facilities) or other suitable facilities shall be provided within the work area. Ensure expiration dates are checked and water used in storage devices is sanitized.

Each first aid kit shall be equipped with protective gloves.

An assessment of the material or materials used shall be performed to determine the type of flushing/drenching equipment required. At company job sites, portable or temporary eyewash stations must be established, available for use and in proper working condition prior to the use of corrosive materials.

Transportation of the Injured
Based on the first responder’s assessment of the injuries involved, that person should decide whether the injured requires to be taken directly to a hospital’s emergency room, occupational care provider or administer first aid on location.

Proper equipment for prompt transportation of the injured person to a physician or hospital or a communication system for contacting necessary ambulance service shall be provided.

Choices to consider include private automobile, company vehicle, helicopter, EMS vehicles or any other transportation that can provide safe transportation to the hospital or doctor’s office to provide medical attention to the injured in the quickest manner without any additional complications or injuries to the injured employee.

Transportation needs must be preplanned and coordinated with the transportation provider prior to an incident requiring such service.

Training
Volunteers or selected employees will be trained by the American Red Cross or equivalent in CPR and first aid.

FORKLIFT SAFETY

Purpose

The purpose of this program is to establish requirements for the safe operation and use of Powered Industrial Trucks.

Scope

This program applies to all Arrow S Energy Operating (the company) employees who operate a Powered Industrial Truck in the scope of their job duties and assignments. When work is performed on a company owned or operated site, the contractor's program shall take precedence. However, this program may be adopted for use by contractors who do not have a formal Forklift Safety Program. *NOTE*: All employees are required to be trained and certified prior to operating each specific type of forklift.

Definitions

Authorized Employee: A person, at least 18 years of age and who has completed the company's required safety training for the safe operations of forklifts.

Forklift (Powered Industrial Truck): Any mechanical device used for the movement of supplies, material or finished product that is powered by an electric motor or an internal combustion engine.

Key Responsibilities

Manager/Supervisor

- Shall ensure that each powered forklift operator is competent to operate a forklift safely, as demonstrated by the successful completion of the training and evaluation program.
- Shall ensure that all forklifts are inspected before use by each operator and all needed repairs are made before the forklift is operated.

Employees

- Shall be current on applicable training.
- Operate forklift in accordance to the forklift standards and manufacture requirements.
- Inspect forklift at the start of shift and repair any known defects before forklift is operated.
- Operate forklift in a safe manner.

Procedure

General

- All approved forklifts shall have a manufactures identification plate attached showing all specifications of the forklift and that the forklift is accepted by a nationally recognized testing laboratory.

- Modifications and additions, that affect capacity and safe operation, shall not be performed without manufacturer's prior written approval. Capacity, operation, and maintenance instruction plates, tags, or decals shall be changed to reflect the modification or addition.
-

- If the forklift is equipped with front-end attachments other than factory installed attachments, the supervisor shall ensure that the forklift is marked to identify the attachments and show the approximate weight of the forklift and attachment combination at maximum elevation with load laterally centered.
- The operator shall see that all nameplates and markings are in place and are maintained in a legible condition.
- All forklifts shall be equipped with safety seat belts.
- All forklifts shall be equipped with a horn, backup alarm, beacon light, headlights and taillight.

Safety Guards

- Forklifts shall be fitted with an overhead rollover cage, as per manufactures specifications.
- If the type of load presents a hazard to the operator, the forklift shall be equipped with a vertical load backrest extension, as per manufactures specifications.

Training

Training shall consist of a combination of formal instruction (e.g., lecture, discussion, interactive computer learning, video tape, and written material), practical training (demonstrations performed by the trainer and practical exercises performed by the trainee) and evaluation of the operator's performance in the workplace.

All operator training and evaluation shall be conducted by authorized persons who have the knowledge, documented training, and experience to train powered industrial truck operators and evaluate their competence.

Each operator is required to be re-evaluated every three years.

Training shall include the following topics, except in topics for locations where they are not applicable to safe operation of the truck due to the type of equipment or facility conditions.

1. Operating instructions, warnings, and precautions for the types of truck the operator will be authorized to operate,
2. Differences between the truck and the automobile,
3. Truck controls and instrumentation: where they are located, what they do, and how they work,
4. Engine or motor operation,
5. Steering and maneuvering,
6. Visibility (including restrictions due to loading),
7. Fork and attachment adaptation, operation, and use limitations,
8. Vehicle capacity,
9. Vehicle stability,
10. Any vehicle inspection and maintenance that the operator will be required to perform,
11. Refueling and/or charging and recharging of batteries,
12. Operating limitations,

13. Any other operating instructions, warnings, or precautions listed in the operator's manual for the types of vehicle that the employee is being trained to operate,
14. Surface conditions where the vehicle will be operated,
15. Composition of loads to be carried and load stability,
16. Load manipulation, stacking, and unstacking,
17. Pedestrian traffic in areas where the vehicle will be operated,
18. Narrow aisles and other restricted places where the vehicle will be operated,
19. Hazardous (classified) locations where the vehicle will be operated,
20. Ramps and other sloped surfaces that could affect the vehicle's stability,
21. Closed environments and other areas where insufficient ventilation or poor vehicle maintenance could cause a buildup of carbon monoxide or diesel exhaust,
22. Other unique or potentially hazardous environmental conditions in the workplace that could affect safe operation, and
23. The requirements of CFR 1910.178 (Powered Industrial Trucks).

Mandatory refresher training shall be provided when unsafe operations are observed, after an incident, if operating a different vehicle type, changes in conditions or any time Arrow S Energy Operating feels an operator requires refresher training.

Certification
Only trained and certified operators, including supervisors, can operate the device (this includes refresher training requirements).

The trainer shall certify in writing that each operator has been trained and evaluated as required.

The certification shall include the name of the operator, the date of the training, the date of the evaluation and the identity of the person(s) performing the training and/or evaluation.

Operations
General

- All operators shall wear a safety seat belt when operating a forklift.
- Forklifts shall not be driven up to anyone standing in front of a bench or other fixed object.
- No person shall be allowed to stand or pass under the elevated portion of any forklift, whether loaded or empty.
- Unauthorized personnel shall not be permitted to operate forklifts.
- No riders or passengers are permitted.
- It is prohibited for arms or legs to be placed between the uprights of the mast or outside the running lines of the forklift.
- When a forklift is left unattended, the forks shall be fully lowered, controls shall be neutralized, power shall be shut off, and brakes set.
- Wheels shall be blocked if the forklift is parked on an incline.
- A forklift is unattended when the operator is 25 ft. or more away from the vehicle, which remains in view, or whenever the operator leaves the forklift and it is not in view.

- When the operator of a forklift is dismounted and within 25 ft. of the forklift still in view, the forks must be fully lowered, controls neutralized, and the brakes set to prevent movement. The operator may leave the forklift running in this scenario.
- A safe distance shall be maintained from the edge of ramps or platforms while on any elevated dock, or platform or freight car.
- Forklifts shall not be used for opening or closing freight doors.
- Brakes shall be set and wheel blocks shall be in place to prevent movement of trucks or trailers while loading or unloading.
- Fixed jacks may be necessary to support a semi-trailer during loading or unloading when the trailer is not coupled to a tractor.
- The flooring of trucks, trailers, and railroad cars shall be checked for breaks and weakness before they are driven onto.
- There shall be enough headroom under overhead installations, lights, pipes, sprinkler system, etc.
- An overhead guard (cages) shall be used as protection against falling objects.
- An overhead guard is intended to offer protection from the impact of small packages, boxes, bagged material, etc., representative of the job application, but not to withstand the impact of a falling capacity load.
- Fire aisles, access to stairways, and fire equipment shall be kept clear.

Traveling

- The operator shall slow down and sound the horn at cross isles and other locations where vision is obstructed.
- If the load being carried obstructs forward view, the operator shall be required to travel with the load trailing.
- The operator shall be required to look in the direction of and keep a clear view of the path of travel.
- Grades shall be ascended or descended slowly.
- When ascending or descending grades more than 10 percent, loaded forklifts shall be driven with the load upgrade.
- On all grades the load and the forks shall be tilted back if applicable and raised only as far as necessary to clear the road surface.
- Under all travel conditions the forklift shall be operated at a speed that will permit it to be brought to a stop in a safe manner.
- Stunt driving, and horseplay are prohibited.
- The operator shall slow down for wet and slippery floors.
- Dock board or bridge plates shall be properly secured before they are driven over.
- Dock board or bridge plates shall be driven over carefully and slowly, and their rated capacity never exceeded.
- While negotiating turns, speed shall be reduced to a safe level by means of turning the hand steering wheel in a smooth, sweeping motion.

- Except when maneuvering at a very low speed, the hand steering wheel shall be turned at a moderate, even rate.

Loading

- Only stable or safely arranged loads shall be handled.

- Caution shall be exercised when handling off-center loads, which cannot be centered.
- Only loads within the rated capacity of the forklift shall be handled.
- Forklifts equipped with attachments shall be operated as partially loaded forklifts when not handling a load.
- The forks shall be placed under the load as far as possible; the mast shall be carefully tilted backward to stabilize the load.
- Extreme care shall be used when tilting the load forward or backward, particularly when high tiering.
- Tilting forward with load engaging means elevated shall be prohibited except to pick up a load.
- An elevated load shall not be tilted forward except when the load is in a deposit position over a rack or stack.
- When stacking or tiering, only enough backward tilt to stabilize the load shall be used.

Operation of the Truck

- If at any time a forklift is found to need repair, defective, or in any way unsafe, the forklift shall be taken out of service until it has been restored to safe operating condition.
- Fuel tanks shall not be filled while the engine is running.
- Spillage of oil or fuel shall be carefully washed away or completely evaporated and the fuel tank cap replaced before restarting engine.
- When fueling with Liquefied Petroleum Gas (LPG), precautions and handling requirements set forth in the "Safe Handling of LPG" program shall be followed.
- No forklift shall be operated with a leak in the fuel system.
- Open flames shall not be used for checking electrolyte level in storage batteries or gasoline level in fuel tanks.
- Operator must verify trailer chocks, supports, and dock plates are secured prior to loading/unloading.

Maintenance and Inspection of Forklifts

- Only authorized personnel shall perform maintenance and make repairs.
- Those repairs to the fuel and ignition systems of forklifts, which involve fire hazards, shall be conducted only in locations designated for such repairs.
- Forklifts in need of repairs to the electrical system shall have the battery disconnected prior to such repairs.
- Only parts equivalent with those used in the original design shall replace all parts of any forklift requiring replacement parts.

- Forklifts shall not be altered so that the relative positions of the various parts are different from what they were when originally received from the manufacturer, nor shall they be altered either by the addition of extra parts not provided by the manufacturer or by the elimination of any parts.
- Additional counter weighting of fork trucks shall not be done unless approved by the truck manufacturer.
- Forklifts shall be inspected daily by the operator before being placed in service and shall not be placed in service if the inspection shows any condition adversely affecting the safety of the forklift.
- Inspection shall be made at least daily – prior to each shift. (visual – non-documented) Inspection items shall be posted on each forklift. Operators must insure the vehicle is safe prior to operating. A forklify inspection form can be found at www.arrowsenergy.com/hse in the assessments tab.
- Where forklifts are used on a round-the-clock basis, they shall be inspected before each shift.
- Defects when found shall be immediately reported to the supervisor and corrected before operating the forklift.
- When the temperature of any part of any forklift is found to be more than its normal operating temperature, thus creating a hazardous condition, the forklift shall be removed from service and not returned to service until the cause for such overheating has been eliminated.
- Forklifts shall be kept in a clean condition, free of lint, excess oil, and grease.
- Noncombustible agents, where at all possible, shall be used for cleaning trucks.
- Low flash point (below 100 degrees F.) solvents shall not be used.
- High flash point (at or above 100 degrees F.) solvents may be used if precautions regarding toxicity, ventilation, and fire hazard are mitigated with the agent or solvent used.

HAZARD COMMUNICATION

Version: 1 Date: 08/19/2018

Purpose

The purpose of this program is to ensure the safe use of hazardous chemical substances and to comply with the requirements of OSHA HCS 2012. This program may be adopted for use by contractors who do not have a formal hazard communication program.

Introduction
In 2012, OSHA revised the Hazard Communication Standard (HCS) to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS). As a result, this Hazard Communication Program (HCP) has been revised to comply with the requirements of the OSHA HCS 2012.

It spells out how Arrow S Energy Operating will inventory chemicals stored and used, obtain and use Safety Data Sheets, maintain labels on chemical substances and train employees about the hazards of chemicals they are likely to encounter on the job.

Preparation of this program indicates our continuing commitment to safety among our employees and contractors at all company sites.

- Each facility is expected to follow this program and maintain its work areas in accordance with these requirements.
- Employees, contractors and government officials must be provided copies of this program upon request.
- In addition to the program, other information required as part of our hazard communication effort is available to workers at www.arrowsenergy.com/hse.
- Providing and using this information is part of our shared commitment to a safe, healthy workplace.

Scope

This program is applicable to all Arrow S Energy Operating employees and contractors who may be exposed to hazardous chemical substances. Because this program meets minimum federal requirements, the contractor's program shall meet the requirements of this program and take precedence. However, this program may be adopted for use by contractors who do not have a formal hazard communication program.

Responsibilities

HSE Director
The HSE Director, or designee, is responsible for administering the hazard communication program. This person is also responsible for:

- Reviewing the potential hazards and safe use of chemicals.
- Maintaining a list of all hazardous chemicals and a master file of SDSs.
- Ensuring that all containers are labeled, tagged or marked properly.
- Providing new-hire and annual training for employees who may work with chemicals in company operations.
- Maintaining training records.
- Identifying hazardous chemicals used in nonroutine tasks and assessing their risks.
- Informing contractors who are performing work on Arrow S Energy Operating property about potential hazards.

- Reviewing the effectiveness of the hazard communication program and making sure that the program satisfies the requirements of all applicable federal, state or local hazard communication requirements.

Employees

- Employees are responsible for following the requirements in the Hazard Communication Program.
- Any employee who transfers any material from one container to another is responsible for labeling the new container with all required information.
- All employees are responsible for learning the requirements of this section and for applying them to their daily work routine.
- Identifying hazards before starting a job.
- Reading container labels and SDS's.
- Notifying the supervisor of torn, damaged or illegible labels or of unlabeled containers.
- Using controls and/or personal protective equipment provided by the company to minimize exposure.
- Following company instructions and warnings pertaining to chemical handling and usage.
- Properly caring for personal protective equipment, including proper use, routine care and cleaning, storage and replacement.
- Knowing and understanding the consequences associated with not following Arrow S Energy Operating policy concerning the safe handling and use of chemicals.
- Participating in Arrow S Energy Operating training.

Procedure

List of Hazardous Chemicals

The SDS library located at www.arrowsenergy.com/hse will serve as the chemical inventory list of chemicals known to be present on any Arrow S Energy Operating worksite at any given time. Arrow S Energy Operating does not assume responsibility for managing chemical inventories of contractors.

The Hazardous Chemical List is updated as necessary and at least annually by the HSE Director or their designee.

Safety Data Sheets (SDS)

Safety Data Sheets (SDS) are obtained for all hazardous chemicals. Chemical manufacturers are responsible for developing SDSs. Arrow S Energy Operating shall have an SDS for each chemical used.

The purchasing of any potentially hazardous chemical products from any supplier that does not provide an appropriate Safety Data Sheet in a timely fashion is prohibited.

The Safety Data Sheet must be kept in the online SDS library for as long as the chemical is used by the facility.

Electronic access (telephone, fax, internet, etc.) may be used to acquire and maintain SDS libraries and archives.

The HSE Director is responsible for seeing that the Chemical Inventory List is maintained, is current and is complete. He/she will review the Chemical Inventory List at least annually. When a hazardous material

has been permanently removed from the workplace, it is not necessary for the SDS to be removed from the Chemical Inventory List.

SDS's for hazardous materials to which Arrow S Energy Operating employees have been exposed must be maintained after the employee leaves the employment of Arrow S Energy Operating.

Methods to be Used to Inform Employees of the Hazards of Non-Routine Tasks
The methods that Arrow S Energy Operating will use to inform employees of the hazards of non-routine tasks and the hazards associated with chemicals contained in unlabeled pipes in their work areas include:

- Conducting a Job Hazard Assessment (JSA).
- Employees will be advised of methods and special precautions, PPE and the hazards associated with chemicals and the hazards associated with chemicals contained in unlabeled pipes in their work areas.
- In the unlikely event that such tasks are required, the supervisor, or designee, will provide an SDS for the involved chemical.

The Use and Care of Labels and Other Forms of Warning
Containers of hazardous chemicals are labeled. Container labels should contain the following information:

- Product identifier
- Signal word
- Hazard statement
- Pictogram(s)
- Precautionary statement(s), and
- Name, address and telephone number of the chemical manufacturer, importer or other responsible party.

The Manager will ensure that all hazardous chemicals used or stored in the facility are properly labeled.

Damaged labels or labels with incomplete information shall be reported immediately.

Workplace labels or other forms of warning will be legible, in English, and prominently displayed on the container or readily available in the work area throughout each work shift.

If employees speak languages other than English, the information in the other language(s) may be added to the material presented, as long as the information is presented in English as well.

Arrow S Energy Operating will use the GHS labeling system for secondary containers.

Portable containers into which hazardous chemicals are transferred from labeled containers and that are intended for the immediate use of the employee who performs the transfer do not require a label.

If the portable container will be used by more than one employee or used over the course of more than one shift, the container must be labeled.

Chemicals that are received from vendors that are not properly labeled must be rejected.

<u>Pictograms and Hazards</u>

Health Hazard	Flame	Exclamation Mark
• Carcinogen • Mutagenicity • Reproductive Toxicity • Respiratory Sensitizer • Target Organ Toxicity • Aspiration Toxicity	• Flammables • Pyrophorics • Self-Heating • Emits Flammable Gas • Self-Reactives • Organic Peroxides	• Irritant (skin and eye) • Skin Sensitizer • Acute Toxicity (harmful) • Narcotic Effects • Respiratory Tract Irritant • Hazardous to Ozone Layer (Non-Mandatory)
Gas Cylinder	**Corrosion**	**Exploding Bomb**
• Gases Under Pressure	• Skin Corrosion/ Burns • Eye Damage • Corrosive to Metals	• Explosives • Self-Reactives • Organic Peroxides
Flame Over Circle	**Environment** (Non-Mandatory)	**Skull and Crossbones**
• Oxidizers	• Aquatic Toxicity	• Acute Toxicity (fatal or toxic)

Example Label

Multi-Employer Job Sites

Multi-Employer Job Sites

A pre-job briefing shall be conducted with the contractor prior to the initiation of work on the site.

- During this pre-job briefing, contractors shall notify Arrow S Energy Operating and present current copies of Safety Data Sheets and label information for every hazardous chemical brought on-site.
- Arrow S Energy Operating shall notify and provide required SDS and label information for all hazardous chemicals the contractor may encounter on the job.
- The facilities labeling system and any precautionary measures to be taken by contractor during normal conditions and emergencies shall be addressed.
- By providing such information to other employers, Arrow S Energy Operating does not assume any obligations that other employers have for the safety of their employees.

Training

Employees are provided with information and training on the hazardous chemicals they may be exposed to. Employees shall be provided with effective information and training on hazardous chemicals in their work area at the time of their initial assignment, and whenever a new physical or health hazard the employees have not previously been trained about is introduced into their work area. Information and training may be designed to cover categories of hazards (e.g., flammability, carcinogenicity) or specific chemicals. Chemical-specific information must always be available through labels and safety data sheets.

Formal training will be available at www.arrowsenergy.com/hse

The Hazard Communication Program documented training shall, as a minimum, include:

- Requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200 (General Industry) or 29 CFR 1926.59 (Construction Industry).
- Operations in the work area where hazardous chemicals are present.
- Location and availability of the hazard communication program, chemical inventory list and SDS's.

- Methods and observations used to detect the presence or release of a hazardous chemical in the work area, such as monitoring devices, visual appearance or odor of hazardous chemicals when being released.
- Explanation of the labels received on shipped containers.
- Explanation of the workplace labeling system.
- Explanation of the SDS, including order of information and how employees can obtain and use the appropriate hazard information.

Records of employee training are maintained electronically.

HEAT ILLNESS PREVENTION

Purpose

This program is designed to reduce the risk of work-related heat illnesses. Arrow S Energy Operating (the company) is committed to taking every precaution to protect employees who might be exposed to heat stress, including establishing safe work practices, heat illness prevention controls, and emergency preparedness, which will be detailed in this plan. Arrow S Energy Operating complies with local, state, and federal regulations.

Scope

This procedure applies to all company employees exposed to hot environments in the course of/during their employment duties. This program may be adopted for use by contractors who do not have a formal heat illness program.

Definitions

Acclimatization- means temporary adaptation of the body to work in the heat that occurs gradually when a person is exposed to it. Acclimatization peaks in most people within four to fourteen days of regular work for at least two hours per day in the heat.

Heat Illness- means a serious medical condition resulting from the body's inability to cope with a particular heat load, and includes heat cramps, heat exhaustion, heat syncope and heat stroke.

Heat Stress- stress on the body due to high temperatures or exertion, which can lead to heat illness if unchecked.

Preventative recovery period- means a period of time to recover from the heat in order to prevent heat illness.

Shade- means blockage of direct sunlight. Canopies, umbrellas and other temporary structures or devices may be used to provide shade. One indicator that blockage is sufficient is when objects do not cast a shadow in the area of blocked sunlight. Shade is not adequate when heat in the area of shade defeats the purpose of shade, which is to allow the body to cool.

Requirements

All managers and supervisors are responsible for implementing and maintaining the Heat Illness Program in their work areas.

Provision of Water
Employees shall have access to potable drinking water. Where it is not plumbed or otherwise continuously supplied, it shall be provided in sufficient quantity at the beginning of the work shift.

Access to Shade
Employees will be provided with access to shade as well as sufficient rest periods will be provided in an area that is conducive to the cooling of the body, such as but not limited to cooling rooms or tents, trailer/s on site, vehicle etc. Employees suffering from heat illness or believing a preventative recovery period is needed shall be provided access to an area with shade that is either open to the air or provided with ventilation or cooling. Such access to shade shall be permitted at all times. See definition of "Shade".

Control Measures
Each work location involved in working in hot environments shall implement measures that must be in place to control the effects of environmental factors that can contribute to heat related illnesses. The most common environmental factors are air temperature, humidity, radiant heat sources and air circulation.

Physical factors that can contribute to heat related illness shall be taken into consideration before performing a task. The most common physical factors that can contribute to heat related illness are type of work, level of physical activity and duration, and clothing color, weight and breathability.

Supervisors must ensure personal factors that contribute to heat related illness are taken into consideration before assigning a task where there is the possibility of a heat-related illness occurring. The most common personal factors that can contribute to heat related illness are age, weight/fitness, drug/alcohol use, prior heat-related illness, etc.

Each work site shall develop site specific procedures but shall include the minimum:

- Bring at least 2 quarts per employee at the start of the shift, and employees are encouraged to report to supervisor when water supply gets low.
- Supervisors will provide frequent reminders to employees to drink frequently.
- Every morning there will be short tailgate meetings to remind workers about the importance of frequent consumption of water throughout the shift during hot weather.
- Place water containers as close as possible to the workers.
- Water levels should not fall below the point that will allow for adequate water during the time necessary to effect replenishment.
- Working hours will be modified to work during the cooler hours of the day, when possible.
- When a modified or shorter work-shift is not possible, more water and rest breaks will be provided.
- Supervisors will continuously check all employees and stay alert to the presence of heat related symptoms.
- Supervisors will carry cell phones or other means of communication, to ensure that emergency services can be called and check that these are functional at the worksite prior to each shift.
- On occasion, workers will be reminded about address and directions to the worksite to inform medical responders and emergency procedures. The County Specific Emergency Action Plans are available at www.arrowsenergy.com/hse in the "Emergencies" tab.

Heat Illness Detection and Response
Heat cramps:

This affects employees who have perspired so heavily that they have depleted the body's water and salt.

Symptoms:

- Muscle cramps
- Pain or spasms in the abdomen, arms, or legs

First aid:

The victim should do the following:

- Sit and rest in a cool place.
- Drink sports drinks, juice, or water combined with food.
- After recovery, do not begin strenuous work again for several hours.
- Seek medical help if you have heart problems, are on a low-sodium diet, or if you don't feel better after one hour.

Heat exhaustion:

This is the body's response to not being able to cool itself efficiently due to dehydration. Without prompt treatment, this condition can lead to heat stroke.

Symptoms:

- Rapid, weak pulse
- Headache
- Heavy sweating
- Extreme weakness
- Dizziness or fainting
- Irritability
- Nausea or vomiting
- Cold, pale, clammy skin

First aid:

- Help the victim to do the following:
  - Sit and rest in a cool place.
  - Drink small amounts of cool water.
  - Take a cool shower or bath or apply ice packs.
- Monitor the victim carefully. If they do not improve within 30 minutes, get medical help.
- Confusion, vomiting, or fainting may indicate a more serious condition. Seek medical attention immediately in this case.

Heat stroke:

This condition occurs when the body is unable to control its temperature as a result of prolonged exposure or physical exertion in high temperatures. Untreated, it can quickly cause death or disability.

Symptoms:

- High body temperature
- Strong, rapid pulse
- Confusion
- Loss of coordination
- Hot, red, dry or moist skin
- Nausea and vomiting
- Seizure or unconsciousness

First aid:

- Contact emergency medical services immediately.
- Move the victim to a cool, shaded area.
- Remove any excess clothing.
- Cool the victim's body as quickly as possible, using ice or cold water.
- If the victim is able to drink, give him or her cool fluids.

Emergency Response Procedures

- If an employee shows signs of heat illness, they will be monitored and shall not be left alone or sent home without being offered first aid or emergency medical services.
- If an employee reports symptoms of heat illness or if a supervisor or coworker sees evidence of the symptoms, the supervisor will take immediate action appropriate to the symptoms.
- If symptoms indicate severe heat illness, the employer will provide for prompt medical attention according to the Emergency Action Plan for the respective county.

Training

Training in the following topics shall be provided to all supervisory and non-supervisory employees:

- The environmental and personal risk factors for heat illness;
- The importance of frequent consumption of small quantities of water, up to 4 cups per hour, when the work environment is hot, and employees are likely to be sweating more than usual in the performance of their duties;
- The importance of acclimatization;
- The different types of heat illness and the common signs and symptoms of heat illness;
- The importance to employees of immediately reporting to the employer, directly or through the employee's supervisor, symptoms or signs of heat illness in themselves, or in co-workers;
- Arrow S Energy Operating procedures for responding to symptoms of possible heat illness, including how emergency medical services will be provided should they become necessary;
- Arrow S Energy Operating procedures for contacting emergency medical services, and if necessary, for transporting employees to a point where they can be reached by an emergency medical service provider;
- Arrow S Energy Operating procedures for ensuring that, in the event of an emergency, clear and precise directions to the work site can and will be provided as needed to emergency responders.

Supervisors must receive training in the prevention of heat related illnesses prior to supervising employees working in the heat.

Training for employees shall be in a form readily understandable by all affected employees.

Arrow S Energy Operating shall ensure all contractors, subcontractors, staffing companies, etc. employees (including temporary) working outdoors have been trained in heat illness prevention.

HOT WORK

Purpose

The purpose of this program is to assure a safe work environment during welding, cutting and hot-work operations.

Scope

This program covers the minimum requirements for Arrow S Energy Operating (the company) employees and contractors working on company owned or operated sites who are directly involved or assisting in the welding, cutting and hot-work operations. It is intended that the contractor performing hot work shall follow their established internal hot work program. However, this program may be adopted for use by contractors who do not have a formal hot work program.

Definitions

Affected Employee/Worker - a Arrow S Energy Operating Employee or any Worker whose job requires them to work in
an area in which hot work is being performed.
Authorized Employee/Worker - a trained Arrow S Energy Operating Employee or any Worker who is authorized to perform hot work.
Brazing and Soldering - soldering and brazing use molten metal to join two pieces of metal. The metal added during both processes has a melting point lower than that of the workpiece, so only the added metal is melted, not the workpiece. Brazing produces a stronger joint than does soldering, and often is used to join metals other than steel, such as brass. Brazing can also be used to apply coatings to parts to reduce wear and protect against corrosion.
Cutting/Grinding - Any process which produces sparks capable of igniting combustible of flammable materials and transmits heat to the work materials from a hot gas.
Designated Area - A permanent location designed for or approved for hot work operations to be performed regularly.
Fire Watch - Trained personnel who are in attendance during the entire hot work operation and are immediately available to extinguish a fire or take other effective action if needed.
Hazards - includes, but not limited to the following: fires and explosions, skin burns, welding "blindness", and respiratory hazards from fumes and smoke.
Hot Work - Any process that can be a source of ignition when flammable material is present or can be a fire hazard regardless of the presence of flammable material in the workplace. Common hot work processes are welding, soldering, cutting, and brazing.
Hot Work Permit - A document issued for the purpose of authorizing a specified fire ignition potential activity.
Manager, Supervisor - is the site manager or supervisor ultimately responsible for the safe execution of all activities on the site.
Welding - Joining together (metal pieces or parts) by heating the surface to the point of melting using a blowtorch, electric arc, or other means, and uniting them by pressing, hammering,
Worker(s) – all Workers whether it be contractors or Arrow S Energy Operating employees

Key Responsibilities

Managers and Supervisors

- Determine if company property is safe for welding and cutting operations.
- Establish safe areas for welding and cutting operations.
- Ensure training for all workers whose task includes heat, spark or flame producing operations such as welding, brazing, or grinding.
- Develop and monitor effective hot-work procedures.
- Provide safe equipment for hot-work.
- Provide proper and effective PPE for all hot-work.
- Monitor all hot-work operations.
- Ensure all hot-work equipment and PPE are in safe working order.
- Allow only trained and authorized workers to conduct hot-work and conduct inspections of the hot-work area before operations begin.
- Ensure permits are used for all hot-work outside authorized areas.

Workers and Employees

- Follow all hot-work procedures.
- Properly use appropriate hot-work PPE.
- Inspect all hot-work equipment before use.
- Report any equipment problems or unsafe conditions.

Procedure

General

If hot-work is performed outside an authorized safe hot-work area, a hot-work permit must be completed before performing hot-work. Before cutting or welding is permitted the area shall be inspected to ensure all explosive, flammable and combustible materials have been removed and a safe hot-work zone has been established. The site supervisor must authorize hot-work to be performed on any hydrocarbon active or producing company owned or controlled site; the authorization must be supplied in writing such as a permit, hand written, email or text.

A fire watch is required for all hot work activities that produce ignition sources not immediately confined to the exact point of heat generated by the source. Activities that produce sparks, slag, hot debris, or other ignition producing material must be observed by a fire watch for 30 minutes after the work is completed.

Defective hot-work equipment must be removed from service. Operators of equipment should report or remedy any equipment defect or safety hazard/s and discontinue use of equipment until its safety has been assured. Repairs shall be made only by qualified personnel.

Where practicable, all combustibles shall be relocated at least 35 feet from the work site. Where relocation is impractical, combustibles shall be protected with flameproof covers, shielded with metal, guards, curtains, or wet down the material to help prevent ignition of material.

If fire hazards cannot be taken to a safe place or guards cannot be used to confine heat, sparks, slag and protect the immovable fire hazards, the welding and cutting shall not be performed.

Ducts, conveyor systems, and augers that might carry sparks to distant combustibles shall be protected or shut down.

Where cutting or welding is done near walls, partitions, ceilings, or openings in the floor (grating, manholes, etc.), fire-resistant shields or guards shall be provided to prevent ignition.

If welding is to be done on a metal wall, partition, ceiling, or solid decking/flooring, precautions shall be taken to prevent ignition of combustibles on the other side, due to conduction or radiation of heat. Where combustibles cannot be relocated on the opposite side of the work, a fire watch person shall be provided on the opposite side of the work.

Welding shall not be attempted on a metal partition, wall, and ceiling or decking/flooring constructed of combustible sandwich panels.
Cutting or welding on pipes or other metal in contact with combustible walls, partitions, floors, ceilings, or roofs shall not be undertaken if the work is close enough to cause ignition by combustion.

Cutting or welding shall not be permitted in the following situations:

- In areas not authorized by management.
- In sprinkled buildings while such protection is impaired.
- In the presence of potentially explosive atmospheres, e.g. flammables.
- In areas near the storage of large quantities of exposed, readily ignitable materials.
- In areas where there is indoor dust accumulation of greater than 1/16 inch within 35 feet of the area where welding/hot-work will be conducted.
- All indoor dust accumulation shall be cleaned up before welding or hot-work is permitted.

Whenever welding or cutting is performed in locations where other than a minor fire might develop or any of the conditions mentioned above cannot be met, a fire watch shall be provided.

- The fire watch shall be provided during and for a minimum of 1/2 hour past the completion of the welding project.
- The fire watch shall be trained in the use of fire extinguishers and the facility's alarm system.
- During this time the fire watch will have appropriate fire extinguishers readily available.
- Suitable extinguishers shall be provided and maintained ready for instant use.
- A hot-work permit will be issued on all welding or cutting outside of the authorized designated welding area.

Fire Prevention Measures
A designated welding area shall be established to meet the following requirements:

- Indoor floors swept and cleaned of combustibles within 35 feet of work area.
- Flammable and combustible liquids and material will be kept 35 feet from hot-work area.
- Adequate ventilation providing 20 air changes per hour.
- At least one 10-pound dry chemical fire extinguisher shall be within access of 35 feet of the work area.

Requirements for welding conducted outside the authorized designated welding area:

- Portable welding curtains or shields may be necessary to protect other workers in the welding area.

- A hot-work permit must be completed and complied with prior to initiating welding operations.
- Plastic materials must be covered with welding tarps during welding procedures.
- Fire Watch must be provided for all hot-work outside authorized designated area.

Confined Space

A confined space presents extraordinary hazards that present an elevated safety risk. Before any hot work is performed in a confined space, the requirements of the Arrow S Energy Operating Confined Spaces Procedure must be met.

A Confined Space is a space that is:

- A space that Is large enough and so configured that an employee can bodily enter and perform assigned work;
- Has limited or restricted means for entry or exit (for example, tanks, vessels, coolers, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry); and
- Is not designed for continuous occupancy.

Refer to the Arrow S Energy Operating Confined Spaces Program before commencing any welding, cutting, and/or brazing operations in an area meeting the requirements of a confined space.

Ventilation is a prerequisite to work in confined spaces.

When welding or cutting is being performed in any confined spaces, the gas cylinders and welding machines shall be left on the outside. Before operations are started, heavy portable equipment mounted on wheels shall be securely blocked to prevent accidental movement.

When a welder must enter a confined space through a manhole or other small opening, means shall be provided for quickly removing him in case of an emergency.

- When safety belts and lifelines are used for this purpose, they shall be so attached to the welder's body that it cannot be jammed in a small exit opening.
- An attendant with a preplanned rescue procedure shall be stationed outside to observe the welder at all times and be capable of putting rescue operations into effect.
- Rescue personnel must be trained in confined space rescue.

When arc welding is to be suspended for any substantial period of time, such as during lunch or overnight, all electrodes shall be removed from the holders and the holders carefully located so that accidental contact cannot occur, and the machine shall be disconnected from the power source.

In order to eliminate the possibility of gas escaping through leaks of improperly closed valves, when gas welding or cutting, the torch valves shall be closed and the fuel-gas and oxygen supply to the torch positively shut off at some point outside the confined area whenever the torch is not to be used for a substantial period of time, such as during lunch hour or overnight. If practical, the torch and hose shall also be removed from the confined space.

When welding must be performed in a space entirely screened on all sides, the screens shall be so arranged that no serious restriction of ventilation exists. It is desirable to have the screens so mounted that they are about 2 feet (0.61 m) above the floor unless the work is performed at so low a level that the screen must be extended nearer to the floor to protect nearby workers from the glare of welding.

A fixed enclosure shall have a top and not less than two sides which surround the welding or cutting operations, and a rate of airflow sufficient to maintain a velocity away from the welder of not less than 100 linear feet (30 m) per minute.

All welding and cutting operations carried on in confined spaces shall be adequately ventilated to prevent the accumulation of toxic materials or possible oxygen deficiency. This applies not only to the welder, but also to helpers and other personnel in the immediate vicinity. All air withdrawn will be replaced with air that is clean.

In circumstances for which it is impossible to provide such ventilation, airline respirators or hose masks approved for this purpose by the National Institute for Occupational Safety and Health (NIOSH) will be provided. In areas immediately hazardous to life, a full-face piece, positive pressure, self-contained breathing apparatus or a combination full-face piece, positive pressure supplied-air respirator with an auxiliary, self-contained air supply approved by NIOSH must be used.

Where welding operations are carried on in confined spaces and where welders and helpers are provided with hose masks, hose masks with blowers or self-contained breathing equipment, a worker shall be stationed on the outside of such confined spaces to ensure the safety of those working within.

Simultaneous Operations (SIMOPS)
Prior to conducting hot-work on a Arrow S Energy Operating site where simultaneous operations (SIMOPS) are under way, the Arrow S Energy Operating Person In Charge (PIC) must provide consent prior to commencement of hot-work.
Hot-work must be shut down if any of the following conditions occur:

- Any emergency alarm sounds
- Smell of gas
- Evacuation
- Emergency drill
- Any other emergency

Hot-work activities may not resume following any of the above conditions without reauthorization from the PIC.

Prior to actually starting hot-work under an approved hot work permit, an announcement shall be made to notify the PIC that hot-work is beginning; notification shall be made when work is completed as well.

Fumes, Gases and Dust
Fumes produced by some welding processes can be toxic and may require source extraction. An assessment of the work to be performed must be completed before each job is undertaken. Fumes generally contain particles from the material being welded. Welding fumes can have an acute effect on the respiratory system.

Any welding, cutting or burning of lead base metals, zinc, cadmium, mercury, fluorides, beryllium or exotic metals or paints not listed here that could produce dangerous fumes shall have proper ventilation or respiratory protection. This includes inert-gas metal-arc welding or oxygen cutting of stainless steel.

Welders and helpers will refer to the Arrow S Energy Operating Respiratory Protection Program to determine the appropriate respiratory protection to be used during welding operations.

All welding and cutting operations shall be adequately ventilated to prevent the accumulation of toxic materials. This applies not only to the welder, but also to helpers and other personnel in the immediate vicinity.

Personal Protection
Helmets and hand shields shall be made of a material, which is an insulator for heat and electricity. Helmets, shields, and goggles shall not be readily flammable and shall be capable of withstanding sterilization.

Helmets and hand shields shall be arranged to protect the face, neck and ears from direct radiant energy from the arc.

Helmets shall be provided with filter plates and cover plates designed for easy removal.

All personal protective equipment shall be constructed of a material, which will not readily present sensitivity to or discolor the skin.

Goggles shall be ventilated to prevent fogging of the lenses as much as practicable.

All glass for lenses shall be tempered, substantially free from scratches, air bubbles, waves and other flaws. Except when a lens is ground to provide proper optical vision correction, the front and rear surfaces of lenses and windows shall be smooth and parallel.

Lenses shall bear some permanent distinctive marking which may readily identify the source and shade.

The following is a guide for the selection of the proper shade numbers. These recommendations may be varied to suit the individual's needs.

Welding Operation		Shade Number
Shielded metal — arc welding 1/16, 3/32, 1/8-5/32 inch electrodes		10
Gas-shielded arc welding (nonferrous) 1/16, 3/32, 5/32 inch electrodes		11
Gas-shielded arc welding (ferrous) 1/16, 3/32, 1/8, 5/32 electrodes		12
Shielded metal arc welding: 3/16	7/32,1/4 inch electrodes	12
	5/16, 3/8-inch electrodes	14
Atomic hydrogen welding		10 – 14
Carbon arc welding		14
Soldering		2
Torch brazing		3 or 4
Light cutting, hp to 1 inch		3 or 4
Medium cutting, 1 inch to 6 inches		4 or 5
Healy cutting, 6 inches or over		5 or 6
Gas welding (light) up to 1/8 inch		4 or 5
Gas welding (medium) 1/8 - 1/2 inch		5 or 6
Gas welding (heavy) 1/2 inch or over		6 or 8

NOTE:

In gas welding or oxygen cutting where the torch produces a high yellow light, it is desirable to use a filter or lens that absorbs the yellow or sodium line in the visible light of the operation. All filter lenses and plates shall meet the test for transmission of radiant energy prescribed in ANSI Z87.1 — 1968 — American National Standard Practice for Occupational and Educational Eye and face Protection. Where the work permits the welder to be enclosed in an individual booth painted with a finish of low reflectivity such as zinc oxide (an important factor for absorbing ultraviolet radiation) and lamp black or shall be enclosed with noncombustible screens similarly painted. Booths and screens shall permit circulation of air at floor level. Workers or other persons adjacent to the welding areas shall be protected from the rays by noncombustible or flameproof screens or shields or shall be required to wear appropriate goggles.

Adequate hand protection and clothing must be used to protect the body from welding hazards.

Cleaning Compounds
In the use of cleaning materials, because of their possible toxicity or flammability, appropriate precautions such as manufacturer instructions shall be followed.

- Degreasing and other cleaning operations involving chlorinated hydrocarbons shall be so located that no vapors from these operations will reach or be drawn into the atmosphere surrounding any welding operation.
- In addition, trichloroethylene and perchloroethylene shall be kept out of atmospheres penetrated by the ultraviolet radiation of gas-shielded welding operations.

Oxygen cutting, using a chemical flux, iron powder or gas shielded arc cutting for stainless steel shall be performed using mechanical ventilation adequate to remove the fumes generated. It is not permissible for workers to be exposed to these fumes.

Cylinders
Compressed gas cylinders shall be DOT-approved and legibly marked near the shoulder of the cylinder for the purpose of identifying the gas content with either the chemical or trade name of the gas.

- All compressed gas cylinder connections must comply with ANSI B57. 1-1965 Standards.
- Compressed gas cylinders shall be secured in an upright position at all times except, if necessary, for short periods of time while cylinders are actually being hoisted or carried.

All cylinders shall be kept away from sources of heat and from radiators and piping systems that may be used for grounding purposes. Cylinders and cylinder valves including couplings and regulators shall be kept free from oily or greasy substances and must not be handled with gloves or rags in the same condition.

Stored oxygen cylinders shall be kept at least 20 feet from the fuel gas cylinders or combustible materials, especially oil or grease, or separated by a non-combustible barrier at least 5 feet high with a fire rating of at least one-half hour. All empty cylinders shall have closed valves. Valve protection caps shall always be in place and hand-tight except when cylinders are in use or connected for use.

Cylinders shall not be kept in unventilated enclosures such as lockers and cupboards.
Fuel gas cylinders stored inside buildings shall be limited to a total capacity of 2000 cubic feet (300 pounds) of liquefied petroleum gas, except for those in actual use or attached ready for use.

All acetylene cylinders shall be stored valve-end up.

Assigned storage spaces shall be located where cylinders cannot be knocked over or damaged by falling objects or subject to tampering by unauthorized persons.

- Back flow protection shall be provided by an approved device that will prevent oxygen from flowing into the fuel-gas system or fuel from flowing into the oxygen system.
- An approved device that will prevent flame from passing into the fuel-gas system shall provide flashback protection.
- An approved pressure-relief device set at the appropriate pressure shall provide backpressure protection.

Special care must be taken when transporting gas cylinders:

- Cylinders must be secured with valve cap installed.
- Cylinders shall not be lifted by the valve protection caps, the regulators must be removed and cylinders shall not be dropped or permitted to strike each other.
- Removed regulators must be carried in the cab of the vehicle.
- Cylinders shall not be tampered with, nor should any attempt be made to repair them.
- They shall be handled carefully - rough handling, knocks, or falls are liable to damage the cylinder, valve or safety device and cause leakage.

Safety devices shall not be tampered with.

Arc Welding and Cutting
All personnel operating, installing, and maintaining welding equipment shall be qualified or trained to operate and maintain such equipment.

- All workmen assigned to operate or maintain equipment shall be familiar with and electrical welding equipment shall be chosen for safe operation and comply with applicable Requirements for Electric Arc Welding Standards to include: 29 CFR 1910.254, 29 CFR 1910.252 (a)(b) (c) and if gas shielded arc welding is done the must be familiar with the American Welding Society Standard A6-1-1966.
    - Arc welding equipment must be designed to meet conditions such as exposure to corrosive fumes, excessive humidity, excessive oil vapor, flammable gasses, abnormal vibration or shock, excessive dust and seacoast or shipboard conditions.
    - It shall be operated at recommended voltage in accordance to the manufacturer recommendations.
    - All leads shall be periodically inspected and replaced if insulation is broken or splices are unprotected.
    - Leads shall not be repaired with electrical tape.
- All ground connections shall be checked to determine that they are mechanically strong and electrically adequate for the required current.

A disconnecting switch or controller shall be provided at or near each welding machine along with over current protection.

All direct current machines shall be connected with the same polarity and all alternating current machines connected to the same phase of the supply circuit and with the same polarity.

- To prevent electrical contact with personnel, all electrode holders shall be placed where they do not make contact with persons, conducting objects or the fuel of compressed gas tanks.
- All cables with splices within 10 feet of the holder shall not be used.

If the object to be welded or cut cannot readily be moved, all moveable fire hazards should be removed.

If an object to be welded or cut cannot be moved and if all the fire hazards cannot be removed, then guards shall be used to confine the heat sparks and slag and to protect the immovable fire hazards.

Resistance Welding
All personnel operating, installing, and maintaining welding equipment shall be qualified or trained to operate and maintain such equipment.

- Voltage, interlocks, guarding, grounding and shields shall be in accordance with manufacturer recommendations.
- Precautions such as flash guarding, ventilation and shields shall be provided to control flashes, toxic elements and metal fumes.

If the object to be welded or cut cannot readily be moved, all moveable fire hazards should be removed.

Transmission Pipeline
When arc welding is performed in wet conditions, or under conditions of high humidity, special protection against electric shock shall be supplied.

The welded construction of transmission pipelines shall be conducted in accordance with the Standard for Welding Pipelines and Related Facilities, API Std. 1104-1998.

Oxygen Fuel Gas Welding and Cutting:
Only approved apparatuses such as torches, regulators or pressure-reducing valves, setting generators and manifolds shall be used:

- Mixtures of fuel gases and air or oxygen may be explosive and must be guarded against.
- All hoses and hose connections shall comply with the Compressed Gas Association and Rubber Manufacturers' Associations' applicable standards.
- Workers in charge of the oxygen or fuel-gas supply equipment, including generators, shall be instructed and judged competent by the Arrow S Energy Operating before being left in charge.

If the object to be welded or cut cannot readily be moved, all moveable fire hazards should be removed.

Fire Watch Requirements
A fire watch shall be under these conditions as a minimum and when welding, cutting, brazing and/or soldering is performed near combustible materials and/or locations where fire may develop:

- Locations where other than a minor fire might develop.
- Combustible materials are closer than 35 feet to the point of operation.
- Combustibles that are 35 feet or more away but are easily ignited.
- Wall or floor openings within a 35 feet radius of exposed combustible materials.
- Combustible materials are adjacent to the opposite side of metal partitions, ceilings or roofs.

Fire watch personnel shall be maintained at least a half an hour after welding or cutting operations have been completed and fire watchers shall have fire extinguishers readily available.

First Aid Equipment
First aid equipment shall be available at all times. All injuries shall be reported as soon as possible for medical attention. First aid shall be rendered until medical attention can be provided.

Training
Training shall include:

- Position Responsibilities
- Cutters, welders and their supervisors must be suitably trained in the safe operations of their equipment and the safe use of the process.
- Fire Watch Responsibilities - specifically, the fire watch must know:
    - That their ONLY duty is Fire Watch.
    - When they can terminate the watch.
    - How to use the provided fire extinguisher(s).
    - Be familiar with facilities and how to activate fire alarm, if fire is beyond the incipient stage.
    - Operator Responsibilities
    - Contractor Responsibilities
    - Documentation requirements
    - Respirator Usage requirements
    - Fire Extinguisher training.

OSHA Fact Sheet: https://www.arrowsenergy.com/hseosha.gov/sites/default/files/publications/OSHA3696.pdf
Hot Work Permit www.arrowsenergy.com/hseaseo.energy in “Permits” tab.

INCIDENT MANAGEMENT

Purpose

The purpose of this program is to ensure the safety of all employees and contractors working for Arrow S Energy Operating (the company) and to establish incident reporting and incident management procedures.

Scope

This program covers all employees and other workers that may be involved in an incident on a Arrow S Energy Operating site. For incidents that cannot be managed by onsite personnel utilizing local resources, please refer to the Emergency Action Plan (EAP) located in the online solution center for the county in which the operation resides.

Incident Reporting

Arrow S Energy Operating investigates accidents and near-misses to prevent recurrence and ensure employee safety. Accidents are undesired events that result in harm to people, damage to property, loss to process and/or the environment and/or damage to the reputation of the company. Near-misses are defined as, undesired events which, under slightly different circumstances, could have resulted in harm to people, damage to property, loss to process and/or the environment or damage to the reputation of the company. Both accidents and near misses are collectively referred to as Incidents.

Employees and contractors are to report all Incidents, unsafe acts and unsafe conditions to their supervisor as soon as possible and in accordance with the Reporting Guidelines set forth below. Reported Incidents may receive varying levels of investigation based on the severity of risk potential of the Incident.

Reporting Guidelines

Incidents Reporting Procedures

In the event of an incident that requires immediate emergency response, contact 911 or the appropriate emergency services listed in the Emergency Action Plan (EAP) for the County the injured person is located. The EAP is located at Arrow S Energy Operating office.

All incidents shall be reported, documented and investigated for causal factors, and the results must be reported to Arrow S Energy Operating utilizing the incident notification form located in the Arrow S Energy Operating office. The incident notification form will also be utilized as a means for tracking changing conditions or diagnosis surrounding incidents. It is the responsibility of the Arrow S Energy Operating supervising representative and the safety advisor to cooperate in the action of gathering and reporting incident related information.

Spill and Hazardous Substance Reporting

In the case of spilled Oil, petroleum product, and used oil, the Railroad Commission shall be notified when 210 gallons (5Bbls) or more is spilled outside of containment- click here for specific spill reporting requirements.

Spills of hazardous substance shall be reported through the Arrow S Energy Operating Solution Center. It is required that spills in excess of specified amounts (click here for Reportable Quantities or view chart below) be reported to the appropriate Railroad Commission District Office (see a map of the district boundaries here) by telephone. Such notice shall be followed by a letter submitted to the district office giving the full description of the event including, but not

limited to, the volume of crude oil, gas, geothermal resources, other well liquids, or associated products that are lost. Click here to view oil and gas district office contact information.

Spill Reportable Quantities			
Product	Location	Reportable Quantity	Resource
Hazardous substance	onto land	"Final RQ" in Table 302.4 in 40 CFR 302.4 (PDF) Exit the TCEQ	30 TAC 327 Exit the TCEQ
	into water	"Final RQ" or 100 lbs, whichever is less	
Any oil	coastal waters	as required by the Texas General Land Office	Texas General Land Office Exit the TCEQ
Crude oil, oil that is neither a petroleum product nor used oil	onto land	210 gallons (five barrels)	30 TAC 327 Exit the TCEQ
	directly into water	enough to create a sheen	
Petroleum product, used oil	onto land, from an exempt PST facility	210 gallons (five barrels)	30 TAC 327 Exit the TCEQ
	onto land, or onto land from a non-exempt PST facility	25 gallons	
	directly into water	enough to create a sheen	
Associated with the exploration, development and production of oil, gas, or geothermal resources	under the jurisdiction of the Railroad Commission of Texas	as required by the Railroad Commission of Texas	Railroad Commission of Texas Exit the TCEQ
Industrial solid waste or other substances	into water	100 lbs	30 TAC 327 Exit the TCEQ
From petroleum storage tanks, underground or aboveground	into water	enough to create a sheen on water	30 TAC 334.75-81 Exit the TCEQ
From petroleum storage tanks, underground or aboveground	onto land	25 gallons or equal to the RQ under 40 CFR 302 Exit the TCEQ	30 TAC 327 Exit the TCEQ
Other substances that may be useful or valuable and are not ordinarily considered to be waste, but will cause pollution if discharged into water in the state	into water	100 lbs	30 TAC

Definitions from table above

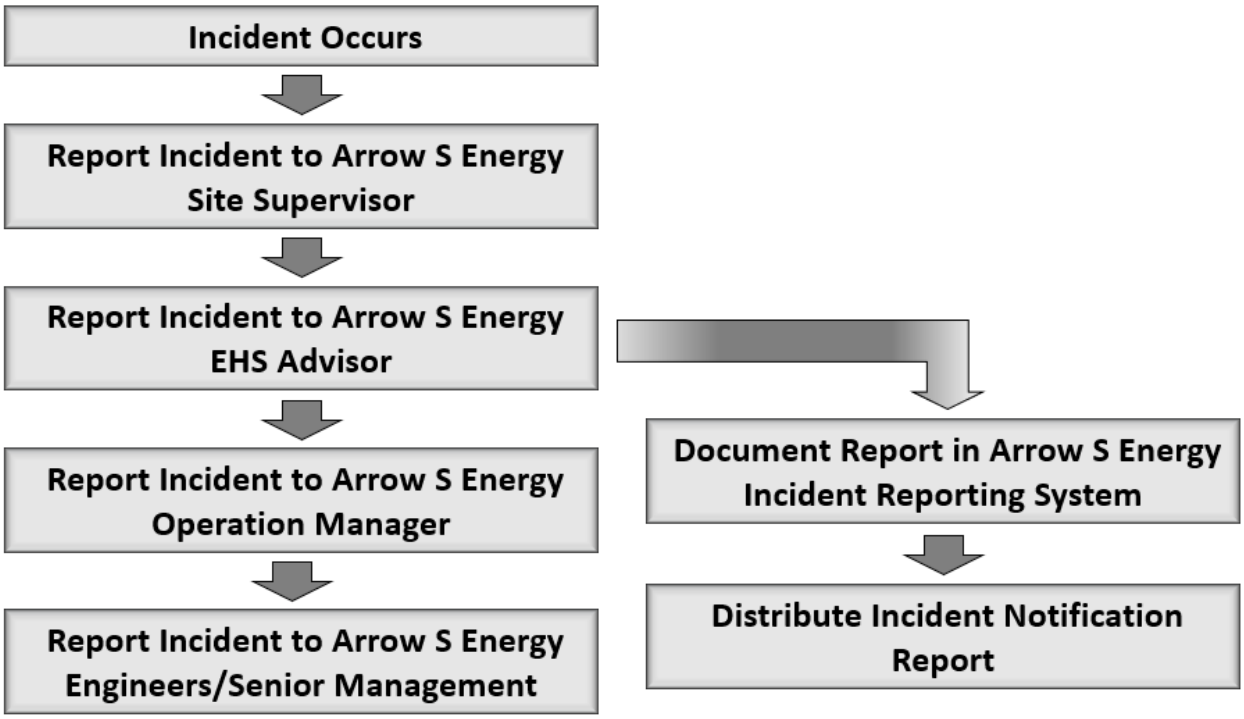
Petroleum storage tank (PST) exempted facilities--Electric service facilities including generation, transmission, distribution equipment and transformers; petrochemical plants; petroleum refineries; bulk loading facilities; and pipelines that are exempted from the Aboveground Storage Tank (AST) program under **§334.123(a)(9) and (b)** of this title (relating to Statutory Exemptions for ASTs), and §334.124(a)(4) of this title (relating to Commission Exclusions for ASTs).

§334.123(a)(9) and (b)
(a) The following aboveground storage tanks (ASTs) are exempt from regulation under this subchapter: (9) a tank that is located at or is part of a petrochemical plant, a petroleum refinery, an electric generating facility, or a bulk facility. (b) The following pipeline facilities are exempt from regulation under this subchapter, as provided in Texas Water Code, §26.344: (1) an interstate pipeline facility, including gathering lines, or any AST connected to such facility, if the pipeline facility is regulated under the Hazardous Liquid Pipeline Safety Act of 1979 (49 United States Code, §60101, et seq. and its subsequent amendments or a succeeding law). (2) an intrastate pipeline facility or any AST connected to such a facility, if the pipeline facility is regulated under one of the following state laws: (A) the Texas Natural Resources Code, Chapter 111; (B) the Texas Natural Resources Code, Chapter 117; or (C) Texas Civil Statutes, Article 6053-1 and 6053-2.

When to Report Incidents

Any Incident occurring within Arrow S Energy Operating operations resulting in property damage, injury, environmental damage or damage to the company's reputation, involving a Arrow S Energy Operating employee, contractor, subcontractor or third-party entity should be reported immediately to the Arrow S Energy Operating site supervisor or their designate. The Arrow S Energy Operating site supervisor must then report the incident to their respective manager who shall report it to their manager, and so on until notification has been made to the CEO. The site manager and the safety advisor must cooperate in reporting the incident utilizing the incident notification form located in the Arrow S Energy Operating Office. It is expected that the written incident notification is completed prior to the end of shift or end of day. In the case the incident occurs at the end of day it is acceptable that the written report be completed by noon the next day or start of the next shift, whichever comes first. In no case shall an incident be reported before a verbal report has been made up the chain of command.

Incident Report Flowchart



The Arrow S Energy Operating emergency phone number is 713-400-6648. This number shall be posted at all Arrow S Energy Operating locations where an emergency event could occur in the absence of people being present. When this number is called the Emergency Call Center will gather predetermined information and start calling the names on the below notification chart until a person is reached. The emergency information will also be forwarded via text message to all people on the following notification chart:

Incident Command on Single Well Pads, Producing Pads, completions Pads or Construction Sites

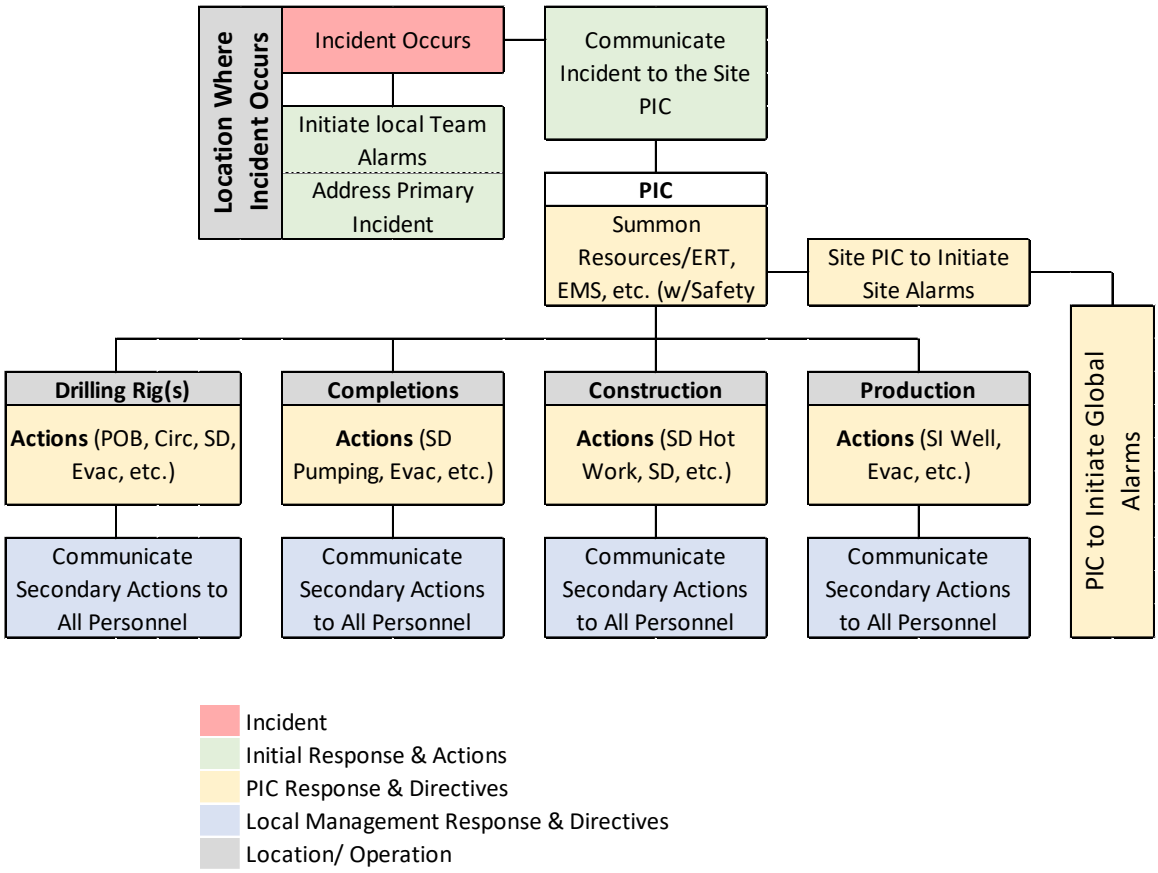
On single rig drill sites, the following incident command structure will be recognized:

- The Arrow S Energy Operating acting site supervisor will manage control for any incident that impacts or could impact Arrow S Energy Operating property or assets. The site supervisor will maintain control for the duration of the incident or until relieved by his counterpart or other appointed incident management entity.
- The drilling rig owner will manage control of incidents that present a localized threat or impact to the rig and/or property of the rig owner.
- On production, completions or construction sites, the Arrow S Energy Operating operations manager or his designate shall manage control of all incidents through to close out or until relieved by his counterpart or other appointed incident management entity.

Incident Command on Mega Pads

The following process should be utilized when responding to an incident on a Mega-pad or SIMOPS operation:

1. Incident site manager will initiate local alarm and address the primary incident and notify PIC ASAP
2. PIC will initiate site alarms and global alarms as event condition(s) dictates the need
3. PIC will summon needed resources such as local emergency response needs, emergency medical services, etc.
4. PIC will communicate necessary actions required of simultaneously occurring operations (SIMOPS)
5. Local operations will communicate secondary actions to all personnel



Emergency Drills

When conducting emergency evacuation drills on a SIMOPS location- drilling and construction operations will participate as if the event is a live and active emergency. A drill scenario will be established, alarms will be initiated, workers will evacuate or respond according to the below flow chart, and drill response times will be recorded. Although the drill can be conducted with or without notification being made to the workers in drilling and construction sites, this is not the case for completion and production operations- completions and production crews shall be notified of a drill in accordance with the directions in the bullets below. In any case the site manager(s) should always be notified prior to a drill.

During as drill, completion and production operations shall respond by radio and role play the actions they would take if the event were a real world emergency. It is critically important completions and production do not mistake a drill for a real life emergency. In order to prevent this from happening the following steps will be strictly adhered to for initiation of a drill:

- Insure completions and production operations are supplied with an adequate number of radios
- Announce the drill on the radio by first stating:
    - THIS IS A DRILL
    - THIS IS A DRILL
    - THIS IS A DRILL

- One of the following drill scenarios shall be announced:
    - H2S gas release on rig _____ that requires location evacuation
    - Loss of well control on _____ well that requires evacuation
    - Fire at _____ location that requires evacuation.

Prior to initiating an emergency drill a person shall be appointed to document the required information in the Emergency Drill Log located at www.arrowsenergy.com/hse

LADDER SAFETY

Purpose

The purpose of the program is to prescribe rules and establish minimum requirements for the construction, care, and use of the common types of ladders.

All ladders that are purchased and placed into service; or, any ladders that are engineered, manufactured and installed on any Arrow S Energy Operating (the company) equipment shall follow the requirements set forth by this program.

Scope

This program is applicable to all employees who may utilize ladders. When work is performed by a contractor on a company site, the contractor's program shall take precedence. However, this procedure may be adopted by contractors who do not have a formal ladder procedure.

Definitions

Ladder: an appliance usually consisting of two side rails joined at regular intervals by cross- pieces called steps, rungs, or cleats, on which a person may step in ascending or descending.

Stepladder: a self-supporting portable ladder, nonadjustable in length, having flat steps and a hinged back. Its size is designated by the overall length of the ladder measured along the front edge of the side rails.

Single ladder: a non-self-supporting portable ladder, nonadjustable in length, consisting of but one section. The overall length of the side rail designates its size.

Extension ladder: a non-self-supporting portable ladder adjustable in length. It consists of two or more sections traveling in guides or brackets so arranged as to permit length adjustment. Its size is designated by the sum of the lengths of the sections measured along the side rails.

Fixed ladder: a ladder permanently attached to a structure, building, or equipment.

Individual-rung ladder - a fixed ladder each rung of which is individually attached to a structure, building, or equipment.

Cage: a guard that may be referred to as a cage or basket guard, which is an enclosure that is fastened to the side rails of the fixed ladder or to the structure to encircle the climbing space of the ladder for the safety of the person who must climb the ladder.

Key Responsibilities

Managers and Supervisors

- Managers and supervisors are responsible for ensuring that all employees, and/or contractors have been trained in the use and inspection of ladders in accordance with the manufacture's guidelines.

- Managers and supervisors are responsible for ensuring that all employees and contractors are aware that if an inspection discovers a defect, the ladder shall not be used and shall be taken out of service.

Employees

- Employees shall inspect ladders prior to use.
- Employees are responsible for following this program and reporting to their supervisors any damage or repairs that may be needed.

Procedure

Inspection, Care and Safe Work Practices of Ladders

Inspection

- Ladders must be inspected before each use.
- Ladders used by Arrow S Energy Operating employees must meet OSHA/ANSI specifications.
- Ladder rungs, cleats, and steps shall be parallel, level, and uniformly spaced, when the ladder is in position for use.
- Defective ladders shall be removed from service and disposed of. Portable and fixed ladders with structural defects such as broken or missing rungs, cleats, or steps, broken or split rails, corroded components, or other faulty or defective components, shall either be immediately marked in a manner that readily identifies them as defective, or be tagged with "Do Not Use" or similar language, and shall be discarded or withdrawn from service until repaired.
- If a ladder is tipped over, it shall be inspected for side rail dents or bends, or excessively dented rungs; check all rung to side rail connections; check hardware connections; check rivets for shears.
- On wood ladders, all parts shall be free from sharp edges and splinters.

Care

- Ladders shall be maintained in good condition, the joint between the steps and side rails shall be tight, all hardware and fittings securely attached, and the movable parts shall operate freely without binding or undue play.
- Metal bearings of locks, wheels, pulleys, etc., shall be frequently lubricated.
- A frayed or badly worn rope shall be replaced. Safety feet and other auxiliary equipment shall be kept in good condition to ensure proper performance.
- Rungs shall be kept free of grease and oil.
- Ladders shall be stored in a well-ventilated area in a manner to prevent sagging and warping.

How to Safely Use Ladders

- Ladders shall be used only for the intended purpose for which they were designed.
- The ladder shall be secured at the top or held by another person at the base.
- The footing of the ladder shall be placed on a stable and level surface.
- Ladders shall be used at an angle such that the horizontal distance from the top support to the foot of the ladder is approximately one-quarter of the working length of the ladder. (The distance along the ladder between the foot and the top support.)

- When ladders are not able to be extended then the ladder shall be secured at its top to a rigid support that will not deflect.
- Ladders shall not be used in a horizontal position as platforms, runways, or scaffolds.
- Ladders shall not be used by more than one man at a time.
- Ladders shall not be placed in front of doors opening toward the ladder unless the door is blocked open, locked, or guarded.
- If a ladder is used in a high traffic area, barricades shall be placed to avoid accidental displacement due to collisions.
- Do not stand on the top two rungs or top of step ladders.

On two-section extension ladders the minimum overlap for the two sections in use shall be as follows:

Size of Ladder (feet)	Overlap (feet)
Up to and including 36’	3
Over 36 up to and including 48’	4
Over 48 up to and including 60’	5

- The upper supports of ladders used to access elevated work areas must extend a minimum of 3 feet above the elevated surface. When ladders are not able to be extended then the ladder shall be secured at its top to a rigid support that will not deflect.
- The employee shall maintain a three (3)-point grip on the ladder and carry tools/ equipment on a belt or hoist up. Do not carry anything in the hands that could cause injury in case of fall.
- The employee shall face the ladder while ascending or descending.
- The bracing on the back legs of stepladders is designed solely for increasing stability and not for climbing.
- The ladder shall not be moved while occupied.

Portable Ladders
Stepladders shall not be longer than 20 feet. Single ladders shall not be longer than 30 feet. A two-section extension ladders shall not be longer than 60 feet. All ladders of this type shall consist of two sections, one to fit within the side rails of the other and arranged in such a manner that the upper section can be raised and lowered.

Keep all ladders at least ten (10) feet away from power lines.

Ladders shall not be loaded beyond the maximum intended load for which they were built, nor beyond the manufacturer's rated capacity. Weight includes the combined weight of the climber and his tools/equipment. Ladders are rated as the following:

- I (holds 250 Ibs)
- I-A (holds 300 Ibs)
- II (holds 225 Ibs)
- III (holds 200 Ibs)

Fixed Metal Ladders
Ladders shall be constructed to withstand a minimum of 200 pounds.

All metal rungs shall have a minimum diameter of ¾ inches and wooden rungs shall have a minimum diameter of 1 1/8 inches.
Rungs shall not be more than 12 inches apart and shall be uniform throughout the length of the ladder.
Rungs shall be a minimum length of 16 inches and provide protection, so a foot cannot slip off the end.
Rungs shall have a minimum of 7 inches between itself and the structure behind it.
A fall restraint system must be provided for all fixed ladders greater than six feet in length.

- A Cage is required when the fixed ladder is at least twenty feet tall.
- Cages on fixed ladders shall not begin at a point less than 7 feet nor greater than 8 feet from the walking surface below the cage.
- Cages shall provide a clear width of 15 inches in each direction of the rung's centerline.
- Cages shall not extend less than 27 inches, but not greater than 28 inches from the centerline of the rung.
- A climbing fall restraint system may be substituted for a ladder cage.

LOCKOUT TAGOUT (LO/TO)

Purpose

The purpose of this procedure is to define the minimum requirements for safely performing Energy Isolation or Lockout Tagout activities on an Arrow S Energy Operating worksite. Arrow S Energy Operating (the Company) requires contractors to utilize their company-provided policies and procedures when performing activities on behalf of the Company. Contractor expectations may include procedures with more stringent requirements than the minimum requirements of this procedure.

Scope

This program covers the servicing and maintenance of machines equipment where the unexpected energization or startup of the machine or equipment, or the release of stored energy could cause an incident. This program establishes minimum performance requirements for the control of such hazardous energy when work is performed on an Arrow S Energy Operating (the company) owned or operated site. However, this program may be adopted for use by contractors who do not have a formal Lockout/ Tagout program.

Definitions

Affected Employee - An employee whose job requires them to operate or use a machine or equipment on which service and/or maintenance is being performed under lockout/tagout, or whose job requires the employee to work in an area in which such service or maintenance is being performed.

Authorized Employee - A person that performs lockout/tagout procedures on machines or equipment in order to perform service or maintenance on that machine or equipment. An Affected Employee becomes authorized when that employee's duties include performing service or maintenance covered under this program.

Capable of Being Locked Out - An energy isolating device is capable of being locked out if it has a hasp or other means of attachment to which, or through which, a lock can be affixed, or it has a locking mechanism built into it. Other Energy Isolating Devices are capable of being locked out if lockout can be achieved without the need to dismantle, rebuild or replace the energy isolating device or permanently alter its energy control capability.

Energized - Connected to an energy source or containing residual or stored energy.

Energy Isolating Device - A mechanical device that physically prevents the transmission or release of energy including, but not limited to, the following:

- A manually operated electrical circuit breaker, a disconnect switch, a manually operated switch by which the conductors and no pole can be operated independently, a line valve, a block and any similar device used to block or isolate energy. *NOTE: Push buttons, selector switches and other control circuit type devices are not isolating devices.*

Lockout - The placement of a lockout device on an energy isolating device in accordance with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

Lockout Device - A device that utilizes a positive means, such as either a key or combination type lock, to hold an energy isolating device in the safe position and prevent the energizing of a machine or equipment. Included are blank flanges and bolted slip blinds.

Normal Operation - The utilization of a machine or equipment to perform its intended operation.

Potential Energy Sources - Any source of gas, electrical, mechanical, hydraulic, pneumatic, chemical, gravity, steam, thermal, tension or other energy sources.

Service and/or Maintenance - Workplace activities such as constructing, setting up, adjusting, inspecting, modifying and maintaining and/or servicing machines and equipment, where the employee may be exposed to an unexpected energization or startup of the equipment or release of a hazardous energy source.

Setting Up - Any work performed to prepare a machine or equipment for performing its normal operation.

Tagout - The placement of a tagout device on an energy isolating device, in accordance with an established procedure, to indicate that the Energy Isolating Device and the equipment being controlled may not be operated until the tagout device is removed.

Tagout Device - A prominent warning device, such as a tag and a means of attachment, which can be securely fastened to an energy isolating device in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until tagout device is removed.

Key Responsibilities

Manager

- Site Managers are responsible for the control and enforcement of this procedure and to ensure that all Workers that are affected by energy isolation procedures have the knowledge and understanding required for safe application, usage, and removal of all energy controls and devices.
- Ensure employees are trained and comply with the requirements of this program.

Employees and Contractors

- Employees who are affected by this program are required to attend training on an annual basis.
- All Workers, at a minimum, will be provided, by their employer, training that ensures that the purpose and function of their energy control program are understood by their respective employees, and that the knowledge and skills required for the safe application, usage, and removal of the energy controls are acquired by the respective employers' employees.
- All Workers are at a minimum are required to follow the provisions set forth in this procedure.

Procedure

General

Only an authorized, trained Worker performing Service or Maintenance activities shall be permitted to perform energy isolation or Lockout Tagout activities..

Devices
Lockout Device - If an energy source can be locked out a device that utilizes a lock to hold an energy isolating device in a safe position shall be used..

Tagout Device – If an energy source cannot be locked out with a lockout device then a tagout device shall be used. Tagout devices are a warning only level of protection and shall be weather and chemical resistant, standardized in color with clear written warning of hazardous energy; i.e. Do Not Operate, Do Not Start, Do Not Energize, etc.

Specific Energy Control Procedures
Each manager or supervisor is responsible for developing specific step-by-step shutdown and startup procedures for each type of machine or piece of equipment in their respective area. This procedure shall include:

- Equipment number if assigned.
- Equipment location.
- Energy Source(s) (i.e. electrical, hydraulic, gas pressure, etc.)
- Location of isolating controls (i.e. breaker switches, valves, etc.)
- Quantity of isolating controls
- Quantity of locks required to isolate the equipment
- Other hardware required to isolate the equipment (i.e. chains, valve covers, blocks, etc.)
- List any residual energy required to be dissipated before work begins.

Specific Sequence for Application of Energy Control

1. Notification
Authorized employees must notify all other affected employees of the application and removal of lockout/tagout devices. Notification shall be given before the controls are applied and before they are removed from the machine or equipment.

2. Preparation for Shutdown
Before an authorized or affected employee turns off a machine or equipment, the authorized employee shall have knowledge of the type and magnitude of the energy, the hazards of the energy to be controlled and the methods or means to control the energy.

3. Machine or Equipment Shutdown
The machine or equipment shall be turned off or shutdown using the procedures established for the machine or equipment. An orderly shutdown must be utilized to avoid any additional or increased hazard(s) to employees as a result of the equipment stoppage.

4. Machine or Equipment Isolation
All energy isolating devices that are needed to control the energy to the machine or equipment shall be physically located and operated in such a manner as to isolate the machine or equipment from the energy source.

5. Lockout/Tagout Devices and Application

- Each authorized employee shall have the proper number of locks and devices to be able to perform proper lockout/tagout procedures for machines or equipment that they may be working on.
- Lockout or tagout devices shall be affixed to each energy isolating device by authorized employees.

- Lockout and tagout devices shall include name of individual placing device. Devices shall indicate the identity of the employee applying the device.
- Lockout devices shall be affixed in a manner to hold the energy isolating devices in a safe or off position.
- Tagout devices shall be affixed in a manner that will clearly indicate that the operation or movement of isolating devices from the safe or off position.
- Tagout devices used with energy isolating devices with the capability of being locked out shall be fastened at the same point at which the lock would have been attached. If a tag cannot be directly attached to the Energy Isolation Device it shall be located as close as safely possible to the device in a position that will be immediately obvious to anyone attempting to operate the device.
- Each energy source shall be locked out completely isolating the equipment.
- Isolating machines or equipment shall include, but are not limited to:
    - Pumps, compressors, generators, electric distribution, storage tanks, etc.
    - Each type of equipment to be isolated shall have specific procedures for isolation, i.e. for compressors: suction, discharge, power, starting, fuel, dumps shall be closed, locked and tagged out properly. The blow-down valve shall be opened, locked and tagged out properly. (NOTE): If compressor has a side stream hooked up, the side stream shall be closed, locked and tagged out properly.

6. Stored Energy and the Possibility of Reaccumulation
Following the application of lockout or tagout devices to energy isolating devices, all potentially hazardous stored or residual energy shall be relieved, disconnected, restrained and otherwise rendered safe.

If there is a possibility of re-accumulation of stored energy, verification of isolation shall be continued until the servicing or maintenance operation is completed, or until the possibility of such accumulation no longer exists.

7. Verification of Isolation
Prior to starting work on machines or equipment that have been locked or tagged out; the authorized employee shall verify that isolation and deenergization of the machine or equipment have been accomplished.

Procedures for Handling Multiple Groups of Workers Involved in a Group Lockout
A crew of authorized workers may use a group lockout or tagout device. This will afford the group of workers a level of protection equal to that provided by a personal lockout or tagout device. Procedures include:

- A tailgate meeting shall be conducted to review the lockout procedures and other information as required for safe work to continue – all crafts and effected departments shall be involved.
- An authorized employee will isolate the equipment and ascertain the exposure status of individual group members.
- All workers will then place their individual locks on the device's group lockout or tagout device after they have verified the procedure.
- An authorized worker has primary responsibility for a set number of workers working under the protection of a group lockout or tagout device. The authorized worker should ascertain the exposure status of individual group members. Each participating worker shall attach a personal lockout or tagout device to the group's device while he/she is working and then removes it when finished.
- During shift change or personnel changes, there are specific procedures to ensure the continuity of lockout or tagout procedures. These include:
    - In the event shift or personnel changes occur during maintenance and/or repair activities, the designated persom in charge shall take the necessary steps to maintain the continuity of the

lockout/tagout protection. This includes maintaining that all provisions in this procedure are adhered to and the transfer of lockout/tagout devices between authorized workers is accomplished.

- No work shall be allowed to proceed following personnel or shift change unless these requirements are met. The job manager must observe that all personnel or shift change locks or tags are properly transferred during the process.
- Before the last outgoing person is allowed to leave they must remove their lock (or warning tag) and the incoming person shall affix their lock or (warning tag) to prevent the lock out device or tag warning device from ever not being locked or warning if a lock out device is not practicable.
- This also applies to all group lockout tagout situations.
- This also applies to all group Lockout Tagout activities.
- If any outgoing person leaves the site and their lock/tag is still attached then follow Removal of Locks guidelines below.

Release from Lockout/Tagout

When servicing or maintenance is completed and LO/TO devices must be removed to return to normal operating status, the following steps shall be taken, in this order:

- Check the machine or equipment and the immediate area surrounding the machine or equipment to ensure that all nonessential items such as tools have been removed and that the machine or equipment components are operationally intact.
- Check the work area to ensure that all personnel have been safely positioned or removed from the area.
- Remove the Lockout/Tagout device
- Energize and proceed with testing
- De-energize and reapply control methods including Lockout / Tagout devices
- Document the procedure by use of the completed isolation log and provide to supervisor for filing.

Removal of Locks

The authorized worker who applied the lock shall be the one to remove their lock. However, after all work has been completed, certain conditions may arise which prohibit this person from being present to remove the lock.

The following procedures shall be followed to allow for the removal of a lock that another person has applied:

- Every effort shall be made to contact the authorized worker who applied the lock to obtain the key(s).
- If the key(s) cannot be made available, the worker who requests removal of the lock shall contact their supervisor.
- The supervisor shall verify that every effort was made to contact the original authorized worker who applied the lock and to obtain the key(s).
- The employee removing the lock shall note on the Service Report that the lock(s) were removed with permission by supervisor.
- All reasonable efforts will be made by supervisor to notify that worker their lock has been removed, ensuring that the authorized worker has this knowledge before they return to work.

Contractors

Contractors performing lockout procedures on Arrow S Energy Operating property shall comply with this procedure at a minimum. Contractors shall supply their own locks.

Periodic Inspections of the Energy Control Procedure
Periodic inspections of the energy control procedure are conducted and documented at least annually to ensure procedures and requirements are being followed.

A Arrow S Energy Operating manager or their designee performs the inspection (it must be someone other than those actually using the lockout/tagout in progress). The inspector will produce a certified review of the inspection including date, equipment, worker and the inspection shall be documented. They will verify that:

- Any material changes that affect procedural changes are transferred to Affected Workers to notify and train those Workers on the changes.
- A copy of the most current revision of this procedure must be maintained in the Procedure tab located at www.areo.energy

WORKER TRAINING

The employer of the Affected Worker shall provide training to ensure that the purpose and function of the energy control program are understood by their employees and that the knowledge and skills required for the safe application, usage, and removal of the energy controls are acquired by their employees. The training shall include the following:

- Each Authorized Worker shall receive training by their employer in the recognition of applicable hazardous energy sources, the type and magnitude of the energy available in the workplace, and the methods and means necessary for energy isolation and control.
- Each Affected Worker shall be instructed by their employer in the purpose and use of the energy control procedure.
- All other Workers whose work operations are or may be in an area where energy control procedures may be utilized, shall be instructed by their employer about the procedure, and about the prohibition relating to attempts to restart or reenergize machines or equipment which are locked out or tagged out.
- When Tagout systems are used, Workers shall also be trained by their employer in the following limitations of tags:
- Tags are essentially warning devices affixed to energy isolating devices, and do not provide the physical restraint on those devices that is provided by a lock.
- When a tag is attached to an energy isolating means, it is not to be removed without authorization of the authorized person responsible for it, and it is never to be bypassed, ignored, or otherwise defeated.
- Tags must be legible and understandable by all Authorized Workers, Affected Workers, and all other Workers whose work operations are or may be in the area, in order to be effective.
- Tags and their means of attachment must be made of materials which will withstand the environmental conditions encountered in the workplace.
- Tags may evoke a false sense of security, and their meaning needs to be understood as part of the overall energy control program.
- Tags must be securely attached to energy isolating devices so that they cannot be inadvertently or accidentally detached during use.

Retraining:

- Retraining shall be provided for all authorized and Affected Workers, by their employer, whenever there is a change in their job assignments, a change in machines, equipment or processes that present a new

hazard, or when there is a change in the energy control procedures.

- Additional retraining shall also be conducted whenever a periodic inspection under paragraph (c)(6) of this section reveals, or whenever the employer has reason to believe that there are deviations from or inadequacies in the Workers knowledge or use of the energy control procedures.
- The retraining shall reestablish Worker proficiency and introduce new or revised control methods and procedures, as necessary.
- The employer shall certify that their employees' training has been accomplished and is being kept up to date. The certification shall contain each employee's name and dates of training.

The LO/TO Assessment form is located at www.arrowsenergy.com/hse under the "Assessments" tab.

The LO/TO form is located at www.arrowsenergy.com/hse under the "Forms" tab.

OSHA Fact Sheet: https://www.osha.gov/sites/default/files/publications/factsheet-lockout-tagout.pdf

MOBILE EQUIPMENT OPERATIONS

Purpose

This program is written to follow regulatory requirements and provide directives to employees about their responsibilities in the operations and management of Arrow S Energy Operating (the company) mobile equipment.

Scope

When work is performed by a contractor on a company site, the contractor's program shall take precedence. However, this program may be adopted for use by contractors who do not have a formal Equipment Operation Program.

Key Responsibilities

Site Manager

- Responsible for the implementation and maintenance of the program for their site and ensuring all assets are made available in compliance with the plan.

Employees

- All company equipment operators and spotters shall be familiar with this procedure.
- Follow all requirements, report unsafe conditions, and follow all posted requirements.

Mobile Equipment

The following requirements apply for all Arrow S Energy Operating locations:

- Arrow S Energy Operating HSE Director must develop and implement safe work procedures for the use of powered mobile equipment in the workplace and must train workers in those safe work procedures.
- The equipment operator of mobile equipment shall be directly responsible for the safe operation of that equipment and shall comply with all laws and regulations governing the operation of the equipment.
- Maintenance records for any service, repair or modification which affects the safe performance of the equipment must be maintained and be reasonably available to the operator and maintenance personnel during work hours
- All mobile equipment shall be maintained in safe operating condition and operation, inspection, repair, maintenance and modification shall be carried out in accordance with manufacturer's instructions or, in the absence of the instructions, in accordance with good engineering practice.
- Servicing, maintenance and repair of mobile equipment shall be done when the equipment is not in operation, except that equipment in operation may be serviced if the continued operation is essential to the process and a safe means is provided.
- Only authorized employees shall be allowed to operate mobile equipment. Authorization to operate mobile equipment will be issued to employees qualifying under appropriate training and proficiency testing. The person must also have in their possession an applicable operator's license for forklift and/or manlift
- operator certificate where required and be familiar with the operating instructions pertaining to the equipment and be authorized to operate the equipment. Authorization will be issued only after these requirements are met.

- A supervisor must not knowingly operate or permit a worker to operate mobile equipment which is, or could create, an undue hazard to the health or safety of any person or who is in violation of any local or federal regulations.
- Unauthorized personnel shall not be permitted to ride on equipment unless it is equipped to accommodate riders safely.
- At the beginning of each shift, the operator shall inspect and check the assigned equipment, reporting immediately to his/her supervisor any malfunction of the clutch or of the braking system, steering, lighting, or control system and locking/tagging out the equipment if necessary. The company equipment inspection form is located at www.arrowsenergy.com/hse.
- The operator shall immediately report defects and conditions affecting or likely to affect the safe operation of the equipment to his or her immediate supervisor or other authorized person and confirm this by a written report as soon as possible. If an inspection of powered mobile equipment identifies a defect or unsafe condition that is hazardous or may create a risk to the safety or health of a worker. Operators and supervisors must ensure that the powered mobile equipment is not operated until the defect is adjusted, repaired or the unsafe condition is corrected.
- The operator of mobile equipment must not leave the controls unattended unless the equipment has been secured against inadvertent movement such as by setting the parking brake, placing the transmission in the manufacturer's specified park position and by chocking wheels where necessary.
- No operator shall leave unattended a suspended load, machine or part or extension of it unless it has been immobilized and secured against inadvertent movement. When parked, forks, buckets, blades and similar parts shall be in the lowered position or solidly supported.
- Before a worker starts any powered mobile equipment, the operator shall make a complete 360-degree visual inspection of the equipment and the surrounding area to ensure that no worker, including the operator, is endangered by the startup of the equipment. No worker shall start any powered mobile equipment until the inspection is completed.
- All powered mobile equipment shall be inspected by a competent person for defects and unsafe conditions as often as is necessary to ensure that it is capable of safe operation. A written electronic record of the inspections, repairs and maintenance carried out on the powered mobile equipment is maintained at the solution center and will be made readily available to the operator of the equipment. As soon as is reasonably practicable the defect must be repaired, or the unsafe condition is corrected.
- All mobile equipment shall be equipped with a working signal alarm for backing up. The operator shall make sure the warning signal is operating when the equipment is backing up.
- The operator shall use manufacturer provided access ways to get on or off equipment. Do not jump to the ground.
- No operator shall operate mobile equipment in any condition other than manufacturer intended design.
- Operators must wear eye protection when working in equipment without window protection or when operations occur with windows open.
- Where there is a danger to the operator of powered mobile equipment or any other worker who is required or permitted to be in or on a unit of equipment from a falling object or projectile, Arrow S Energy Operating requires that the powered mobile equipment is equipped with a suitable and adequate cab, screen or guard.
- Every forklift will be equipped with a seat belt for the operator if the forklift is equipped with a seat and the operator of a forklift is required to use the seatbelt. Before starting the engine, the driver shall fasten seat belts and adjust them for a proper fit.
- Each mobile equipment vehicle used for lifting must be provided with a durable and clearly legible load rating chart that is readily available to the operator. The operator shall not load the vehicle/equipment

beyond its established load limit and shall not move loads which because of the length, width, or height that have not been centered and secured for safe transportation.

- The operator shall not use or attempt to use any vehicle in any manner or for any purpose other than for which it is designated.
- The operator's manual for powered mobile equipment must be readily available to a worker who operates the equipment.
- A competent person shall perform services, tire repairs and hydraulic system repairs, disassembles and reassembles of powered mobile equipment in accordance with the specifications of both the tire manufacturer and the manufacturer of the powered mobile equipment.
- All mobile equipment must be equipped with:
    - (a) an audible warning signal;
    - (b) a means of illuminating the path of travel at any time and taillights when, because of insufficient light or unfavorable atmospheric conditions,
    - (c) adequate illumination of the cab and instruments; and
    - (d) a mirror providing the operator with an undistorted reflected view to the rear of the mobile equipment.
- The operator of a gasoline or diesel vehicle shall shut off the engine before filling the fuel tank and shall see that the nozzle of the filling hose contacts the filling neck of the tank. No one shall be on the vehicle during fuelling operations except as specifically required by design. There shall be no smoking or open flames in the immediate area during fuelling operation.
- When a worker is required to work beneath elevated parts of mobile equipment including trucks, the elevated parts shall be securely blocked.
- Materials and equipment being transported shall be loaded and secured in a manner to prevent movement which could create a hazard to workers or another person. This includes keeping the cab, floor and deck of mobile equipment free of material, tools or other objects which could create a tripping hazard, interfere with the operation of controls or be a hazard to the operator or other occupants in the event of an accident.
- Where the operator of a vehicle, mobile equipment, crane or similar material handling equipment does not have a full view of the intended path of travel of the vehicle, mobile equipment, crane or similar material handling equipment or its load, the vehicle, mobile equipment, crane or similar material handling equipment shall only be operated as directed by a signaler who is a competent person.
- The signaler shall be stationed, in full view of the operator and with a full view of the intended path of travel of the vehicle, mobile equipment, crane or similar material handling equipment and its load, and clear of the intended path of travel of the vehicle, mobile equipment, crane or similar material handling equipment and its load.
- Where a vehicle, crane or similar equipment is operated near a live power line carrying electricity, every part of the equipment shall be kept at least the minimum distance from the live power line for the voltage as required by local or federal law.

NOISE AWARENESS

Purpose

The purpose of this program is to establish minimum expectations as well as provide a process to minimize Arrow S Energy Operating (the company) employee hearing loss caused by excessive occupational exposure to noise and to educate employees on an awareness level basis.

Scope

This program is applicable to all employees who may be exposed to noise in excess of 85 decibels (decibels). However, this program may be adopted for use by contractors who do not have a Noise Awareness program..

Definitions

Audiometric testing: means detection by the person being tested of a series of pure tones. For each tone, the person indicates the lowest level of intensity that they are able to perceive.

Decibels: means the sound energy measured by a sound level meter using the "A" scale. The "A" scale is electronically weighted to simulate the response of the human ear to high and low frequency noise.

Slow Response: means the setting on the sound level meter that averages out impulses of brief duration that would cause wide fluctuation in the sound level meter reading.

Standard Threshold Shift: means a change in hearing threshold relative to the baseline audiogram of an average of 10 dB (corrected for age) at 2000, 3000 and 4000 Hz in either ear.

Key Responsibilities

Managers and Supervisors

- Ensure requirements of this program are established and maintained.
- Ensure employees are trained and comply with the requirements of this program.

Employees

- Wear hearing protection when required, attend the training, and cooperate with testing and sampling.
- Hearing protection shall be worn by any employee entering an area designated with a sign requiring hearing protection.

Procedure

Occupational hearing loss is a cumulative result of repeated or continued absorption of sound energy by the ear. Employee protection is based on reduction of the noise level at the ear or limiting the employee's exposure time. Arrow S Energy Operating offers hearing protection to all employees exposed to potential high noise levels in working areas and to those employees requesting hearing protection.

Hearing Conservation Program (the program)
The company will administer a continuing effective hearing conservation program when employees, who work in areas where the exposure to noise levels are 85 decibels or greater for the 8-hour time-weighted average of 85 decibels, must wear hearing protection and the company will implement a monitoring program to identify employees to be included in the hearing conservation program. Employees will wear hearing protection in signed areas while on a company owned or operated facility.

Surveys
In the event the company has employee(s) working in an area that meets the Program noise thresholds, the company will conduct surveys utilizing a qualified employee or third party.

To evaluate noise exposure in terms of possible hearing damage, it is necessary to know the overall sound level ("A" scale measurement), the exposure time of the individual in hours per day and the length of time the individual has worked in the area being surveyed. This data shall be supplemented by the following:

- Name of area and location
- Date and time of survey
- Name of person conducting survey
- Description of instrument used, model and serial number
- Environmental conditions
- Description of people exposed

The company shall notify each employee of their monitoring results, or, if their job is exposed to noise 85 decibels or greater.

A plot of noise levels must be made for owned facilities that meet the program requirements. The plot must be filed or posted at the facility.

The company shall evaluate hearing protector attenuation for the specific noise environments in which the protector will be used. The adequacy of hearing PPE shall be reevaluated whenever noise exposures increase to the point that the PPE provided may no longer provide adequate protection. The shall then provide more effective PPE where or when necessary.

All sound measuring equipment must be calibrated before and after each survey. Records of sound measuring equipment calibration and noise level surveys shall be kept for 20 years.

Noise Surveys must be repeated whenever changes in the workplace may expose additional personnel to high noise, or when hearing protection being used by employees may not be adequate to reduce the noise exposure to a level below 85 decibels.

Sound Level Surveys

- All owned facilities that are suspected of having noise levels exceeding 85 decibels must be screened.

Exposure Surveys:

- A representative sampling of employees shall be conducted to determine the exposure to noise over a period of time.

- Noise dosimeters must be capable of integrating all continuous, intermittent and impulsive sound levels from 80 dB to 130 dB and must be calibrated so a dose of 50% corresponds to a time weighted average of 85 dB.

Signage
Clearly worded signs shall be posted at entrances to, or on the periphery of, areas where employees may be exposed to noise levels in excess of 85 decibels. These signs shall describe the hazards involved and the required protective actions.

Audiometric Testing
Arrow S Energy Operating shall establish and maintain an audiometric testing program by making audiometric testing available to all employees whose exposure to noise 85 decibels (8 hr TWA) or greater, and employees should be provided an opportunity to take an annual audiogram test. The program shall be provided at no cost to employees.

- The company shall establish a valid baseline audiogram against which future audiograms can be compared. An employee must receive a baseline audiogram within six months of their first exposure to 85 decibels or greater for an eight hour period.
- When a mobile van is used the baseline shall be established within one year.
- An employee shall receive an annual audiogram every year they work in a position that is exposed to noise 85 decibels or greater for an eight hour period.
- A qualified third party shall perform all audiometric testing, evaluation, reporting and retesting.
- Audiometric testing shall be preceded by a period of at least 14 hours during which there is no exposure to workplace sound levels in excess of 80 decibels. This requirement may be met by the use of hearing protectors that reduce the employee noise exposure level below 80 decibels and employees shall also be notified to avoid high levels of noise.
- An otoscopic exam is required before an audiogram is initiated. A qualified person shall examine the ear canal for any ear infections or canal irregularities that might affect the audiogram or rule out the use of earplugs.

At least annually, and after obtaining the baseline audiogram, the company shall obtain a new audiogram for each employee exposed at or above an 8-hour time-weighted average of 85 decibels for an eight hour time weighted period. Annual audiograms shall be evaluated as follows:

- Each audiogram shall be compared to the employees' baseline audiogram to ensure the test was valid and to determine if a standard threshold shift has occurred.
- If a comparison of the annual audiogram to the baseline audiogram indicates a standard threshold shift, the employee shall be informed of this fact in writing, within 21 days of the determination.
- If a standard threshold shift is determined, the employee will be retested within 30 days.
- The retest results will be considered as the annual audiogram.
- Employees shall be informed of their audiometric test results in writing within 21 days of determination.
- If the employee has sustained a standard threshold shift, after retesting, that employee shall be retrained and refitted for appropriate hearing protection.
- The employee shall be referred for additional medical evaluation if indicated.

Records
Arrow S Energy Operating shall maintain accurate record(s) of all employee exposure measurements and that all records are maintained as required by CFR 1910.95 (Occupational Noise Exposure).

Employee audiograms are considered medical/exposure records. These records must be kept for the length of employment plus 30 years.

Hearing Protection Devices
Earmuffs and earplugs shall be made available to employees in sizes and configurations that will be comfortable to the employee.

Proper hearing protection will be made available to the employee at no cost. Hearing protectors shall be available to all employees exposed to an 8-hour time-weighted average of 85 decibels or greater at no cost to the employees. Hearing protectors shall be replaced as necessary.

Supervisor and employees shall ensure that hearing protectors are worn when and where required.

Training

A training program shall be provided for all employees who are exposed to a noise action level or work in high noise areas. The training shall be repeated annually for each employee.

The training shall address the effect of noise on hearing; the purpose of hearing protectors, including the advantages, disadvantages and alternatives of various types, including instructions on selection, fitting, use and care of and the purpose of audiometric testing and an explanation of test procedures.

Training shall be updated to be consistent with changes in the PPE and work processes that include instruction on the proper techniques of use, fit and wearing of hearing protectors.

All staff shall have a copy of this program, noise exposure procedures and it shall be posted at the worksite and a copy made available to all employees, their representatives and regulatory agencies. This document can be found at www.arrowsenergy.com/hse

The training must be documented.

OFFICE SAFETY

Purpose

The purpose of the office safety program is to protect employees from safety hazards that may be encountered in the Arrow S Energy Operating (the company) office environment. Office personnel should know what to do in case of an emergency, be provided with a safe and efficient workstation, and have periodic safety training.

Scope

This program applies to Arrow S Energy Operating employees and consultants and contractors who work in a Arrow S Energy Operating owned or controlled office setting.

Responsibilities

Office manager will be responsible to train/orientate employees within his/her area.
Office manager will be responsible for ensuring all office equipment is in good working order and maintenance is done regularly or in accordance with contracts in place.
Employees are required to follow all duties as specified in this procedure.
Employees will be responsible for safe work practices, knowing what to do in the event of emergencies and being proactive in their work environment.

General Requirements

The leading types of disabling accidents that occur within the office are the result of falls, strains and overexertion's, falling objects, striking against objects, and being caught in or between objects.

Falls
Falls are the most common office accident, accounting for the greatest number of disabling injuries. The disabling injury rate of falls among office workers is 2 to 2.5 times higher than the rate for non-office employees. One of the most common causes of office falls is tripping over an open desk or file drawer. Bending while seated in an unstable chair and tripping over electrical cords or wires are other common hazards.

Office falls are frequently caused by slipping on wet floors or using a chair or stack of boxes in place of a ladder. Loose carpeting, objects stored in halls or walkways, and inadequate lighting are other hazards that invite accidental falls. Fortunately, all of these fall hazards are preventable.
The following checklist can help stop a fall before it happens.

- Be sure the pathway is clear before you walk.
- Close drawers completely after every use.
- Avoid excessive bending, twisting, and leaning backward while seated.
- Secure electrical cords and wires away from walkways.
- Always use a stepladder for overhead reaching- chairs should never be used as ladders.
- Clean up or report spills immediately.
- Pick up objects co-workers may have left on the floor.
- Report loose carpeting or damaged flooring.
- Never carry anything that obscures your vision.
- Wear stable shoes with non-slip soles.

If you find yourself heading for a fall, remember to roll, don't reach. By letting your body crumple and roll, you are more likely to absorb the impact and momentum of a fall without injury. Reaching out an arm or leg to break your fall may result in a broken limb instead.

Housekeeping

A clean and orderly workplace is a safe workplace. Clear, clean and organized work areas make for happier employees and contribute to a freer flow of people.

Some basic elements of good housekeeping include:

- Make sure that doors, hallways, stairs, and other exit routes are kept free of obstructions.
- Use and store cleaning materials in designated areas, away from workstations.
- Use nontoxic cleaning products.
- Keep office equipment in good working order.
- Ensure that portable heating and cooling units are safe guarded and turned off when not in use.
- Report any leaks, cracks, heating, air conditioning issues to your supervisors immediately.
- Keep work areas free of dust, lint, garbage (old food and beverage containers, and similar material).
- Do not rely on extension cords if wiring improvements are needed, take care not to overload circuits, do not leave cords running across floors and general walk ways.
- Turn off electrical equipment when not in use.
- Trash receptacles should be emptied regularly.

Ergonomics

Strains and Overexertion

Although a typical office job may not involve lifting large or especially heavy objects, it's important to follow the principles of safe lifting. Small, light loads (i.e., stacks of files, boxes of computer paper, books) can wreak havoc on your back, neck, and shoulders if you use your body incorrectly when you lift them. Backs are especially vulnerable. Most back injuries result from improper lifting.

Before you pick up a carton or load, ask yourself these questions:

- Is this too heavy for me to lift and carry alone?
- How high do I have to lift it?
- How far do I have to carry it?
- Am I trying to impress anyone by lifting this?

If you feel that the lift is beyond your ability, contact your supervisor or ask another employee to assist you.

Safe Lifting Steps:

- Take a balanced stance, feet placed shoulder-width apart. When lifting something from the floor, squat close to the load.
- Keep your back in its neutral or straight position. Tuck in your chin so your head and neck continue the straight back line.
- Grip the object with your whole hand, rather than only with your fingers.
- Draw the object close to you, holding your elbows close to your body to keep the load and your body weight centered.
- Lift by straightening your legs. Let your leg muscles, not your back muscles, do the work. Tighten your stomach muscles to help support your back.

- Maintain your neutral back position as you lift.
- Never twist when lifting. When you must turn with a load, turn your whole body, feet first.
- Never carry a load that blocks your vision.
- To set something down, use the same body mechanics designed for lifting.
- Lift from a seated position

Bending from a seated position and coming back up places tremendous strain on your back. Also, your chair could be unstable and slip out from under you. Instead, stand and move your chair out of the way. Squat and stand whenever you have to retrieve something from the floor

Back Safety

If you are doing a lot of twisting while lifting, try to rearrange the workspace to avoid this. People who have to twist under a load are more likely to suffer back injury.

- Rotate through tasks so that periods of standing alternate with moving or sitting. Ask for stools or footrests for stationary jobs.
- Store materials at knee level whenever possible instead of on the floor.
- Make shelves shallower (12-18") so one does not have to reach forward to lift the object.
- Break up loads to reduce the weight. If you must carry a heavy object some distance, consider storing it closer, have a table to rest it on, or try to use a hand truck or cart to transport it.

Struck By

Striking against objects is another cause of office injuries.
Incidents of this type include:

- Bumping into doors, desks, file cabinets, and open drawers.
- Bumping into other people while walking.
- Striking open file drawers while bending down or straightening up.
- Striking against sharp objects such as office machines, spindle files or even foil and food wrap cutting edges.
- Office supplies sliding from shelves or cabinet tops.
- Overbalanced file cabinets in which two or more drawers were opened at the same time or in which the file drawer was pulled out too far.
- Machines, such as computers or monitors that were dropped on feet.
- Doors that were opened suddenly from the other side.

Be careful in the kitchen and storage rooms and pay attention to where you are walking at all times and properly store materials in your work area, and never carry objects that prevent you from seeing ahead of you.

Caught-in or Between

The last category of leading disabling incidents occurs as a result of office workers who get their fingers or articles of clothing caught in or between objects.
Office workers may be injured as a result of:

- Fingers caught in a drawer, door, or window.
- Fingers, hair or articles of clothing and jewelry caught in office machines.
- Fingers caught under the blade of a paper cutter or scissors.

Material Storage

Improperly stored office materials can lead to objects falling on workers, poor visibility, and create a fire hazard. A good housekeeping program will reduce or eliminate hazards associated with improper storage of materials. Examples of improper storage include unstable piling, piling materials too high, and obstructing doors, aisles, fire exits and fire-fighting equipment.

The following are good storage practices:

- Boxes, papers, and other materials should not be stored on top of lockers or file cabinets because they can cause sliding problems.
- Boxes and cartons should all be of uniform size in any pile or stack. Always stack material in such a way that it will not fall over.
- Store heavy objects on lower shelves.
- Try to store materials inside cabinets, files, and lockers.
- Office equipment such as computers, monitors, index files, lights or calculators should not be placed on the edges of a desk, filing cabinet, or table.
- Aisles, corners, and passageways must remain unobstructed. There should be no stacking of materials in these areas.
- Storage areas should be designated and used only for that purpose.
- Store heavy materials so you do not have to reach across something to retrieve them.
- Fire equipment, extinguishers, fire door exits, and sprinkler heads should remain unobstructed. Materials should be at least 18 inches minimum away from sprinkler heads.

Workstation Ergonomics

Ergonomics means fitting the workplace to the workers by modifying or redesigning the job, workstation, tool or environment.

Workstation design can have a significant impact on office workers health and well-being. There are a multitude of discomforts, which can result from ergonomically incorrect computer workstation setups. The most common complaints relate to the neck, shoulders, and back. Others concern the arms and hands and occasionally the eyes. Certain common characteristics of computer workstation tasks have been identified and associated with increased risk of musculoskeletal problems. These include:

- Design of the workstation
- Nature of the task
- Repetitiveness of the job
- Degree of postural constraint
- Work pace
- Work/rest schedules
- Personal attributes of individual workers

key to comfort is in maintaining the body in a relaxed, neutral position. The ideal work position is to have the arms hanging relaxed from the shoulders. If a keyboard is used, arms should be bent at right angles at the elbow, with the hands held in a straight line with forearms and elbows close to the body. The head should be in line with the body and slightly forward.

Arranging Your Workstation to Fit You

- Adjust the height of the chair's seat such that the thighs are horizontal while the feet are flat on the floor.

- Adjust the seat pan depth such that your back is supported by the chair back rest while the back of the knee is comfortable relative to the front of the seat.
- Adjust the back rest vertically so that it supports/fits the curvature of your lower back.
- With the arms at your sides and the elbow joint approximately 90 degrees, adjust the height/position of the chair armrests to support the forearms.
- Adjust the height of the keyboard such that the fingers rest on the keyboard home row when the arm is to the side, elbow at 90 degrees, and the wrist straight.
- Place the mouse, trackball, or special keypads, next to the keyboard tray. Keep the wrist in a neutral position with the arm and hand close to the body.
- Adjust the height of the monitor such that the top of the screen is at eye level. If bifocals/trifocals are used, place the monitor at a height that allows easy viewing without tipping the head back.
- Place reference documents on a document holder close to the screen and at the same distance from the eye.

Good Work Practices

The way a task is performed and the workstation environment it is performed in can influence the risk of injury and general work productivity. Good technique can make a job easy and safe to accomplish.

Good work practices include:

- Adjusting the drapes or blinds.
- Moving the monitor away from sources of glare or direct light.
- Tipping the monitor slightly downward.
- Using diffusers on overhead lighting.
- Placing an anti-glare filter on the screen.
- Clean the monitor screen on a regular basis
- Avoid cradling the telephone between the head and shoulder. Hold the phone with your hand, use the speaker phone, or a headset.
- Keep frequently used items like the telephone, reference materials, and pens/pencils within easy reach.
- Position the monitor and keyboard directly in front of the user.
- Move between different postures regularly.
- Apply task lighting as to your needs.
- Use the minimum force necessary to strike the keyboard/ten-key keys.
- Use the minimum force necessary to activate the hole punch and stapler.
- Vary your tasks to avoid a long period of one activity.
- Take mini-breaks to rest the eyes and muscles. A break does not have to be a stop of work duties. However, it should be a different style of physical activity such as changing from keyboarding to using the telephone or filing.
- Neutralize distracting noise by using ear plugs, playing soft music, or turning on a fan.
- Maintain a comfortable workplace temperature by using layers of clothing or a fan.

Emergency Action Plans

Emergency Action Plans are designed to control emergency events and minimize the effects. Through careful pre-planning, training, and drills, employees can be safeguarded and potential for damage to Arrow S Energy Operating assets can be minimized.
An Emergency Action Plan includes

- Exit routes and accounting for employees
- Emergency evacuation and notification to emergency services
- Personal injury and property damage
- Severe Weather (floods, tornadoes, snow etc.)
- Bomb threats and facility security
- First Aid Response
- Elevator Entrapment
- Violent Disturbances

Hazard Communication Program
Each office employee must be made aware of all hazardous materials they may contact in their workplace area. Hazard communication program includes:

- Written Program
- Safety Data Sheets (SDS's), available at www.arrowsenergy.com/hse
- Specific safe handling uses and disposal
- Employee training

Electrical Safety

Today's office utilizes numerous electronic equipment; i.e., personal computers, printers, etc. A common occurrence is that some office work areas have only one or two poorly placed outlets. The result is overloaded circuits and use of extension cords. Hazards in this situation would include fire, electric shocks, trips, and falls.
Solutions Include

- Efficient workstation design
- Adding convenient outlets
- Use of fixed power strips with ground fault circuit and circuit overload interrupters in place of extension cords
- Replacing worn or broken power cords
- Never running power cords under carpet or chair pads
- Having an electrician run additional power outlets

Training

Training shall enable each employee to recognize the hazards of working in an office, office safe work practices, emergency preparedness and general policies. Office training is documented. Written certification records showing participants, training dates and signatures of attendees will be maintained by the HSE Director.

OVERHEAD POWER AND UTILITIES

Purpose

The purpose of this program is to set forth safe work procedures for work being performed on or near overhead utilities by Arrow S Energy Operating (the company) employees.

Scope

This program represents the minimum requirements of Arrow S Energy Operating employees, temporary employees and contractors when work is performed on a company owned, operated or controlled site. The contractors program shall take precedence, however, this document may be adopted for use a contractors program doesn't exist or is less stringent.

Requirements

Before Working on Poles

Before employees are allowed to climb or perform work on poles or towers the structures are capable of sustaining the additional or unbalanced stresses. Before elevated structures, such as poles or towers, are subjected to such stresses as climbing or the installation or removal of equipment may impose, the employer shall ascertain that the structures are capable of sustaining the additional or unbalanced stresses. If the pole or other structure cannot withstand the loads which will be imposed, it shall be braced or otherwise supported so as to prevent failure.

Electrical Personal Protective Equipment

When a pole is set, moved, or removed near an exposed energized overhead conductor, the employer shall ensure that each employee wears electrical protective equipment or uses insulated devices when handling the pole and that no employee contacts the pole with uninsulated parts of his or her body.

- Employees working in areas where there are potential electrical hazards shall be provided with, and shall use, electrical protective equipment that is appropriate for the specific parts of the body to be protected and for the work to be performed.
- Equipment shall be maintained in a safe, reliable condition. Such protective equipment shall be periodically inspected and/or tested.
- If the insulating capability of protective equipment may be subject to damage during use, the insulating material shall be protected. (An example might be an outer covering of leather used for the protection of rubber insulating material.)
- Employees shall wear nonconductive head protection wherever there is a danger of head injury from electric shock or burns due to contact with exposed energized parts.
- Employees shall wear protective equipment for the eyes or face wherever there is danger of injury to the eyes or face from electric arcs or flashes or from flying objects resulting from electrical explosion.
- Each employee shall use insulated tools or handling equipment if they might make contact with conductors or parts. Program shall state that if the insulating capability of insulated tools or handling equipment is subject to damage, the insulating material shall be protected.
- Ropes and handlines used near exposed energized parts shall be nonconductive.
- Protective shields, protective barriers, or insulating materials shall be used to protect each employee from shock, burns, or other electrically related injuries while that employee is working near exposed energized

- parts. When normally enclosed live parts are exposed for maintenance or repair, they shall be guarded to protect unqualified persons from contact with the live parts.
- Alerting techniques used to warn and protect employees from hazards which could cause injury due to electric shock, burns or failure of electric equipment parts can take the form of safety signs and tags, barricades & attendants).

Protection of Employees from Falling Into Holes Which Poles Are to be Placed
To protect employees from falling into holes into which poles are to be placed, the holes shall be attended by employees or physically guarded whenever anyone is working nearby.

Tension Stringing and Other Methods
Tension stringing, barriers or other equivalent measures will be used to minimize the possibility of contact with energized power lines or equipment during installation or removal. Arrow S Energy Operating shall use the tension stringing method, barriers, or other equivalent measures to minimize the possibility that conductors and cables being installed or removed will contact energized power lines or equipment.

Reel Handling Equipment
Reel handling equipment, including pulling and tensioning devices, shall be in safe operating condition, shall be leveled and aligned.

Load Ratings
Load ratings of stringing lines, pulling lines, conductor grips, load-bearing hardware and accessories, rigging, and hoists may not be exceeded.

Adverse Weather
Work will not be performed if adverse weather conditions make the work unsafe. Work may not be performed when adverse weather conditions would make the work hazardous even after the work practices required by this section are employed.

Signalling
A signal person must be utilized when operating equipment near an overhead line if the operator's view is obstructed. A signal person responsible for giving signals to the operator of equipment or machinery must have an unobstructed view of the operator, signal the operator when the equipment or machinery being operated may come into contact with the electrical line and make all reasonable efforts to notify persons who are not required to be engaged in the work that they are prohibited from entering the worksite, and prevent persons, other than the operator, from touching the equipment or machinery until it is safe to do so.

When it is not possible for the signal person and the operator of the equipment or machinery to have an unobstructed view of each other, Arrow S Energy Operating must ensure that the signal person and the operator of the equipment or machinery are provided with a suitable means of communication or a person is posted in a location where he or she can see both the signal person and the equipment or machinery, and relays all signals between the signal person and the operator.

Training

- Live line bare-hand work is not performed by Arrow S Energy Operating or not allowed to be performed.

- Employees will receive training on the contents of this procedure before performing any work on or near overhead lines.
- Workers are provided training on working near overhead power lines. Arrow S Energy Operating must train workers who may perform work or operate equipment or machinery near overhead electrical lines in those safe work procedures.
- Training shall be documented and retained in the worker's training file.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Purpose

The purpose of the Personal Protective Equipment Program is to set forth the procedures for the use, care, and maintenance of personal protective equipment required to be used by employees of Arrow S Energy Operating (the company) for the prevention of injuries.

Scope

Applies to all Arrow S Energy Operating employees. When work is performed on a company owned or operated site, the contractor's program shall take precedence, however, this program may be adopted for use by contractors who do not have a formal personal protective equipment (PPE) program.

Key Responsibilities

HSE Director

- Assists in the selection of appropriate PPE. If a task exposes an employee to hazards which cannot be eliminated through engineering or administrative controls, the HSE Manager assists managers to identify and select PPE suitable for the specific task performed, conditions present, and frequency and duration of exposure. Employees need to give feedback to management about the fit, comfort, and suitability of the PPE being selected.
- Assists managers in assuring all PPE meets regulatory requirements.
- Ensures a certified PPE hazard assessment is completed. The hazard assessment must indicate a determination if hazards are present or are likely to be present, which necessitate the use of PPE. The certifier's name, signature, date(s) should be present on the assessment documents. Sources of hazards include but are not limited to: hazards from impact/motion, high/low temperatures, chemicals, materials, radiation, falling objects, sharp objects, rolling or pinching objects, electrical hazards, and workplace layout. Certifies in writing the tasks evaluated, hazards found, and PPE required to protect employees against hazards and ensures exposed employees are made aware of hazards and required PPE before they are assigned to the hazardous task.

Managers and Supervisors

- Supervisors and managers shall regularly monitor employees for correct use and care of PPE and obtain follow-up training if required to ensure each employee has adequate skill, knowledge, and ability to use PPE.
- Supervisors and managers shall enforce PPE safety rules following the guidance of this program.

Employees

- Complying with the correct use and care of PPE.
- Reporting changes in exposure to hazardous conditions that might require a follow-up assessment of the task for PPE.
- Reporting and replacing defective or damaged PPE, which shall not be used.
- Wearing of required PPE is a condition of employment.

Procedure

General
Protective equipment, including personal protective equipment for eyes, face, head, and extremities, protective clothing, respiratory devices, and protective shields and barriers, must be provided, used and maintained in a sanitary and reliable condition.

Arrow S Energy Operating is responsible for employee-owned equipment. Where employees provide their own protective equipment, Arrow S Energy Operating must assure its adequacy, including proper maintenance and sanitation of such equipment.

Employee owned equipment is NOT permitted, except for safety toe footwear and prescription safety glasses. Arrow S Energy Operating is still responsible for the assurance of its adequacy of those two items.

All PPE issued shall be at no cost to the employee as required by federal regulation. All employees will know and follow the procedures outlined in this Program.

Eye Protection
Employees must use appropriate eye or face protection when exposed to eye or face hazards from flying particles, molten metal, liquid chemicals, acids or caustic liquids or chemical gases or vapors. Eye and Face PPE must comply with ANSI Standard Z87.1-2003 (Z87+), *Occupational and Educational Personal Eye and Face Protective Devices.*

Safety Glasses
Safety glasses, with side shields, that meet ANSI Z-87.1-2003 standards with "high Impact lenses" are required to be worn by all employees, contractors, and visitors while on Arrow S Energy Operating property, at all times, as described below:

- At field locations, in shops and warehouses, except in approved, designated, striped safety zones.
- In all yard work zones or by everyone when in the vicinity of loading or unloading equipment, performing mechanic or maintenance work, test stand operations, operating equipment such as forklifts, welding, or any type of work which has the potential to inflict an eye injury.
- In any office, restroom, or any other building while performing any type of work where a potential eye injury may be present.
- Visitors will be provided with visitor glasses. In the absence of approved prescription safety glasses, "Over the glass" type safety glasses or goggles, must be worn over the nonsafety glasses until approved prescription safety glasses are obtained.
- Workers assisting welders must wear absorbent safety glasses that protect the wearer from ultra-violet (UV) and/or infrared rays (IR).
- Dark shaded lens (sunglasses) darker than a # 1 shade is prohibited to be worn indoors unless welding or assisting a welder.
- A doctor must support "exceptions for medical reasons" in writing to exempt safety eyewear requirements.
- Safety glasses are not required:
    - Inside offices.
    - Inside vehicles.
    - Parking lots when traveling from vehicles to and from trailers or buildings that do not pass-through active work areas.

Goggles

- Chemical splash proof goggles shall be worn when handling or mixing liquid chemicals, solvents, paints, etc., and/or as recommended on the Safety Data Sheet of the material being handled.
- Dust proof goggles shall be worn when blowing equipment down with air or while performing other jobs where safety glasses are not adequate to prevent airborne particles from entering the openings around the lenses and side shields.

Face Shields

- Full face shields shall be worn over safety glasses when operating handheld or stationery grinders with abrasive or wire wheels, while chipping paint or concrete or, performing jobs where there is the potential for flying objects striking the face and safety glasses or goggles would not provide adequate protection.

Head Protection

Employees must wear hard hats when working in areas where there is a potential for injury to the head from impact events. Helmets must comply with ANSI Standard Z89.1-1997 Class E, *American National Standard for Industrial Head Protection* for Type II head protection or be equally effective.

- Employees must wear hard hats when working in areas where there is a potential for injury to the head from falling objects.
- Hard hats will not be altered in any way.
- Do not paint hard hats.
- Do not drill, cut, bend, or apply heat.
- Hard hats will be inspected by the employee regularly for cracks, chips, scratches, signs of heat exposure (sun cracks), etc.
- Defective hard hats will be replaced immediately.
- Hard hats must be made available to visitors.
- Employees will be trained in the use, care and maintenance of head protection equipment.

Hearing Protection

Hearing protection is required to be worn by all employees, contractors, and visitors while in posted “High Noise” areas.

Warning signs will be posted in areas known or suspected to have noise levels exceeding 85 dBA either constantly or intermittently.

When signs are not posted, employees shall wear hearing protection when noise caused by machinery, tools, etc., prevents normal conversations from being heard clearly.

Rule of thumb: If you must yell to be heard, hearing protection is required

Types

- Molded Inserts (ear plugs)
- Canal Caps (head band type)
- Muff, either headband or hard hat mounted earmuffs and earplugs shall be provided to the employee in sizes and configurations that will be comfortable to the employee.

Care and Maintenance

- Inspect hearing protection prior to each use.

- Hearing protection must be kept clean to prevent ear infections.
- If earplugs are of disposable type, they must be discarded when they become dirty, greasy, or cracked.
- Earmuffs that have deteriorated foam inserts, cracked seals or are defective must be replaced.

Fit

- Due to individual differences, not everyone can wear the same type of hearing protection. A variety of styles may have to be tried before one is found to be comfortable and provide adequate protection.
- Employees shall be instructed how to obtain the proper fit.

Hand Protection

Gloves

- Gloves are required to be worn when performing work which may expose the hands to extreme temperatures, cuts and abrasions, or exposure to chemicals.
- Welding gloves made of leather or other heat resistant materials shall be worn when performing arc welding or oxy/gas cutting.
- Impervious (chemical resistant) gloves shall be worn when handling chemicals that specify gloves as personal protection equipment when handling.
- Refer to the specific chemical's Safety Data Sheet for the correct glove type.
- Persons assigned to working with chemicals, i.e., solvent vats, shall be issued their own individual gloves for hygiene purposes.
- Leather gloves should be worn when working with sharp materials or when handling rigging equipment.
- Cloth gloves should be worn when handling objects or materials, which could cause blisters, splinters, cuts, etc.
- Heat resistant gloves shall be worn when handling hot materials or objects that have been heated beyond ambient temperatures.
- Insulated gloves shall be worn to prevent frostbite in extreme cold climates.
- Glove Inspections
    - Gloves shall be inspected before each use for holes, tears, and worn areas.
    - Chemical gloves shall be periodically air tested for pinholes by twisting the cuff tightly, apply low air pressure to expand the glove, and then submersing in water to check for bubbles.
    - Defective gloves shall be discarded immediately. Exception: machinists are exempted from wearing gloves while working with rotating machinery.

Foot Protection

Safety footwear shall be worn by all employees with regularly assigned duties at field locations, in shops and warehouses.

- Office workers and visitors who enter these areas on an infrequent basis will not be required to wear foot protection provided they stay clear of the work being performed.
- If required to be in close proximity of the work, the work will be stopped while visiting the area or safety footwear will be worn.
- The boot must provide ankle protection and have soles designed to protect from punctures with defined heels for climbing ladders.
- Metatarsal guards will be worn when duties present a hazard of equipment or material crushing the foot.
- All safety footwear must meet ANSI Z41-1999 standards.

Fall Protection
Personal fall protection is required when performing certain elevated jobs in excess of four feet. Consult the Arrow S Energy Operating Fall Protection Program.

Electrical Protection
Consult the Arrow S Energy Operating Electrical Safety Program.

Worksite Hazard Assessment
A written hazard assessment shall be performed. During the hazard assessment a determination if hazards are present or are likely to be present, this necessitates the use of PPE. The following sample hazard sources will be identified:

- High or low temperatures
- Chemical exposures (use SDS for guidance)
- Flying particles, molten metal or other eye, face, or skin hazards
- Falling objects or potential for dropping objects
- Employee falling from a height of 4' or more
- Sharp objects
- Rolling or pinching that could crush the hands or feet
- Electrical hazards

The results of this assessment shall be communicated to each affected employee and kept at the local office.

Proper Fitting or Sizing of PPE
Consideration must be given to comfort and fit. PPE that fits poorly will not afford the necessary protection. Continued wearing of the PPE is more likely if it fits the wearer comfortably. PPE is generally available in a variety of sizes. Care should be taken to ensure that the right size is selected.

Defective Equipment
Procedures must be in place to ensure defective or damaged PPE is not used. PPE that is in disrepair must be discarded or removed from service until repaired.

Training on the Use of PPE

Training should be given to employees concerning when to wear PPE, what PPE should be worn, how to put on and take off and adjust PPE. The limitations of the PPE and its use, care, and maintenance should also be included in the training.

Retraining on the Use of PPE
Each affected employee must demonstrate an understanding of training received and the ability to use PPE properly. When there is a reason to believe that any employee who has been trained does not have the required understanding and skill or there are changes in the workplace, the employee must be retrained.

PPE Training is Documented
Training shall be documented, and records maintained. The training certification shall include:

- Name of employee(s) trained
- The dates of training, and
- Training content

PPE Matrix for Arrow S Energy Operating Company Wide
1000 Louisiana, Suite 7000 Houston, TX 77002
D = **D**epends on Situation **M** = **M**andatory N = **N**ot Required

CATEGORY	EQUIPMENT	THREAT	INSPECTION	MAINTENANCE	Job/Task					
					Field	Shop	Driving	Office	Summer	Winter
Head Protection:										
	Hard Hats	Falling Objects	Each Use	Dispose	M	D	-	-	-	-
Eye and Face Protection:										
	Safety Glasses	Eye Injuries	Each Use	Keep Clean	M	M	-	-	-	-
	Face Shield		Each Use	Keep Clean	D	D	-	-	-	-
	Goggles		Each Use	Keep Clean	D	D	-	-	-	-
	Spoggels		Each Use	Keep Clean	D	-	-	-	-	-
	Welding Helmet		Each Use	Keep Clean	D	D	-	-	-	-
Hearing Protection:										
	Disposable Earplugs	Hearing Loss	Each Use	Dispose	D	D	-	-	-	-
	Ear Muffs		Each Use	Keep Clean	D	D	-	-	-	-
Clothing Protection:										
	Cold Weather Clothes	Frostbite	Each Use	Keep Clean	-	-	-	-	-	D
	Rainwear	Wet Skin Hypothermia	Each Use	Keep Clean	D	-	-	-	D	D
	Flame Resistant	Flash Burn Heat Exhaustion	Each Use	Keep Clean	D	D	-	-	D	M
Foot Protection:										
	Safety Shoes	Crush Injuries	Each Use	Dispose	M	M	-	-	-	-
Hand Protection:										
	Work Gloves	Hand Injuries	Each Use	Dispose	M	M	-	D	-	-
	Rubber Gloves	Chemical Burns	Each Use	Dispose	D	D	-	D	-	-
Lung Protection:										
	5 Minute Escape Air-pack	Death by Poisoning	Monthly	Keep Clean	D	D	-	-	-	-

Arrow S Energy Operating PPE Hazard Assessment Certification Form

Name of work place: Arrow S Energy Operating
Work place address: 1000 Louisiana, Suite 7000 Houston, TX 77002
Work area/s: All company locations

Conducted by:
Date of Assessment:
Title:
Signature:

EYES		
Work activities, such as:	**Work-related exposure to:**	**PPE**
Abrasive Blasting	Airborne dust	Safety glasses
Grinding	Small particles/ flying debris	Spoggels or face shield
Drilling	Flying particles	Safety glasses
Welding	UV burn to eyes	Welding helmet
Torch cutting	Molten metal/ UV burn to eyes	Deep shade goggles

HEAD		
Work activities, such as:	**Work-related exposure to:**	**PPE**
Working under overhead falling object hazards	Falling objects	Hard Hat

HANDS		
Work activities, such as:	**Work-related exposure to:**	**PPE**
Normal construction work	Cuts and scrapes	Leather gloves
Cutting	Punctures	Rubber gloves (chemical resistant)
Welding	Pinches	Latex gloves
Working with tools	Amputations	Insulated gloves
Working with sharp objects	Crushes	Slip resistant gloves
Working with hot or cold objects	Burnes/ frostbite	Adequate gloves/ clothing
Working with chemicals	Frostbite, skin absorption	As per SDS
Working with electricity	Shock	Non-conductive gloves/ clothing

Cleaning body fluids	Bloodborne pathogens type illnesses	As per the Bloodborne Pathogens Procedure

FEET		
Work activities, such as:	**Work-related exposure to:**	**PPE**
Normal oil and gas activities/ work	Crushes	Safety shoes

BODY/SKIN		
Work activities, such as:	**Work-related exposure to:**	**PPE**
Normal construction work	Cuts and scrapes	Shirts with sleeves (No tank-tops)
Cutting	Punctures	Wear pants (No shorts)
Welding	Pinches	Chemical apron
Working with tools	Amputations	Winter clothing
Working with sharp objects	Crushes	Light summer clothing
Working with hot or cold objects	Burnes	Flash/flame Resistant Clothing
Working with chemicals	Frostbite, skin absorption	As per SDS
Working with electricity	Shock	Non-conductive gloves/ clothing
Working w/ flammable liquids or gas	Explosions or fire	FR clothing
Working in weather over 90 degrees	Heat related illness	Short sleeve FR clothing
	Sunburn	Sunscreen

BODY WHOLE		
Work activities, such as:	**Work-related exposure to:**	**PPE**
Normal construction work	Cuts and scrapes	Flame/ flash resistant clothing
Working w/ flammable liquids or gas	Explosions or fire	Light breathable clothing (unless atmosphere LEL is IDLH)
Working in weather over 90 degrees	Heat related illness	

LUNGS/ RESPIRATORY SYSTEM

Work activities, such as:	Work-related exposure to:	PPE
Work around poisonous gas	Poisonous gas	Five-minute escape pack
Work in dusty environment	Dust	Respirators
Working with chemicals	Fumes	Single strap dust mask (must be supplied by employee and approved by the HSE Director)
Cutting	Toxic vapor	N95 respirator
Grinding	Dust	N95 respirator
Sanding	Dust	Adequate respiratory protection
Burning	Smoke	Adequate respiratory protection
Venting	Air contaminants	Adequate respiratory protection

EARS/ HEARING		
Work activities, such as:	**Work-related exposure to:**	**PPE**
Generators	Excessive loud noises	Hearing protection
Motors	Excessive loud noises	Hearing protection
Grinding	Excessive loud noises	Hearing protection
Pneumatic equipment	Excessive loud noises	Hearing protection
High pressure gas flow	Excessive loud noises	Hearing protection

RESPIRATORY PROTECTION

Purpose

It is the intention of Arrow S Energy Operating to provide a respiratory protection program that meets all federal standards. Arrow S Energy Operating will attempt to engineer potential harmful vapors and oxygen deficient atmosphere exposure hazards out of the work environment. If engineering control measures are not feasible, or emergency situations with high exposure levels prevent engineering controls, then respirators shall be provided by the employer of the worker that are suitable for the purpose intended.

Scope

This program applies to all Arrow S Energy Operating employees. Employees potentially exposed to airborne contaminants must wear respiratory protection. Respirators are to be used when engineering control measures are not feasible or during emergency situations with high exposure. Respirators shall be provided by the company which are applicable and suitable for the purpose intended. This program may be adopted for use by contractors who do not have a formal Respiratory Protection program.

Respiratory Program Administrator

The program administrator has been designated as the HSE Director, in order to ensure that specific requirements are followed.

The Administrator must be knowledgeable of the complexity of the program, able to conduct evaluations and have the proper training.

This assignment is made, however, with the understanding that individual supervisors will have to implement and enforce major portions of the program. It is understood that the Program Administrator will report performance problems to the HSE Director for resolution.

The responsibilities of the Program Administrator will include, but are not limited to:

- Conducting an annual written evaluation of the program. The program evaluation should be completed no later than January, 31, of each year.
- Ensuring an adequate supply of respirators, cartridges, and repair/replacement parts. The Program Administrator may delegate this duty but will retain overall responsibility. The person(s) to whom this duty has been delegated is the Project Manager and/or Field Supervisor.
- Respiratory protective equipment must be selected based on respiratory hazards. Hazards must be identified and NIOSH certified respirators must be selected and provided based on those hazards and factors affecting performance.
- Ensuring that all respirator users have been trained in the use, selection and limitations of the type of respirators they will be using prior to the first time the respirator must be used. While the duty of conducting the training may be delegated, the Program Administrator retains final responsibility for seeing that all employees are appropriately trained.
- Ensuring that all respirator users have been medically evaluated and found fit to use the type of respirators that will be required in their job. The medical evaluation must be completed before an employee can use a respirator.
- Ensuring that all respirator users are fit-tested at least annually and more often if other federal requirements apply.

- Ensuring that respirators are individually issued, are cleaned and sanitized on a regular basis, and respirators are stored in a clean and accessible location. This duty may also be delegated but the Program Administrator retains final responsibility for seeing that it is done.
- Ensuring that respirators are selected based on the hazard that will be encountered. This program describes the basic respirators that will be used at this site and the tasks for which they will be required. In special circumstances, the Program Administrator will contact the corporate health and safety staff for guidance in selecting the correct respirator.
- Ensuring that employee exposure is monitored to assure correct respirator type is used. Exposure monitoring may be delegated to others; however, the Program Administrator has final responsibility of monitoring completion and to request assistance when necessary.
- Ensuring an employee must leave the area if a vapor/gas breakthrough, changes in breathing resistance, and/or leakage of the facepiece occur. Employees must leave the respirator use area if they detect vapor or gas breakthrough, changes in breathing resistance, or leakage of the facepiece.
- Ensuring that the elements of the Respiratory Protection Program for the selection, use, cleaning/maintenance, storage and fit testing of respirators are followed.
- Ensuring that respirator parts are not exchanged between brands of respirators.
- Ensuring medical evaluations, respirators and required training are provided at no cost to the employee.

Medical Evaluation Requirements

General

A medical evaluation must be completed before an employee can use a respirator. The medical evaluation must be confidential, during normal working hours, convenient, understandable and the employee should be allowed to discuss the results with the PLHCP.

Arrow S Energy Operating may discontinue an employee's medical evaluations when the employee is no longer required to use a respirator.

Medical Evaluation Procedures

Arrow S Energy Operating shall identify a physician or other licensed health care professional (PLHCP) to perform medical evaluations using a medical questionnaire or an initial medical examination that obtains the same information as the medical questionnaire. The medical evaluation shall obtain the information requested by the Medical Questionnaire in Forms section (or equivalent).

The medical evaluation prior to fit-testing will be confidential, conducted during normal working hours, be at a convenient time and location, be understandable and the employee will be given a chance to discuss the results with the PLHCP.

Supplemental Information for the PLHCP

The following information must be provided to the PLHCP before the PLHCP makes a recommendation concerning an employee's ability to use a respirator:

- 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.

Arrow S Energy Operating shall provide the PLHCP with a copy of the Arrow S Energy Operating Respiratory Protection Program.

Note: When Arrow S Energy Operating replaces a PLHCP, Arrow S Energy Operating must ensure that the new PLHCP obtains this information, either by providing the documents directly to the PLHCP or having the documents transferred from the former PLHCP to the new PLHCP. However, OSHA does not expect employers to have employees medically re-evaluated solely because a new PLHCP has been selected.

Medical Determination
In determining the employee's ability to use a respirator, Arrow S Energy Operating shall obtain a written recommendation regarding the employee's ability to use the respirator from the PLHCP. The recommendation shall provide only the following information:

- Any limitations on respirator use related to the medical condition of the employee, or relating to the workplace conditions in which the respirator will be used, including whether or not the employee is medically able to use the respirator;
- The need, if any, for follow-up medical evaluations; and
- A statement that the PLHCP has provided the employee with a copy of the PLHCP's written recommendation.

All recommendations are to be sent to Arrow S Energy Operating's HSE Director.

Additional Medical Evaluations
At a minimum, Arrow S Energy Operating shall provide additional medical evaluations that comply with the requirements of this program if:

- An employee reports medical signs or symptoms that are related to ability to use a respirator;
- A PLHCP, supervisor, or the respirator Program Administrator informs Arrow S Energy Operating that an employee needs to be re-evaluated;
- Information from the respiratory protection program, including observations made during fit testing and program evaluation, indicates a need for employee re-evaluation; or
- A change occurs in workplace conditions (e.g., physical work effort, protective clothing, and temperature) that may result in a substantial increase in the physiological burden placed on an employee.

Work Site Procedures

Each work site where respirators are required to protect the health of the worker shall have work site procedures that follow the guidelines of this program. The following areas shall be included:

- Identification of specific hazard requiring respiratory protection

- The selection of the appropriate respiratory protection equipment based on the specific hazard and concentration levels, characteristics, etc. Specific brand and models of respiratory equipment to be used shall be identified in the procedures.

- Verification that each user of respiratory protection is qualified (medical approval, current fit test, annual training and demonstrates competency.

Respirator Selection Criteria

Arrow S Energy Operating provides respiratory equipment to employees. Respiratory equipment must be provided to employees at no cost to them.

The selection of the respiratory equipment is based on the hazards the employee is exposed to. Arrow S Energy Operating shall:

- Perform hazard identification,
- Select and provide respirators based on those hazards and factors affecting performance,
- Establish brands and models to be used, and
- Estimate exposures and contaminant information.

Hazard Identification
Due to the many varied work locations Arrow S Energy Operating's identification of respiratory hazards will be contained in the various work site specific safety plans. However, common respiratory hazards that will be encountered include:

- Dust
- Fumes
- Gases
- Chemical particles
- Oxygen Deficiency

Characteristics of Hazardous Operation or Process
- Hot operations: welding, chemical reactions, soldering, melting, melding and burning
- Liquid operations: painting, degreasing, dipping, spraying, brushing, coating, etching, cleaning, pickling, plating, mixing, galvanizing and chemical reactions
- Solid operations: pouring, mixing, separations, extraction, crushing, conveying, loading, bagging and demolition.
- Pressurized spraying: cleaning parts, applying pesticides, degreasing, sand blasting and painting
- Shaping operations: cutting, grinding, filing, milling, melding, sawing and drilling

Gaseous Contaminants
- Inert gases (helium, argon, etc.), which do not metabolize in the body but displace air to produce an oxygen deficiency.
- Acid gases (SO_2, H_2S, HCl, etc.) which are acids or produce acids by reaction with water.
- Alkaline gases (NH_3, etc.), which are alkalies or produce alkalies by reaction with water.
- Organic gases (butane, acetone, etc.), which exist as true gases or vapors from organic liquids.
- Organometallic gases (tetraethyl lead, organo-phosphates, etc.), which have metals attached to organic groups.

Particulate contaminants
- Dusts are mechanically generated solid particulates (0.5 to 10µm)

- Fumes are solid condensation particles of small diameter (0.1 to 1.0 µm)
- Mists are liquid particulate matter (5 to 100 µm)
- Smoke is chemically generated particulates (solid and liquid) of organic origins (0.01 to 0.3 µm)

Selection of Respirator
The following factors shall be taken into account when selecting the proper respirator:

Concentration and Type of Contaminant
The concentration and type of contaminant will determine the model and type of respirator and cartridges/filters or filters to be used. The concentration is based on a sampling of the atmosphere.

Location of Hazardous Area
(Confined Space, nearby contaminants, etc.)

Worker Activity
(Extreme heat, cold, welding hood requirement, etc.)

Types of Respirators

Air-purifying respirators can be either full-face or half masks with mechanical or chemical cartridges to filter dusts, mists, fumes, vapors or gases.

Powered air-purifying respirators use a blower to pass the contaminated air through a filter. The purified air is then delivered into a mask or hood. They filter dusts, mists, fumes, vapors and gases, just like ordinary air-purifying respirators.

Air-purifying respirators cannot be used in oxygen-deficient atmospheres, which can result when another gas displaces the oxygen or consumption of oxygen by a chemical reaction occurs. Oxygen levels below 19.5% require either a source of supplied air or supplied-air respirator protection. Levels below 16% are considered to be unsafe and could cause death. To determine the proper cartridge for air-purifying respirators contact the Arrow S Energy Operating Safety Advisor or a qualified on-site safety representative of your company. You should also consult the Material Safety Data Sheet of the substance that needs to be filtered.

All cartridges are assigned a color designating the type of contaminant they will filter:

White:	Acid gas
Black:	Organic vapors
Green:	Ammonia gas
Yellow:	Acid gas and organic vapors
Purple:	Radioactive materials
Orange:	Dust, fumes and mists
Olive:	Other gases and vapors

Once the wearer of the respirator can detect an odor, irritation, or taste of the contaminant, the cartridge should be replaced. All cartridges and/or filters shall be changed at the beginning of each shift.

Supplied-air respirators provide the highest level of protection against highly toxic and unknown materials. Supplied air refers to self-contained breathing apparatuses (SCBAs) and air-line respirators. SCBAs have a limited air supply that is carried by the user, allowing for good mobility and fewer restrictions than air-line respirators.

Air-line respirators have an air hose that is connected to a fresh air supply from a central source. The source can be from a compressed air cylinder or air compressor that provides at least Grade D breathing air.

Emergency Escape Breathing Apparatuses (EEBAs) provide oxygen for 5, 10 or 15 minutes depending on the unit. These are for emergency situations in which an employee must escape from environments immediately dangerous to life or health (IDLH).

SCBA (Self Contained Breathing Apparatus)
Arrow S Energy Operating does NOT allow employees to work in an Immediately Dangerous to Life and Health (IDLH) environment.

In order to maintain the NIOSH/MSHA approval of any respirator, mixing parts from other respirator manufacturers is prohibited. This includes airline hoses, valves, gaskets, cartridges, etc. For example, do not use North cartridges or valve gaskets with an MSA product.

Brand and Models
Arrow S Energy Operating has selected North Safety as its NIOSH-certified respirator. Only this brand of respirator shall be used in compliance with the conditions of the certification of its Respiratory Protection Program (fit testing model, no mixing of different manufacturer parts, cartridges, filters, etc.).

The specific model will be based on the hazard, concentration of contaminant, oxygen level, work environment and type of work being performed. To aid in the selection process the following will be used to identify the proper North respiratory equipment for the work being performed and hazard that is present.

- NIOSH Pocket Guide to Chemicals
- North Cartridge Selection Guide
- North Respirator Selection Guide

Estimate of Exposures and Contaminant Information
- No employee shall enter an IDLH environment.
- Normal oxygen levels shall be maintained.
- No employee shall be exposed to an atmosphere containing concentrations that would exceed the STEL or PEL for the identified atmospheric hazard.

Respirator Fit Testing

Users of respiratory protective equipment must be fit tested. Employees are required to pass qualitative fit test (QLFT) or quantitative fit test (QNFT) before initial use, if a different respirator is used, and annually thereafter.

Before an employee may be required to use any respirator with a negative or positive pressure tight-fitting face piece, the employee must be fit tested with the same make, model, style, and size of respirator that will be used. This section specifies the kinds of fit tests allowed, the procedures for conducting them, and how the results of the fit tests must be used.

All respirator users are fit-tested at least annually and more often if other federal requirements apply.

Supplied Air Respirators are required to be fit tested as well.

Arrow S Energy Operating shall ensure that employees using a tight-fitting face piece respirator pass an appropriate qualitative fit test (QLFT) or quantitative fit test (QNFT) as stated in this program.

Arrow S Energy Operating shall ensure that an employee using a tight-fitting face piece respirator is fit tested prior to initial use of the respirator, whenever a different respirator face piece (size, style, model or make) is used, and at least annually thereafter.

Arrow S Energy Operating shall conduct an additional fit test whenever the employee reports, or Arrow S Energy Operating's PLHCP, supervisor, or Program Administrator makes visual observations of, changes in the employee's physical condition that could affect respirator fit. Such conditions include, but are not limited to, facial scarring, dental changes, cosmetic surgery, or an obvious change in body weight.

If after passing a QLFT or QNFT, the employee subsequently notifies Arrow S Energy Operating, Program Administrator, supervisor, or PLHCP that the fit of the respirator is unacceptable, the employee shall be given a reasonable opportunity to select a different respirator face piece and to be retested.

The fit test shall be administered using an OSHA-accepted QLFT or QNFT protocol. The OSHA-accepted QLFT and QNFT protocols and procedures are contained in this section.

QLFT may only be used to fit test negative pressure air-purifying respirators that must achieve a fit factor of 100 or less. Half face air filtering respirators may be fit tested with irritant smoke while full face air filtering respirators require Portacount fit testing.

If the fit factor, as determined through an OSHA-accepted QNFT protocol, is equal to or greater than 100 for tight-fitting half face pieces, or equal to or greater than 500 for tight-fitting full face pieces, the QNFT has been passed with that respirator.

Fit testing of tight-fitting atmosphere-supplying respirators and tight-fitting powered air-purifying respirators shall be accomplished by performing quantitative or qualitative fit testing in the negative pressure mode, regardless of the mode of operation (negative or positive pressure) that is used for respiratory protection.

Qualitative fit testing of these respirators shall be accomplished by temporarily converting the respirator user's actual face piece into a negative pressure respirator with appropriate filters, or by using an identical negative

pressure air-purifying respirator face piece with the same sealing surfaces as a surrogate for the atmosphere-supplying or powered air-purifying respirator face piece.

Quantitative fit testing of these respirators shall be accomplished by modifying the face piece to allow sampling inside the face piece in the breathing zone of the user, midway between the nose and mouth. This requirement shall be accomplished by installing a permanent sampling probe onto a surrogate face piece, or by using a sampling adapter designed to temporarily provide a means of sampling air from inside the face piece.

Any modifications to the respirator face piece for fit testing shall be completely removed, and the face piece restored to NIOSH-approved configuration, before that face piece can be used in the workplace.

Fit Test Procedures
The requirements in this section apply to all OSHA-accepted fit test methods, both QLFT and QNFT.

The test subject shall be allowed to pick the most acceptable respirator from a sufficient number of respirator sizes so that the respirator is acceptable to, and correctly fits, the user.

Prior to the selection process, the test subject shall be shown how to put on a respirator, how it should be positioned on the face, how to set strap tension and how to determine an acceptable fit. A mirror shall be available to assist the subject in evaluating the fit and positioning of the respirator. This instruction may not constitute the subject's formal training on respirator use, because it is only a review.

The test subject shall be informed that he/she is being asked to select the respirator that provides the most acceptable fit. Each respirator represents a different size and shape, and if fitted and used properly, will provide adequate protection.

The test subject shall be instructed to hold each chosen face piece up to the face and eliminate those that obviously do not give an acceptable fit.

The more acceptable face pieces are noted in case the one selected proves unacceptable; the most comfortable mask is donned and worn at least five minutes to assess comfort. Assistance in assessing comfort can be given by discussing the following points:

- If the test subject is not familiar with using a particular respirator, the test subject shall be directed to don the mask several times and to adjust the straps each time to become adept at setting proper tension on the straps.
- Position of the mask on the nose
- Room for eye protection
- Room to talk
- Position of mask on face and cheeks

The following criteria shall be used to help determine the adequacy of the respirator fit:

- Chin properly placed;
- Adequate strap tension, not overly tightened;
- Fit across nose bridge;
- Respirator of proper size to span distance from nose to chin;
- Tendency of respirator to slip;
- Self-observation in mirror to evaluate fit and respirator position.

Use the Fit Test form.

User Seal Check

Before conducting the negative and positive pressure checks, the subject shall be told to seat the mask on the face by moving the head from side-to-side and up and down slowly while taking in a few slow deep breaths. The test subject shall conduct a user seal check, either the negative or positive pressure seal checks described below:

Positive Pressure Check
Close off the exhalation valve and exhale gently into the face piece. The face fit is considered satisfactory if a slight positive pressure can be built up inside the face piece without any evidence of outward leakage of air at the seal. For most respirators this method of leak testing requires the wearer to first remove the exhalation valve cover before closing off the exhalation valve and then carefully replacing it after the test.

Negative Pressure Check
Close off the inlet opening of the canister or cartridge(s) by covering with the palm of the hand(s) or by replacing the filter seal(s), inhale gently so that the face piece collapses slightly, and hold the breath for ten seconds. The design of the inlet opening of some cartridges cannot be effectively covered with the palm of the hand. The test can be performed by covering the inlet opening of the cartridge with a thin latex or nitrile glove. If the face piece remains in its slightly collapsed condition and no inward leakage of air is detected, the tightness of the respirator is considered satisfactory.

The test shall not be conducted if there is any hair growth between the skin and the face piece sealing surface, such as stubble beard growth, beard, moustache or sideburns which cross the respirator sealing surface. Any type of apparel which interferes with a satisfactory fit shall be altered or removed, including glasses.

If a test subject exhibits difficulty in breathing during the tests, she or he shall be referred to a physician or other licensed health care professional, as appropriate, to determine whether the test subject can wear a respirator while performing her or his duties. If the employee finds the fit of the respirator unacceptable, the test subject shall be given the opportunity to select a different respirator and to be retested.

Prior to the commencement of the fit test, the test subject shall be given a description of the fit test and the test subject's responsibilities during the test procedure. The description of the process shall include a description of the test exercises that the subject will be performing. The respirator to be tested shall be worn for at least 5 minutes before the start of the fit test.

The fit test shall be performed while the test subject is wearing any applicable safety equipment that may be worn during actual respirator use which could interfere with respirator fit.

Test Exercises
Each test exercise shall be performed for one minute except for the grimace exercise which shall be performed for 15 seconds. The test subject shall be questioned by the test conductor regarding the comfort of the respirator upon completion of the protocol. If it has become unacceptable, another model of respirator shall be tried. If due to medical or health conditions the employee cannot perform the test exercises the fit test shall not be performed and the employee not allowed to use a respirator until all elements of the fit test can be achieved.

The respirator shall not be adjusted once the fit test exercises begin. Any adjustment voids the test, and the fit test must be repeated.

The following test exercises are to be performed for all fit testing methods prescribed in this procedure:

- Normal breathing. In a normal standing position, without talking, the subject shall breathe normally.
- Deep breathing. In a normal standing position, the subject shall breathe slowly and deeply, taking caution so as not to hyperventilate.
- Turning head side to side. Standing in place, the subject shall slowly turn his/her head from side to side between the extreme positions on each side. The head shall be held at each extreme momentarily so the subject can inhale at each side.
- Moving head up and down. Standing in place, the subject shall slowly move his/her head up and down. The subject shall be instructed to inhale in the up position (i.e., when looking toward the ceiling).
- Talking. The subject shall talk out loud slowly and loud enough so as to be heard clearly by the test conductor. The subject shall read from the Rainbow Passage

Rainbow Passage

> "When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond reach, his friends say he is looking for the pot of gold at the end of the rainbow." Continue to read for one minute.

- Grimace. The test subject shall grimace by smiling or frowning. (This applies only to QNFT testing; it is not performed for QLFT)
- Jogging in place. The test subject shall jog in place being careful to be aware of their surroundings.
- Normal breathing. Same as exercise (1).

Qualitative Fit Test (QLFT) Protocols

General

Arrow S Energy Operating shall ensure that persons administering QLFT are able to prepare test solutions, calibrate equipment and perform tests properly, recognize invalid tests, and ensure that test equipment is in proper working order. Arrow S Energy Operating shall ensure that QLFT equipment is kept clean and well maintained so as to operate within the parameters for which it was designed.

Irritant Smoke (Stannic Chloride) Protocol

This qualitative fit test uses a person's response to the irritating chemicals released in the ``smoke'' produced by a stannic chloride ventilation smoke tube to detect leakage into the respirator.

General Requirements and Precautions. The respirator to be tested shall be equipped with high efficiency particulate air (HEPA) or P100 series filter(s).

Only stannic chloride smoke tubes shall be used for this protocol. No form of test enclosure or hood for the test subject shall be used.

The smoke can be irritating to the eyes, lungs, and nasal passages. The test conductor shall take precautions to minimize the test subject's exposure to irritant smoke. Sensitivity varies, and certain individuals may respond to a

greater degree to irritant smoke. Care shall be taken when performing the sensitivity screening checks that determine whether the test subject can detect irritant smoke to use only the minimum amount of smoke necessary to elicit a response from the test subject.

The fit test shall be performed in an area with adequate ventilation to prevent exposure of the person conducting the fit test or the build-up of irritant smoke in the general atmosphere.

The person to be tested must demonstrate his or her ability to detect a weak concentration of the irritant smoke.

- The test operator shall break both ends of a ventilation smoke tube containing stannic chloride, and attach one end of the smoke tube to a low flow air pump set to deliver 200 milliliters per minute, or an aspirator squeeze bulb. The test operator shall cover the other end of the smoke tube with a short piece of tubing to prevent potential injury from the jagged end of the smoke tube.
- The test operator shall advise the test subject that the smoke can be irritating to the eyes, lungs, and nasal passages and instruct the subject to keep his/her eyes closed while the test is performed.
- The test subject shall be allowed to smell a weak concentration of the irritant smoke before the respirator is donned to become familiar with its irritating properties and to determine if he/she can detect the irritating properties of the smoke. The test operator shall *carefully direct a small amount* of the irritant smoke in the test subject's direction to determine that he/she can detect it.

Irritant Smoke Fit Test Procedure

- The person being fit tested shall don the respirator without assistance, and perform the required user seal check(s).
- The test subject shall be instructed to keep his/her eyes closed if wearing a half face respirator.
- The test operator shall direct the stream of irritant smoke from the smoke tube toward the face seal area of the test subject, using the low flow pump or the squeeze bulb. The test operator shall begin at least 12 inches from the face piece and move the smoke stream around the whole perimeter of the mask. The operator shall gradually make two more passes around the perimeter of the mask, moving to within six inches of the respirator.
- If the person being tested has not had an involuntary response and/or detected the irritant smoke, proceed with the test exercises.
- The exercises identified in the Test Exercises of this procedure shall be performed by the test subject while the respirator seal is being continually challenged by the smoke, directed around the perimeter of the respirator at a distance of six inches.
- If the person being fit tested reports detecting the irritant smoke at any time, the test is failed. The person being retested must repeat the entire sensitivity check and fit test procedure.
- Each test subject passing the irritant smoke test without evidence of a response (involuntary cough, irritation) shall be given a second sensitivity screening check, with the smoke from the same smoke tube used during the fit test, once the respirator has been removed, to determine whether he/she still reacts to the smoke. Failure to evoke a response shall void the fit test.
- If a response is produced during this second sensitivity check, then the fit test is passed. The glass tube shall be disposed of properly.

Quantitative Fit Test (QNFT) Protocols

Using controlled negative pressure and appropriate instrumentation to measure the volumetric leak rate of a face piece to quantify the respirator have been demonstrated to be acceptable to OSHA.

Arrow S Energy Operating shall ensure that persons administering QNFT are able to calibrate equipment and perform tests properly, recognize invalid tests, calculate fit factors properly and ensure that test equipment is in proper working order.

Arrow S Energy Operating shall ensure that QNFT equipment is kept clean, and is maintained and calibrated according to the manufacturer's instructions so as to operate at the parameters for which it was designed.

Portacount Fit Test Requirements

- Check the respirator to make sure the respirator is fitted with a high-efficiency filter and that the sampling probe and line are properly attached to the face piece.
- Instruct the person to be tested to don the respirator for five minutes before the fit test starts. This purges the ambient particles trapped inside the respirator and permits the wearer to make certain the respirator is comfortable. This individual shall already have been trained on how to wear the respirator properly.
- Check the following conditions for the adequacy of the respirator fit: Chin properly placed; Adequate strap tension, not overly tightened; Fit across nose bridge; Respirator of proper size to span distance from nose to chin; Tendency of the respirator to slip; Self-observation in a mirror to evaluate fit and respirator position.
- Have the person wearing the respirator do a user seal check. If leakage is detected, determine the cause. If leakage is from a poorly fitting face piece, try another size of the same model respirator, or another model of respirator.
- Follow the manufacturer's instructions for operating the Portacount and proceed with the test.
- The test subject shall be instructed to perform the exercises in Test Exercises section of this procedure.
- After the test exercises, the test subject shall be questioned by the test conductor regarding the comfort of the respirator upon completion of the protocol. If it has become unacceptable, another model of respirator shall be tried.

Portacount Test Instrument
The Portacount will automatically stop and calculate the overall fit factor for the entire set of exercises. The overall fit factor is what counts. The Pass or Fail message will indicate whether or not the test was successful. If the test was a Pass, the fit test is over.

Since the pass or fail criterion of the Portacount is user programmable, the test operator shall ensure that the pass or fail criterion meet the requirements for minimum respirator performance.

A record of the test must be sent to the HSE Director and kept on file, assuming the fit test was successful. The record must contain the test subject's name; overall fit factor; make, model, style, and size of respirator used; and date tested.

Use, Maintenance and Care of Respirators

This section requires Arrow S Energy Operating to provide for the use, cleaning and disinfecting, storage, inspection, and repair of respirators used by employees. OSHA Appendix B - Respirator Cleaning Procedures (Mandatory) shall be followed.

Use

- The effective facial seal of respiratory protective equipment is vital. Anything that can affect the seal must be prohibited and include facial hair, glasses, etc. Respirators with tight-fitting facepieces shall not be worn by employees who have facial hair that comes between the sealing surface of the facepiece and the face or that interferes with valve function.
- Each time a respirator is put on a positive and negative pressure check shall be performed.

Cleaning and Storage Requirements

Respirators are properly cleaned and stored. Respirators issued for the exclusive use of an employee shall be cleaned and disinfected as often as necessary to be maintained in a sanitary condition. All respirators shall be stored to protect them from damage, contamination, dust, sunlight, extreme temperatures, excessive moisture, and damaging chemicals, and they shall be packed or stored to prevent deformation of the facepiece and exhalation valve.

The respirators shall be cleaned and disinfected at the following intervals:

- Respirators issued for the exclusive use of an employee shall be cleaned and disinfected by the employee as often as necessary to be maintained in a sanitary condition,
- Respirators used in fit testing and training shall be cleaned and disinfected after each use by a designated person.
- Each individual who is assigned a cartridge respirator is responsible for seeing that the respirator is cleaned, inspected and properly stored.

Cleaning Procedures

- Remove filters, cartridges, or canisters. Disassemble face pieces by removing speaking diaphragms, demand and pressure-demand valve assemblies, hoses, or any components recommended by the manufacturer. Discard or repair any defective parts.
- Wash components in warm water with a mild detergent or with a cleaner recommended by the manufacturer. A stiff bristle (not wire) brush may be used to facilitate the removal of dirt.
- Rinse components thoroughly in clean, warm, preferably running water. Drain.
- When the cleaner used does not contain a disinfecting agent, respirator components should be immersed for two minutes in commercially available cleansers of equivalent disinfectant quality. Another alternative is to use wipes containing alcohol that are intended for use with respirators.
- Rinse components thoroughly in clean, warm, preferably running water. Drain. The importance of thorough rinsing cannot be overemphasized. Detergents or disinfectants that dry on face pieces may result in dermatitis. In addition, some disinfectants may cause deterioration of rubber or corrosion of metal parts if not completely removed.
- Components should be hand-dried with a clean lint-free cloth or air dried. Reassemble face piece, replacing filters, cartridges, and canisters where necessary. Test the respirator to ensure that all components work properly.

Storage and Inspection

- Respiratory equipment shall be stored in a manner to protect it from damage, contamination, temperature extreme, etc.
- Respiratory equipment intended for emergency use shall be stored in an area that is readily accessible and be clearly marked.

Arrow S Energy Operating shall ensure that respirators are inspected as follows:

- Respirators are inspected before use. All respirators used in routine situations shall be inspected before each use and during cleaning.
- All respirators maintained for use in emergency situations shall be inspected at least monthly and in accordance with the manufacturer's recommendations, and shall be checked for proper function before and after each use; and emergency escape-only respirators shall be inspected before being carried into the workplace for use.
- A check by the employee of respirator function, tightness of connections, and the condition of the various parts including, but not limited to, the face piece, head straps, valves, connecting tube, and cartridges, canisters or filters; and
- A check of elastomeric parts for pliability and signs of deterioration.

Breathing Air Quality and Use

Arrow S Energy Operating shall ensure that compressed air accords with the following specifications:

- Compressed breathing air shall meet at least the requirements for Type 1-Grade D breathing air described in ANSI/Compressed Gas Association Commodity Specification for Air, G-7.1-1989, to include:
    - Oxygen content (v/v) of 19.5-23.5%;
    - Hydrocarbon (condensed) content of 5 milligrams per cubic meter of air or less;
    - Carbon monoxide (CO) content of 10 ppm or less;
    - Carbon dioxide content of 1,000 ppm or less; and
    - Lack of noticeable odor.

- Arrow S Energy Operating shall ensure that oxygen is not used in compressed air units.
- Arrow S Energy Operating shall ensure that oxygen concentrations greater than 23.5% are used only in equipment designed for oxygen service or distribution.
- Arrow S Energy Operating shall ensure that cylinders used to supply breathing air to respirators meet DOT requirements and that:
    - Cylinders are tested and maintained as prescribed in the Shipping Container Specification Regulations of the Department of Transportation (49 CFR part 173 and part 178);
    - Cylinders of purchased breathing air have a certificate of analysis from the supplier that the breathing air meets the requirements for Type 1--Grade D breathing air; and
    - The moisture content in the cylinder does not exceed a dew point of -50 deg. F (-45.6 deg. C) at 1 atmosphere pressure.

- Arrow S Energy Operating shall ensure that compressors used to supply breathing air to respirators are constructed and situated so as to:
    - Prevent entry of contaminated air into the air-supply system;
    - Minimize moisture content so that the dew point at 1 atmosphere pressure is 10 degrees F (5.56 deg. C) below the ambient temperature;
    - Have suitable in-line air-purifying sorbent beds and filters to further ensure breathing air quality. Sorbent beds and filters shall be maintained and replaced or refurbished periodically following the manufacturer's instructions.

- Have a tag containing the most recent change date and the signature of the person authorized by Arrow S Energy Operating to perform the change. The tag shall be maintained at the compressor.
- For compressors that are not oil-lubricated, Arrow S Energy Operating shall ensure that carbon monoxide levels in the breathing air do not exceed 10 ppm.
- For oil-lubricated compressors, Arrow S Energy Operating shall use a high-temperature or carbon monoxide alarm, or both, to monitor carbon monoxide levels. If only high-temperature alarms are used, the air supply shall be monitored at intervals sufficient to prevent carbon monoxide in the breathing air from exceeding 10 ppm.
- Arrow S Energy Operating shall ensure that breathing air couplings are incompatible with outlets for nonrespirable worksite air or other gas systems. No asphyxiating substance shall be introduced into breathing air lines.

Repairs

Arrow S Energy Operating shall ensure that respirators that fail an inspection or are otherwise found to be defective are immediately removed from service, and are discarded or repaired or adjusted in accordance with the following procedures:

- Repairs or adjustments to respirators are to be made only by persons appropriately trained to perform such operations and shall use only the respirator manufacturer's NIOSH-approved parts designed for the respirator;
- Repairs shall be made according to the manufacturer's recommendations and specifications for the type and extent of repairs to be performed; and

Voluntary Use

If an employee chooses to voluntarily wear a respirator when not required by this Program (contaminants do not meet protection standards, odors, etc.) they will be advised of the following in their training:

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for employees.

However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the employee. Sometimes, employees may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for

your voluntary use, of if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not present a hazard.

You should do the following:

- Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirators limitations.
- Choose respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety and Health of the U.S. Department of Health and Human Services, certifies respirators. A label or statement of certification should appear on the respirator or respirator packaging. It will tell you what the respirator is designed for and how much it will protect you.

- Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke.
- Keep track of your respirator so that you do not mistakenly use someone else's respirator.

Workplace Monitoring

A program of monitoring potential employee exposures has been implemented through the corporate health and safety department. Project personnel may also be assigned with the task of conducting air monitoring. Direct-reading instruments will also be used in the characterization of potential exposures. All the data collected is used to determine the appropriateness of the respiratory equipment.

Recordkeeping

Arrow S Energy Operating will establish and retain written information regarding medical evaluations, fit testing and the respirator program. Records of medical evaluations required by this section must be retained and made available in accordance with 29 CFR 1910.1020. Arrow S Energy Operating shall provide the employee with an opportunity to discuss the questionnaire and examination results with the PLHCP.

Records will be treated confidentially and maintained on file in the Arrow S Energy Operating corporate office by the HSE Director.

Program Evaluation

Arrow S Energy Operating shall conduct evaluations of the workplace as necessary to ensure that the provisions of the current written program are being effectively implemented and that it continues to be effective.

Arrow S Energy Operating shall regularly consult employees required to use respirators to assess the employees' views on this program’s effectiveness and to identify any problems. Any problems that are identified during this assessment shall be corrected. Factors to be assessed and verified include, but are not limited to:

- Respirator fit (including the ability to use the respirator without interfering with effective workplace performance); Appropriate respirator selection for the hazards to which the employee is exposed;
- Proper respirator use under the workplace conditions the employee encounters; and
- Proper respirator maintenance.

Training

Employees are provided training on Respiratory Protection. Training shall address employee knowledge of respirators, fit, use, limitations, emergency situations, wearing, fit checks, maintenance and storage, medical signs and symptoms of effective use and general requirements of the OSHA standard. The training must be provided before requiring the employee to use the respirator.

Retraining

Retraining shall be administered annually, and when the following situations occur:

- Changes in the workplace or the type of respirator render previous training obsolete;

- Inadequacies in the employee's knowledge or use of the respirator indicate that the employee has not retained the requisite understanding or skill; or
- Any other situation arises in which retraining appears necessary to ensure safe respirator use.

Arrow S Energy Operating Qualitative Respiratory Fit Test Record Sheet

Note: Employee Must Have Completed Respiratory Protection Training and Passed Airway Exam <u>Prior</u> To Fit Testing

Test Date: _____

Employee Name: _____ **SS#** _____

Test Agent: Irritant Smoke (Stannic Chloride)

<u>Respirator Identification</u>:

Model: _____ Size (circle one): Small Medium Large
Manufacturer: _____ Approval No: _____
Additional Information: <u>Respirator must be equipped with proper HEPA filters</u>

<u>Fit Test Protocol (Test Subject Initials indicate steps were performed):</u>

___ TOLD TO KEEP EYES CLOSED DURING SMOKE EXPOSURE

___Test subject smelled irritant smoke before fit test
___Protocol reviewed before fit test
___Shown how to wear respirator
___Mirror available for use by subject
___Must wear PPE (hard hat, etc.) if needed
___Wore respirator 5 minutes before fit test
___Test subject did not have hair in fitting area
___Performed positive pressure & negative fit check successfully after seating respirator

<u>Fit Test Steps (1 minute each except Grimace = 15 seconds)</u>

___ Breath normally
___ Nod up and down
___ Jog in place
___ Breathe deeply
___ Talking (Read Rainbow Passage)
___ Breath normally
___ Turned head side to side
___ Grimace

"When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond his reach, his friends say he is looking for the pot of gold at the end of the rainbow".

Fit Test Results: _____ Pass _____ Fail
Test Subject Signature: _____ Date: _____

Examiner's Name: _____ Examiner's Signature: _____ Date: _____

SCAFFOLDING

Purpose

The purpose of this program is to prevent injuries due to falls from elevated work areas and ensure workers and contractors inspect scaffolding materials and erected scaffolds prior to their use.

Scope

This program is applicable at every Arrow S Energy Operating (the company) work area where scaffolding is erected. The contractor scaffolding program shall take precedence, however, this program may be adopted by contractors who do not have a formal program.

Definitions

Bearer: A horizontal member of a scaffold upon which the platform rests and which may be supported by ledgers.

Brace: A tie that holds one scaffold member in a fixed position with respect to another member.

Coupler; A device for locking together the components of a tubular metal scaffold which shall be designed and used to safely support the maximum intended loads.

Double pole or independent pole scaffold: A scaffold supported from the base by a double row of uprights, independent of support from the walls and constructed of uprights, ledgers, horizontal platform bearers, and diagonal bracing.

Guardrail: A rail secured to uprights and erected along the exposed sides and ends of platforms.

Heavy Duty Scaffold: A scaffold designed and constructed to carry a working load not to exceed 75 pounds per square foot.

Ledger (stringer): A horizontal scaffold member which extends from post to post, and which supports the putlogs or bearer forming a tie between the posts.

Light Duty Scaffold: A scaffold designed and constructed to carry a working load not to exceed 25 pounds per square foot.

Manually Propelled Mobile Scaffold: Manually propelled mobile scaffold.

Maximum intended load: The total of all loads including the working load, the weight of the scaffold, and such other loads as may be reasonably anticipated.

Medium duty scaffold: A scaffold designed and constructed to carry a working load not to exceed 50 pounds per square foot.

Mid-Rail: A rail approximately midway between the guardrail and platform, used when required, and secured to the uprights erected along the exposed sides and ends of platforms.

Putlog: A scaffold member upon which the platform rests.

Runner: The lengthwise horizontal bracing or bearing members or both.

Scaffold: Any temporary elevated platform and its supporting structure used for supporting workmen or materials or both.

Toe board: A barrier secured along the sides and ends of a platform, to guard against the falling of material.

Tube and coupler scaffold: An assembly consisting of tubing, which serves as posts, bearers, braces, ties, and runners, a base supporting the posts, and special couplers which serve to connect the uprights and to join the various members.

Tubular welded frame scaffold: A sectional, panel, or frame metal scaffold substantially built up of prefabricated welded sections that consist of posts and horizontal bearer with intermediate members. Panels or frames shall be braced with diagonal or cross braces.

Working Load: Load imposed by men, materials, and equipment.

Key Responsibilities

Managers and Supervisors

- Responsible for ensuring that scaffolds are erected by a qualified person, that set up inspections are performed, and all daily inspections are performed before work starts for the day.
- Responsible for ensuring that all employees, and/or contractors have been trained in the use and inspection methods for scaffolds. Only qualified and competent personnel are allowed to use or modify scaffolding systems.
- Responsible for ensuring that all employees and contractors are aware that if an inspection discovers a defect, the scaffold cannot be used until repairs are made.

Employees/Workers

- Responsible for following this program by inspecting the scaffolds daily and report any damages or repairs that may be needed to their supervisor.

Procedure

General Requirements

Scaffolds shall be furnished and erected in accordance with applicable standards for persons engaged in work that cannot be done safely from the ground or from solid construction. Except that ladder's used for such work shall conform to ladder safety standards.

Scaffolds shall only be erected by a qualified party, who is competent to certify the scaffolding safe to use.

The footing or anchorage for scaffolds shall be sound, rigid, and capable of carrying the maximum intended load without settling or displacement. Unstable objects such as barrels, boxes, loose boards shall not be used to support scaffolds or planks.

Scaffolds and their components shall be capable of supporting without failure at least four times the maximum intended loads. Scaffold components must meet OSHA requirements 29 CFR 1910.28 and 29 CFR 1926.451.

Wood scaffold planks must be cross-supported every 8 feet. Scaffold deck boards shall be cleated, wired or nailed into place.

All working levels of scaffolds will be floored completely except where internal ladders require space for ladder openings.

Scaffolds and other devices mentioned or described in this program shall be maintained in safe condition. Scaffolds shall not be altered or moved horizontally while they are occupied.

Any scaffold damaged or weakened from any cause shall be immediately repaired and shall not be used until repairs have been completed.

Scaffolds shall not be loaded in excess of the working loads for which they are intended.

Bolts used in the construction of scaffolds shall be of adequate size and in sufficient numbers at each connection to develop the designed strength of the scaffold.

All platforms shall be overlapped (minimum 12 inches) and secured from any movement.

An access ladder or equivalent safe access shall be provided.

Scaffold planks shall extend over their end supports not less than 6 inches or more than 18 inches.

The poles, legs, or uprights of scaffolds shall be plumb, and securely and rigidly braced to prevent swaying and displacement.

Materials being hoisted onto a scaffold shall have a tag line.

Overhead protection shall be provided for workers on a scaffold exposed to overhead hazards.

Toe boards and guardrails shall be installed if a scaffold or platform is erected to a height of 6 feet or more. Scaffolds shall be provided with a screen between the toe board and the guardrail, extending along the entire opening, consisting of No. 18 gauge wire one-half inch mesh or the equivalent, where workers are required to work or pass under the scaffolds.

Work shall not be performed on a scaffold during storms or high winds.

Work shall not be performed on scaffolds that are covered with snow or ice, unless all snow and ice has been removed and all planking has been sanded to prevent slipping.

Tools, material, and debris shall not be allowed to accumulate in quantities to cause a hazard.

Inspections
Scaffolding shall be inspected, by a qualified person, in conjunction with the manufactures required recommendations. The competent person must also insure scaffolds are safe prior to and during scaffold use.

- At a minimum, the following shall be inspected by the competent person after erection, before the start of the day or beginning of a shift change to ensure scaffolds are safe prior to and during use:
    - Ground or surface footing shall be inspected to ensure that there is no settling.
    - All main supports and cross braces shall be inspected for any signs of damage, missing pins, bolts and any locks and/or safety keepers.
    - All walking surfaces and/or planks shall be inspected for damage and proper placements and any possible movement.
    - All walkways and planks must be secure to prevent any movement.
- Inspection shall be made to ensure that the scaffold is stable and any movement is prevented.
- If during the inspection, a defect or damage to the scaffold is discovered, the scaffold shall be tagged out by the competent person, complied with and use prohibited until needed repairs are made.

Mandatory Signs and Tags for Defects Found
Signs and tags shall be visible at all times when work is being performed, and shall be removed or covered promptly when the hazards no longer exist. Employees shall be instructed in complying with signs and tags.

Defective or unsafe equipment or conditions shall be tagged out by the competent person using a weather resistant tag secured to the scaffolding structure on all four sides and must be complied with.

Danger signs shall be used only where an immediate hazard exists. Danger signs must be posted around the immediate area of the scaffold, to alert other workers of possible danger from falling objects from the scaffold.

Caution Signs and/or barricade tape shall be used to mark off a larger area around scaffolding warning other workers to use caution.

Modifications
Modification and repairs shall be performed by a qualified person, who is competent to certify the scaffolding safe to use to ensure non-qualified personnel do not create additional hazards.

Employees/workers shall not perform any modifications or repairs, unless they have been trained and certified.

Training Requirements

Arrow S Energy Operating is required to train all employees that work on scaffolds regarding hazards by "qualified" persons. The supervisor shall have each employee who performs work while on a scaffold trained by a person qualified in the subject matter to recognize the hazards associated with the type of scaffold being used and to understand the procedures to control or minimize those hazards. The training shall occur before use and include the following areas:

- Basic safety information and duties of a competent person assembling/disassembling scaffolding (see below). Basic safety information must be provided prior to use and when conditions change.
- Hazards including fall protection, electrical safety, falling object protection (see below).
- Tags – types and the requirement to comply with.
- The proper use of the scaffold, and the proper handling of materials on the scaffold.
- The correct procedures for dealing with electrical hazards and for erecting, maintaining, and disassembling the fall protection systems and falling object protection systems being used.
- The maximum intended load capacity of the scaffolds used.

The supervisor shall have each employee who is involved in erecting, disassembling, moving, operating, repairing, maintaining, or inspecting a scaffold trained by a competent person to recognize any hazards associated with the work in question.

The training shall include the following topics, as applicable:

- The nature of scaffold hazards.
- The correct procedures for erecting, disassembling, moving, operating, repairing, inspecting, and maintaining the type of scaffold in use.
- The design criteria, maximum intended load-carrying capacity and intended use of the scaffold.

When the employer has reason to believe that an employee lacks the skill or understanding needed for safe work involving the erection, use or dismantling of scaffolds, the employer shall retrain each employee so that the requisite proficiency is regained. Retraining is also required in at least the following situations:

- Where changes in scaffolding at the worksite present a hazard about which an employee has not been previously trained.
- Where changes in the types of scaffolds, fall protection, falling object protection, or other equipment present a hazard about which an employee has not been previously trained.
- Where inadequacies in an affected employee's work involving scaffolds indicate that the employee has not retained the requisite proficiency.

Hazards Associated with the Use of Scaffolds

- Nearby electrical lines or source of electrical hazards
- Poor foundation – scaffold shall be erected on a firm and stable base.
- Damaged scaffold components.
- Overload of scaffold components (load capacity).
- Unstable, incomplete or incorrect use of scaffold.
- Base frames not adequately braced, tied or supported.

- Scaffold exceeds height to base dimensions ratio.
- Inappropriate access or egress points.
- Slips and falls.
- Falling objects.
- Manual handling.
- Movement of plant and machinery – all cranes and mobile machinery shall keep within designated areas and away from scaffolding.

Duties of a Competent Person Assembling/Disassembling Scaffolding

General

- To select and direct employees who erect, dismantle, move, or alter scaffolds.
- To determine if it is safe for employees to work on or from a scaffold during storms or high winds and to ensure that a personal fall arrest system or wind screens protect these employees. (Note: Windscreens should not be used unless the scaffold is secured against the anticipated wind forces imposed.)

For Training

- To train employees involved in erecting, disassembling, moving, operating, repairing, maintaining, or inspecting scaffolds to recognize associated work hazards.

For Inspections

- To inspect scaffolds and scaffold components for visible defects before each work shift and after any occurrence which could affect the corrective actions.
- To inspect ropes on suspended scaffolds prior to each work shift and after every occurrence which could affect the structural integrity and to authorize prompt corrective actions.
- To inspect manila or plastic (or other synthetic) rope being used for top rails or midrails.

For Suspension Scaffolds

- To evaluate direct connections to support the load.
- To evaluate the need to secure two-point and multi-point scaffolds to prevent swaying.

For Erectors and Dismantlers

- To determine the feasibility and safety of providing fall protection and access.
- To train erectors and dismantlers to recognize associated work hazards.

For Scaffold Components

- To determine if a scaffold will be structurally sound when intermixing components from different manufacturers.
- To determine if galvanic action has affected the capacity when using components of dissimilar metals.

Tube And Coupler Scaffolds - Light Duty

Uniformly distributed load		Not to exceed 25 p.s.f.
Post Spacing (longitudinal)		10 ft. 0 in.
Post Spacing (transverse)		6 ft. 0 in.
Working Levels	**Additional Planked Levels**	**Maximum Height**
1	8	125 ft.
2	4	125 ft.
3	0	91 ft. 0 in.

Tube And Coupler Scaffolds - Medium Duty

Uniformly distributed load		Not to exceed 50 p.s.f
Post spacing (longitudinal)		8 ft. 0 in.
Post spacing (transverse)		6 ft. 0 in.
Working Levels	**Additional Planked Levels**	**Maximum Height**
1	6	125 ft.
2	0	78 ft. 0 in.

SILICA EXPOSURE CONTROL

Purpose

The purpose of the silica exposure control plan (ECP) is to set out the Arrow S Energy Operating (the company) minimum expectations for protecting workers from harmful exposure to respirable crystalline silica on all company owned and operated sites.

Scope

This program represents the minimum requirements of workers while engaged in work on behalf of the company. When work is performed by a contractor on a company site, the contractor's program shall take precedence. However, this program may be adopted for use by contractors who do not have a formal Silica Exposure Control Program.

Key Responsibilities

Due to the significant risk posed by respirable crystalline silica, it is critical that all personnel involved in operations that could potentially create silica dust take specific action to ensure that, as much as possible, a hazard is not created.

Contractors:

- Substitution of less hazardous products for those that contain crystalline silica whenever possible.
- Ensuring that the materials (e.g., tools, equipment, personal protective equipment) and other resources (i.e., worker training materials) required to fully implement and maintain this exposure control plan (ECP) are readily available where and when they are required. An ECP auto form is available at the Arrow S Energy Operating Office.
- Providing a job-specific Exposure Control Plan (ECP) for each project, which outlines in detail the work methods and practices that will be followed on each site. Considerations will include:
    - Availability and delivery of all required tools/equipment
    - Scope and nature of work to be conducted
    - Control methods to be used and level of respiratory protection required
    - Coordination plan
- Conducting a periodic review of the effectiveness of the ECP. This would include a review of the available dust-control technologies to ensure these are selected and used when practical.
- Initiating sampling of worker exposure to concrete dust when there are non-standard work practices for which the control methods to be used have not been proven to be adequately protective.
- Ensuring that all required tools, equipment, and personal protective equipment are readily available and used as required by the ECP.
- Ensuring supervisors and workers are educated and trained to an acceptable level of competency.
- Maintaining records of training, fit-test results, crew talks, and inspections (equipment, PPE, work methods/practices).
- Coordinating the work with the company representative to ensure a safe work environment.

- Ensuring that a copy of the written exposure control plan is available to all affected employees. The written exposure control plan must be available for examination and copying by each employee. Copies may be available electronically or physically, depending on location needs and requirements.

Contractor Supervisors:

- Ensure the contractor has made a copy of the ECP available at the worksite.
- Selecting, implementing, and documenting the appropriate site-specific control measures.
- Providing adequate instruction to workers on the hazards of working with silica-containing materials (e.g., concrete and blasting media) and on the precautions specified in the job-specific plan covering hazards at the location.
- Ensuring that workers are using the proper respirators and have been fit-tested, and that the results are recorded.
- Directing the work in a manner that ensures the risk to workers is minimized and adequately controlled.
- Communicating with the prime contractor and other sub-contractors to ensure a safe work environment.

Workers:

- Knowing the hazards of silica dust exposure
- Using the assigned protective equipment in an effective and safe manner
- Setting up the operation in accordance with the site-specific plan
- Following established work procedures as directed by the supervisor
- Reporting any unsafe conditions or acts to the supervisor
- Knowing how and when to report exposure incidents

Crystalline Silica Properties

Crystalline silica is a common mineral found in many naturally occurring materials and used in many industrial products and at construction sites. Materials like sand, concrete, stone and mortar contain crystalline silica. Crystalline silica is also used to make products such as glass, pottery, ceramics, bricks, concrete and artificial stone. Industrial sand used in certain operations, such as sand blasting and hydraulic fracturing (fracking), is also a source of crystalline silica exposure. Amorphous silica, such as silica gel, is not crystalline silica.

Inhaling very small (“respirable”) crystalline silica particles, causes multiple diseases, including silicosis, an incurable lung disease that can lead to disability and death. Respirable crystalline silica also causes lung cancer, chronic obstructive pulmonary disease (COPD), and kidney disease.

List of Tasks That Expose Employees to Respirable Crystalline Silica
A list or description of tasks in the workplace that expose employees to respirable crystalline silica must be in place. Tasks include activities like those listed below and anything else that is likely to expose employees to respirable crystalline silica:

- Sawing
- Drilling

- Grinding
- Abrasive blasting (e.g., of concrete structures)
- Jackhammering, chipping, or drilling rock or concrete
- Cutting brick or tiles
- Sawing or grinding concrete
- Tuck point grinding
- Road construction
- Loading, hauling, and dumping gravel
- Demolition of structures containing concrete
- Sweeping concrete dust
- Fracking

The list of tasks shall be included in the job hazard assessment or any other form of prework hazard assessment.

Health Hazards
Exposure to respirable crystalline silica has been shown to cause silicosis, lung cancer, pulmonary tuberculosis, and other airway diseases. Crystalline silica dust can cause a disabling, sometimes fatal disease called silicosis. The fine particles are deposited in the lungs, causing thickening, and scarring of the lung tissue. The scar tissue restricts the lungs' ability to extract oxygen from the air. This damage is permanent, but symptoms of the disease may not appear for many years.

A worker may develop any of three types of silicosis, depending on the concentrations of silica dust and the duration of exposure:

- Chronic silicosis—develops after 10 or more years of exposure to crystalline silica at relatively low concentrations
- Accelerated silicosis—develops 5 to 10 years after initial exposure to crystalline silica at high concentrations
- Acute silicosis—develops within a few weeks, or 4 to 5 years, after exposure to very high concentrations of crystalline silica

Initially, workers with silicosis may have no symptoms; however, as the disease progresses, a worker may experience:

- Shortness of breath
- Severe cough
- Weakness

These symptoms can worsen over time and lead to death. Exposure to silica has also been linked to other diseases, including bronchitis, tuberculosis, and lung cancer.

Exposure Assessments

Exposure assessments must be conducted for those employees who are expected to be exposed to respirable crystalline silica at or above the action level. The exposure of each employee who is or is expected to be exposed to

respirable crystalline silica at or above the action level (8-hour TWA of 25µg/m³) must be assessed. This assessment can be performed by monitoring employees individually or taking a representative sample from employees.

The key step in developing a silica exposure control plan is to identify the work activities that would put workers at risk of exposure.

- Work activities — that may generate airborne silica dust—for silica, the route of exposure is through the inhalation of airborne dust. The employer should have a qualified person review the planned work activities to identify those that may generate airborne silica.
- Identify workers at risk of exposure.
- Amount of exposure—some work activities generate more dust than others, and the amount of exposure should be estimated. Published resources are available that provide air sampling data and compare silica dust levels from various construction activities.
- Duration of exposure—Workers who grind concrete for a full shift would be at greater risk than workers jackhammering for an hour.

Engineering and Work Practice Controls
Engineering and work practice controls shall be used to reduce and maintain employee exposure to respirable crystalline silica to the lowest feasible level and maintain it at that level when required.

The following hierarchy of control measures must be followed:

- Elimination/substitution (e.g., using products with less silica or using work methods that would eliminate the need for surface grinding)
- Engineering controls (e.g., water, local exhaust ventilation, enclosure)
- Administrative controls (e.g., coordination of tasks with subcontractors, signage)
- The use of proper PPE such as gloves, coveralls and eye protection when exposed to silica. Personal protective equipment such as gloves, coveralls and eye protection will be used to control silica exposures.

Contractors must commit to developing knowledge and expertise about these controls, and to establishing policies/procedures to protect workers from harmful exposure and to minimize reliance on respirators. Effective engineering controls such as HEPA vacuum attachments and wetting methods, which control silica dust at its source should be readily available. These controls have been proven to reduce airborne dust levels significantly when selected and operated in accordance with best practices. We know that engineering controls alone do not reduce airborne silica to safe levels, so in most cases other control measures including respiratory protection will be necessary.

If a contractor takes on a job that could release an unusually high amount of dust, and they are unsure of the adequacy of their control measures, there will be air sampling conducted to ensure that control methods are protective.

Contractors will reduce or eliminate worker exposure to silica dust by selecting a combination of the following listed controls in order of preference:

- Elimination and substitution - Engineering
- Administrative - Personal protective equipment

Elimination and Substitution
The importance of planning the work to minimize the amount of silica dust generated must be recognized. During the project planning phase, workers will advocate for the use of methods that reduce the need for cutting, grinding, or drilling of concrete surfaces (e.g., formwork planning). Whenever possible, supervisors will schedule work when concrete is still wet, because it is known that much less dust is released at that time.

Engineering Control of Dust
Selecting an appropriate control measure depends on the specifics of the operation. In some cases, local exhaust ventilation (LEV) is more effective at controlling exposure (e.g., during grinding operations) than wetting methods. In a different application, wetting may be more effective (e.g., during cutting operations) than LEV. However, using LEV may reduce the amount of final cleaning required, as the silica dust is captured.

A dust control system may employ three well-established techniques:

- Local exhaust ventilation (LEV)
- Wet dust suppression (WDS)
- Restricting or isolating the work activity with barriers or full enclosures (this may be the only option where LEV or WDS is not practical or effective)

Local Exhaust Ventilation (LEV)
When LEV is used, workers will employ the following systems and safe work practices:

- Vacuum attachment systems to capture and control the dust at its source whenever possible.
- Dust control systems (used regularly and well maintained).
- Grinding wheels operated at the manufacturers' recommended rpm (operating more than this can generate significantly higher airborne dust levels).
- Retrofit shrouds or exhaust cowlings for corner grinding; use manufacturer-specified rpm speeds and a well-maintained HEPA vacuum.
- Diamond stone grinders, which allow for the use of a more efficient suction casing on the grinder, whenever practicable.
- HEPA or good quality, multi-stage vacuum units approved for use with silica dust.
- Work planning, so that concrete grinding can be completed when wet (dust release can be significantly reduced).
- Train workers and supervisors on how to properly use and maintain the equipment.

Wet methods for Dust Control
When water spray systems are used, workers will follow these safe work practices:

- Pneumatic grinders will be used instead of electric-powered grinders if water is the method of control.
- Pressure and flow rate of water will be controlled in accordance with tool manufacturers' specifications.
- When sawing concrete or masonry, workers will use only saws that provide water to the blade.
- Wet slurry will be cleaned from work surfaces when the work is completed, using a wet vacuum or wet sweeping.

Barriers and Enclosures - When barriers or enclosures are used, the site foreman will determine the type and design of barrier or enclosure (based on the work activity and the work area) and ensure it is constructed in accordance with the work plan. Barriers may be simple hazard-flagging ribbon or more restrictive barriers.

Administrative Controls

Workers will follow these safe work practices:

- Exposure control plans and the site risk assessment/work plan will be completed prior to the start of work.
- Housekeeping Measures Put in Place to Limit Employee Exposure to Respirable Crystalline Silica – A description of housekeeping measures used to limit exposure to respirable crystalline silica must be in place (and included in the Job Safety Analysis). This can include vacuuming, sweeping, wetting and other techniques used to limit the amount of respirable crystalline silica exposure during housekeeping activities. Vacuums with high-efficiency particulate air (HEPA) filters are required.
- Procedures for housekeeping must be established, restricting work areas, personal hygiene, worker training, and supervision.
- As part of project planning, workers will assess when silica dust may be generated and plan to eliminate or control the dust at the source. It is recognized that awareness and planning are key factors in the prevention of silicosis.
- Warning signs will be posted to warn workers about the hazards of silica and to specify any protective equipment required (for example, respirators).
- Work schedules will be posted at the boundaries of work areas contaminated with silica dust.
- When possible, work that generates silica dust will be conducted after hours, when access to other unprotected workers cannot be restricted.
- Workers will develop a site-specific exposure control plan to cover project-specific issues (e.g., scope of work, project location and site-specific hazards) and must be readily available at the worksite.

Personal Protective Equipment

Respiratory Protection

- When required, respirators must be provided to employees that are exposed to respirable crystalline silica.
- Respirators must be provided to employees who are or will be exposed to actionable levels of respirable crystalline silica. If an employee is performing a task listed in Table 1 of 1926.1153 (c) that does not require the use of a respirator then they are not required. All other tasks not covered by Table 1 must be accounted for by providing respirators if necessary.
- Link for Table 1 https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=1270#1926.1153(c)
- All workers who wear respirators will do so in adherence with their company respiratory protection program.
- Respirators must be selected based upon measured exposure levels and the assigned protection factor of respirators.
- Only approved respirators will be used.
- Filtering face piece respirators give little or no protection to workers with beards, and even a minor growth of stubble can severely reduce the effectiveness of respiratory protection.
- All workers who wear respirators will be fit-tested.
- Workers will be properly trained in the use of respirators, and a high standard of supervision, inspection, and maintenance will be followed.

Protective clothing
The workers employer will provide workers in a restricted area with protective clothing that protects other clothing worn by the worker from silica contamination, ensure that silica does not contaminate workers' street clothing, and ensure that a worker does not leave a restricted area until the worker has been decontaminated.

Documentation
Records must be kept of the following:

- All workers who are exposed to respirable silica dust while on the job
- Worker education and training sessions
- Respirator fit-testing
- Equipment maintenance and repair
- Worksite inspections
- Medical surveillance when required

Annual Assessment
The written program's effectiveness must be reviewed at least annually. Situations where reevaluation may be necessary include regulatory updates, changes in equipment and exposure incidents.

Medical Surveillance

A medical surveillance program for all employees whose exposure is equal to or exceeds the action level for 30 or more days per year is required. A medical surveillance program must be established for employees who are exposed to the action level of 8-hour TWA of 25µg/m³ of respirable crystalline silica. A baseline medical assessment must be available to exposed employees within 30 days of initial assignment unless they have previously received a suitable medical examination in the past three years. This applies to employees who would be required to wear a respirator more than 30 days per year or who are exposed to action level respirable crystalline silica for more than 30 days per year. A suitable prescreen that meets the same requirements is also acceptable.

The basics of the medical examination include:

The employer must bear the cost for the employee to us a qualified health care professional to conduct an exam, and obtain a written medical opinion which is shared with the employees employer. This written opinion needs to contain:

- The date of the exam
- A statement that the exam has specifically checked for silica exposure per the requirements of the standard.
- Any recommended limitations on the employee's exposure to respirable crystalline silica as a result of the exam's findings

The employee may learn other medical information from his or her physician during the visit, but this is private and not required to be shared with the employer.

The exam conducted by the qualified health care provider must include the following:

- A review of the patient's medical and work history.
- A physical examination with special emphasis on the respiratory system.

- A chest x-rays.
- A pulmonary function test administered by a certified spirometry.
- Testing for latent tuberculosis.
- Any other tests deemed appropriate by the health care provider.

Information required to be given to the heath care provider:

- A copy of the OSHA respirable crystalline silica rule.
- Construction Standard - https://www.osha.gov/silica/SilicaConstructionRegText.pdf
- Construction Medical - https://www.osha.gov/silica/AppendixBtosect1926.1153.pdf

- General Industry Standard https://www.osha.gov/silica/SilicaGeneralIndustryRegText.pdf
- General Industry Medical https://www.osha.gov/silica/AppendixBtosect1910.1053.pdf
- A description of the employee's former, current, and anticipated duties as they relate to the employee's occupational exposure to respirable crystalline silica.
- The employee's former, current, and anticipated levels of occupational exposure to respirable crystalline silica.
- A description of any personal protective equipment used or to be used by the employee, including when and for how long the employee has used or will use that equipment.
- Information from records of employment-related medical examinations previously provided to the employee and currently within the control of the employer.

Records

Accurate records of all air monitoring data, objective data, and medical surveillance shall be maintained as required by the regulation.

Training

A training program shall be provided for all employees who are exposed to action level respirable crystalline silica. The training shall ensure that employees covered by the written exposure control plan can demonstrate knowledge and understanding of the health hazards associated with respirable crystalline silica, the specific tasks in the workplace that could result in exposure to respirable crystalline silica, the specific measures taken to protect employees from exposure to crystalline silica, the contents of the respirable crystalline silica rule, and the purpose of the medical surveillance program.

CONTROL PLAN

Date control plan completed:		
Prime contractor:	Superintendent:	
Project manager:	CSO/First aid attendant:	
Project:	Address:	
Company completing work:		
Address:	Contact:	
Contact phone:	Contact fax:	
On-site supervisor(s):		
Worker(s):		
Scope of work to be completed:		
Work start date:	Duration: ☐ Days ☐ Months ☐ Years	
Employer responsible for:		
Supervisor responsible for:		
Worker responsible for:		

HAZARDS IDENTIFIED (other than silica	**CONTROL MEASURE(S)**
☐ Falls	
☐ Slipping	
☐ Confined space	
☐ Workers above	
☐ Workers below	
☐ Noise	
☐ Electrical	

Overview of work procedure (How are you going to work safely?):

Workers trained in (training records must be available for review):

Proper use of grinding equipment	Y☐ N☐	Proper use of admin controls	Y☐ N☐
Proper use of engineering controls	Y☐ N☐	Proper use of PPE	Y☐ N☐
Proper disposal methods	Y☐ N☐	Other (fall protection, swing stages, etc.)	Y☐ N☐

Respirators (Refer to ECP for respirator requirements)

Required: Y☐ N☐	Available: Y☐ N☐	Fit-tested: Y☐ N☐

PPE required for scope of work (other than respirator)

☐ Coveralls ☐ Gloves ☐ Rubber boots ☐ Eye protection ☐ Reflective vest ☐ Hearing protection

Documents to be attached to control plan (☑ if present)

☐ Exposure control program ☐ Respiratory protection program ☐ Training records ☐ SWP (tools and equipment)

Project management signature	Position:	Date:
Contractor supervisor signature	Position:	Date:

Task/risk management matrix (relating to silica dust) use table 1 for codes, separate with a comma (,)

#	Date/Duration		Task	Controls		PPE	Supplies/ Equipment
				Engineering	Administrative		

Notes (For task/risk management matrix above. Use # to indicate which task the note relates to.)

SITE INSPECTION CHECKLIST (complete pre-work & periodically during project)

Engineering controls		Problem noted (DETAIL)	Problem corrected (DETAIL)
Available at site	Y☐ N☐		
Operating correctly	Y☐ N☐		
Used appropriately	Y☐ N☐		
Effective in dust control	Y☐ N☐		
Administrative controls			
Available at site	Y☐ N☐		
Used appropriately	Y☐ N☐		
In place before work start	Y☐ N☐		
Effective	Y☐ N☐		
Cleanup			
Vacuum used properly	Y☐ N☐		

Large pieces picked up	Y☐ N☐		
Vacuum capacity maintained	Y☐ N☐		
Pre-filters in place	Y☐ N☐		
Vacuum attachments used	Y☐ N☐		
Collection bags in place	Y☐ N☐		
Waste properly disposed of	Y☐ N☐		

TABLE 1 (Codes for task/risk management matrix)

Engineering controls		Administrative controls		PPE		Supplies/Equipment	
1	Exhaust fan	1	Signage	1	Respirator	1	Hand grinder
2	LEV	2	After hours work	2	Gloves	2	Ceiling grinder
3	Wetting	3	Scheduling	3	Coveralls	3	Floor grinder
4	Partial enclosure			4	Hearing protection	4	Disposal bags
5	Full enclosure			5	Eye protection	5	HEPA filter (vacuum)
6	Shroud			6	Reflective vest	6	HEPA filter (respirator)
7	Barriers			7	Rubber boots (CSA)	7	Shovel
				8	Fall arrest	8	Lifeline

SITE-SPECIFIC SILICA EXPOSURE CONTROL PLAN

Location: _____ **Date:** _____

Work description:

Primary silica control options (check those options used and explain use if needed)

- Substitution controls (using procedures or products that do not create silica; must review MSDSs)
  - Other means of demo: _____
  - Different products: _____
  - Other substitutions: _____

- Engineering controls (when using ventilation, draw air out and don't expose others to exhaust dusts)
  - Vacuuming: _____
  - Wetting: _____
  - Ventilation: _____
  - Isolation: _____
  - Other means: _____

- Administration controls (reducing exposure by work schedules, timing, or planning options)
  - Control points: _____
  - Work schedule: _____
  - Other means: _____

Secondary silica control options (check those options used and explain use if needed)

- Personal protective equipment
  - Half-mask respirators: _____ Cartridge type: _____ Fit tests confirmed: _____
  - Full-face respirators: _____ Cartridge type: _____ Fit tests confirmed: _____
  - Supplied air units: _____
  - Coveralls required: _____

- Hygiene and decontamination options (reducing exposures after work has stopped or during breaks)
  - Water or washing facilities on site: _____
  - Vacuuming clothing/self: _____

Safe work procedures and other details: _____

Ventilation plan (sketch)

⇦ Show direction of airflow including makeup air locations and discharge air outlets

Area or location in building of ventilation plan (e.g., floor #, wing)

Date plan was reviewed by workers and posted for workers to see

Types of neg. air fans & no.'s *

* Indicate on plan by number the location of the negative air fans

Ventilation safety checklist

- ☐ Makeup air free of possible contaminants
- ☐ Exhaust fan operation has failure warning
- ☐ Dilution fans not stirring up dust
- ☐ Wetting of materials used to keep dust down
- ☐ Workers not placed between contaminants created and exhaust inlet ports
- ☐ Discharge air not affecting others
- ☐ All workers equipped with approved respirators

Note: Attach additional sheets if needed or other documents if required due to hazards or work conditions.

Print supervisor's name

Supervisor's signature

STOP WORK AUTHORITY

Purpose

The Stop Work (SW) Authority process involves a stop, notify, correct and resume approach for the resolution of a perceived unsafe condition, act, error, omission or lack of understanding that could result in an undesirable event.

All Arrow S Energy Operating (the Company) employees have an obligation to pause or stop work when they observe or perceive there to be an unsafe act or condition. This program may be adopted for use by contractors who do not have their own stop work authority program.

Scope

This document covers employees, contractors, consultants, delivery drivers, vendors and visitors to company owned and controlled sites.

Key Responsibilities

Roles and Responsibilities of Employees and Management:

- Employees are obligated to initiate a Stop Work when warranted, and management is responsible to create a culture where SW is exercised freely without fear.
- When a SW is called, the front-line supervisor should acknowledge the SW with a positive reaction and use the opportunity to reinforce the SW expectation.
- Management must establish their support of the SW program and use meetings where workers gather to communicate their support of workers freely participating in the SW program.

Stop Work Authority Steps

- When an unsafe condition or act is identified, the observing worker should call for a pause in work and explain their sense of danger.
- No work will resume until all stop work issues and concerns have been adequately addressed.
- Employees will not be reprimanded for issuing a Stop Work. Any form of retribution or intimidation directed at any individual or company for exercising their right to issue a stop work authority will not be tolerated.

Follow-Up

- All Stop Work actions should be documented for the purpose of sharing learnings and continual improvement. Although the documentation of SW is not currently a mandatory requirement of Arrow S Energy Operating, it is useful for the purpose of:
    - Measuring participation,
    - Determining the quality of interventions
    - Trending common issues
    - Identifying opportunities for improvement, and
    - Facilitating sharing of learnings
- Arrow S Energy Operating places a high importance on supporting the SW program as a tool intended to eliminate unsafe actions and conditions and not a means to tattle, spy on, retaliate against or shame others.

TOOLS - HAND & POWER

Purpose

The purpose of this program is to provide requirements for the safe operation of hand and power tools and other portable tools, including proper guarding.

Scope

This program is applicable to all Arrow S Energy Operating employees while engaged in work at Arrow S Energy Operating facilities owned or operated facilities. When work is performed by a contractor on a company site, the contractor's program shall take precedence. However, this program may be adopted for use by contractors who do not have a formal Hand and power tool Program.

Responsibilities

Any tool which is not in compliance with any applicable requirement of this plan is prohibited from being used on company property.

Managers/Supervisors

- Ensure that all employees using portable tools have been trained and fully understand the operations and maintenance procedures of such tools, including their proper use.
- Provide and train employees with all additional PPE that may be needed for the safe operation of portable tools.

Employees

- Shall ensure they have and properly use the correct tool for each task.
- Shall follow manufacture's safety and operating instructions before using

Requirements

General

All tools, regardless of ownership, shall be of an approved type and maintained in good condition.

- Tools are subject to inspection at any time.
- All employees have the authority and responsibility to condemn unsafe tools, regardless of ownership.

Unsafe tools shall be tagged with a "DO NOT USE OR OPERATE" tag to prevent their use.

Employees shall always use the proper tool for the job to be performed. Makeshift and substitute tools shall not be used.

Hammers with metal handles, screwdrivers with metal continuing through the handle, and metallic measuring tapes shall not be used on or near energized electrical circuit 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 bags/buckets firmly attached to hand lines.

Tools shall never be placed unsecured on elevated places.

Impact tools such as chisels, punches, and drift pins that become mushroomed or cracked shall be dressed, repaired, or replaced before further use.

Chisels, drills, punches, ground rods, and pipes shall be held with suitable holders or tongs (not with the hands) while being struck by another employee.

Shims shall not be used to make a wrench fit.

Wrenches with sprung or damaged jaws shall not be used.

Tools shall be used only for the purposes for which they have been approved.

Tools with sharp edges shall be stored and handled so that they will not cause injury or damage. They shall not be carried in pockets unless suitable protectors are in use to protect the edge.

Wooden handles that are loose, cracked, or splintered shall be replaced. The handle shall not be taped or lashed with wire.

Tools shall not be left lying around where they may cause a person to trip or stumble.

When working on or above open grating, a canvas or other suitable covering shall be used to cover the grating to prevent tools or parts from dropping to a lower level where others could be, or the danger area shall be barricaded or guarded.

The insulation on hand tools shall not be depended upon to protect users from high voltage shock (except approved live line tools).

Portable Electric Tools

The non-current carrying metal parts of portable electric tools such as drills, saws, and grinders shall be effectively grounded 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.

All powered tools shall be examined prior to use to ensure general serviceability and the presence of all applicable safety devices.

Powered tools shall be used only within their design and shall be operated in accordance with manufacturer's instructions. The use of electric cords for hoisting or lowering tools shall not be permitted.

All tools shall be kept in good repair and shall be disconnected from the power source while repairs or adjustments

are being made.

Electrical tools shall not be used where there is hazard of flammable vapors, gases, or dusts without a valid Hotwork Permit.

Ground fault circuit interrupters or use of an Assured Grounding Program shall be used with portable electric tools. This does not apply to equipment run off portable or truck mounted generators at 5kw or less that are isolated from ground or to equipment ran directly off secondaries.

Pneumatic Tools
Pneumatic tools shall never be pointed at another person.

Safety clips or retainers shall be securely installed and maintained on pneumatic impact (percussion) tools to prevent attachments from being accidentally expelled.

Compressed air shall not be used for cleaning purposes or to blow dust or dirt from clothing, except where reduced to less than 30 psi and then only with effective chip guarding and personal protective equipment.

The manufacturer's stated safe operating pressure for hoses, pipes, valves, filters, and other fittings shall not be exceeded.

The use of hoses for hoisting or lowering tools shall not be permitted.

Before adjusting or changing air tools, unless equipped with quick-change connectors, the air shall be shut off at the air supply valve ahead of the hose. The hose shall be bled at the tool before breaking the connection.

Compressed air tools, while under pressure, must not be left unattended.

Hose and hose connections used for equipment shall be designed for the pressure and service to which they are subjected.

Use only approved end-fitting clamps (screw type heater hose clamps are not acceptable).

While blowing down hose, do not point it toward people.

Power tools are to be operated only by competent persons who have been trained in their proper use.

Conductive hose should not be used near energized equipment.

Foot protection shall be worn while operating paving breakers, tampers, rotary drills, clay spades, and similar impactor-type tools or at other times when instructed by supervision.

All pneumatically driven nailers, staplers, and other similar equipment which operate at more than 100 psi, shall have a safety device on the muzzle to prevent the tool from ejecting fasteners, unless the muzzle is in contact with the work surface.

Airless spray guns of the type which atomize paints and fluids at high pressures (1,000 pounds or more per square inch) shall be equipped with automatic or visible manual safety devices which will prevent pulling of the trigger to prevent release of the paint or fluid until the safety device is manually released.

In lieu of the above, a diffuser nut (which will prevent high pressure), high velocity release (while the nozzle tip is removed), plus a nozzle tip guard (which will prevent the tip from encountering the operator), or other equivalent protection, shall be provided.

Powder Actuated Tools (Tools actuated by an explosive charge)
Only those employees who have been certified in their use shall operate these tools.

Explosive charges shall be carried and transported in approved containers.

Operators and assistants using these tools shall be protected by means of eye, face, and hearing protection.

Tools shall be maintained in good condition and serviced regularly by qualified persons. The material upon which these tools are to be used shall be examined before work is started to determine its suitability and to eliminate the possibility of hazards to the operator and others.

Prior to use, the operator shall ensure that the protective shield is properly attached to the tool.

When a tool develops a defect during use, the operator shall immediately cease to use it, until it is properly repaired in accordance with the manufacture's specifications.

Tools shall not be loaded until just prior to the intended firing time, nor shall an unattended tool be left loaded. Empty tools are not to be pointed at any workmen.

In case of a misfire, the operator shall hold the tool in the operating position for at least 30 seconds. He shall then try to operate the tool a second time. He shall wait another 30 seconds, holding the tool in the operating position; then he shall proceed to remove the explosive load in strict accordance with the manufacturer's instructions.

A tool shall never be left unattended in a place where it would be available to unauthorized persons.

Fasteners shall not be driven into very hard or brittle materials including, but not limited to, cast iron, glazed tile, surface hardened steel, glass block, live rock, face brick, or hollow tile.

Driving into materials easily penetrated shall be avoided unless such materials are backed by a substance that will prevent the pin or fastener from passing completely through and creating a flying missile hazard on the other side.

Tools shall not be used in an explosive or flammable atmosphere.

Hydraulic Power Tools
The fluid used in hydraulic powered tools shall be fire-resistant fluids approved under Schedule 30 of the U.S. Bureau

of Mines, Department of the Interior, and shall retain its operating characteristics at the most extreme temperatures to which it will be exposed.

The manufacturer's safe operating pressures for hoses, valves, pipes, filters, and other fittings shall not be exceeded.

All hydraulic tools, which are used on or around energized lines or equipment, shall use non-conducting hoses having adequate strength for the normal operating pressures.

Hydraulic Jacks

Loading and Marking

- The operator shall make sure that the jack used has a rating enough to lift and sustain the load. The rated load shall be legibly and permanently marked in a prominent location on the jack by casting, stamping, or other suitable means. *Operation and Maintenance*
- In the absence of a firm foundation, the base of the jack shall be blocked. If there is a possibility of slippage of the cap, a block shall be placed in between the cap and the load.
- The operator shall watch the stop indicator, which shall be kept clean, to determine the limit of travel. The indicated limit shall not be overrun.
- After the load has been raised, it shall be cribbed, blocked, or otherwise secured at once.
- Hydraulic jacks exposed to freezing temperatures shall be supplied with adequate antifreeze liquid.
- All jacks shall be properly lubricated at regular intervals.

Each jack shall be thoroughly inspected before each use. Jacks, which are in unsafe condition, shall be tagged accordingly, and shall not be used until repairs are made.

Abrasive Blast Cleaning Nozzles

The blast cleaning nozzles shall be equipped with an operating valve, which must be held open manually. A support shall be provided on which the nozzle may be mounted when it is not in use.

Fuel Powered Tools

All fuel-powered tools shall be stopped while being refueled, serviced, or maintained, and fuel shall be transported, handled, and stored in accordance with the Flammable and Combustible Liquids Program.

When fuel powered tools are used in enclosed spaces, the applicable requirements for concentrations of toxic gases and use of personal protective equipment, shall be adhered to.

Guarding Portable Tools

Guards shall always be in place and operable while the tool is in use. The guard may not be manipulated in such a way that will compromise its integrity or compromise the protection in which intended. Guarding shall meet the requirements set forth in ANSI B15.1.

Portable Circular Saws

- All portable, power-driven circular saws having a blade diameter greater than 2 in. shall be equipped with

- guards above and below the base plate or shoe.
- The upper guard shall cover the saw to the depth of the teeth, except for the minimum arc required to permit the base to be tilted for bevel cuts.
- The lower guard shall cover the saw to the depth of the teeth, except for the minimum arc required to allow proper retraction and contact with the work.

- When the tool is withdrawn from the work, the lower guard shall automatically and instantly return to covering position.
- All cracked saw blades shall be immediately removed from service.

Switches and Controls

- All hand-held powered tools, circular saws, drills, tappers, fastener drivers, horizontal or vertical angle grinders, etc., shall be with a constant pressure switch or control, and may have a lock-on control if turnoff can be accomplished by a single motion of the same finger or fingers that turn it on.
- All hand-held powered circular saws having a blade diameter greater than 2 inches, electric, hydraulic or pneumatic chain saws, and percussion tools without positive accessory holding means shall be equipped with a constant pressure switch or control that will shut off the power when the pressure is released. All hand-held gasoline powered chain saws shall be equipped with a constant pressure throttle control that will shut off the power to the saw chain when the pressure is released.
- The operating control on hand-held power tools shall be so located as to minimize the possibility of its accidental operation, if such accidental operation would constitute a hazard to employees.
- Grounding of portable electric powered tools shall meet the electrical requirements that can be found in the Electrical Safety Program. All electric power tools shall be equipped with a three-prong plug.

Portable Abrasive Wheels

Safety Guards Exceptions

- Wheels used for internal work while within the work being ground.
- Mounted wheels used in portable operations 2 inches and smaller in diameter.
- Types 16, 17, 18, 18R, and 19 cones, plugs, and threaded hole pot balls where the work offers protection.
- Guards shall be made of steel or other material with adequate strength.
- A safety guard shall cover the spindle end, nut and flange projections. The safety guard shall be mounted so as to maintain proper alignment with the wheel, and the strength of the fastenings shall exceed the strength of the guard.
- Exception: safety guards on all operations where the work provides a suitable measure of protection to the operator may be so constructed that the spindle end, nut and outer flange are exposed. Where the nature of the work is such as to entirely cover the side of the wheel, the side covers of the guard may be omitted.
- Exception: the spindle end, nut, and outer flange may be exposed on portable machines designed for, and used with, type 6, 11, 27, and 28 abrasive wheels, cutting off wheels, and tuck-pointing wheels.

Mounting and Inspection of Abrasive Wheels

- Immediately before mounting, all wheels shall be closely inspected, and a ring test performed, to make sure they have not been damaged in transit, storage, or otherwise.

- Ring test – “tap" wheels about 45 degrees each side of the vertical centerline and about 1 or 2 inches from the periphery; then rotate the wheel 45 degrees and repeat the test; an undamaged wheel will give a clear metallic tone - If cracked, there will be a dead sound and not a clear "ring.”
- The spindle speed of the machine shall be checked before mounting of the wheel to be certain that it does not exceed the maximum operating speed marked on the wheel.
- Grinding wheels shall fit freely on the spindle and remain free under all grinding conditions.
- A controlled clearance between the wheel hole and the machine spindle (or wheel sleeves or adaptors) is essential to avoid excessive pressure from mounting and spindle expansion.

- The machine spindle shall be made to nominal (standard) size plus zero minus .002 inch, and the wheel hole shall be made suitably oversize to assure safety clearance under the conditions of operating heat and pressure.
- All contact surfaces of wheels, blotters, and flanges shall be flat and free of foreign matter.
- When a bushing is used in the wheel hole it shall not exceed the width of the wheel and shall not contact the flanges.

Portable Grinders
Special "revolving cup guards" which mount behind the wheel and turn with it shall be used. They shall be made of steel or other material with adequate strength and shall enclose the wheel sides upward from the back for one-third of the wheel thickness. It is necessary to maintain clearance between the wheel side and the guard. The clearance shall not exceed one-sixteenth inch.

Vertical portable grinders, also known as right angle grinders, shall have a maximum exposure angle of 180 degrees and the guard shall be located between the operator and the wheel during use. Adjustment of the guard shall ensure that pieces of an accidentally broken wheel will be deflected away from the operator.

Other Portable Grinders
The maximum angular exposure of the grinding wheel periphery and sides for safety guards used on other portable grinding machines shall not exceed 180 degrees and the top half of the wheel shall always be enclosed.

Personal Protective Equipment
Employees using hand and power tools and exposed to the hazard of falling, flying, abrasive, and splashing objects, or exposed to harmful dust, fumes, mists, vapors or gases shall be provided with the PPE necessary to protect them from the hazard.

VEHICLE OPERATIONS

Purpose

This program is written in compliance with regulatory requirements and provides directives to managers, supervisors, and employees about their responsibilities in the operations and management of Arrow S Energy Operating vehicles. However, this program may be adopted for use by contractors who do not have a formal Vehicle Operations Program

Key Responsibilities

Arrow S Energy Operating Safety Manager

- The director of HSE is responsible for developing and maintaining the program and related procedures.

Employees

- All Arrow S Energy Operating employees who operate a company owned vehicle, or operate a personal vehicle used for company business shall be familiar with this procedure and the local workplace vehicle safety program.
- Follow all requirements, report unsafe conditions, and follow all posted requirements.
- Only authorized employees will drive a motor vehicle in the course and scope of work or operate a company owned vehicle.
- The driver of a Arrow S Energy Operating vehicle shall have a valid and current license to operate the vehicle.
- Authorized drivers are not allowed to operate a motor vehicle while under the influence of alcohol, illegal drugs, certain medications, prescription or over-the counter medications that might impair their driving skills.

Vehicle and Transportation Related

Driving Safety

- No passengers shall ride in the bed of trucks or on a trailer bed.
- Drivers, when parking, should make every effort to park the vehicle in a manner that allows the first move when leaving the parking space to be forward.
- Passenger compartments are to be free from loose objects that might endanger passengers in the event of an incident. Any vehicle with non-segregated storage shall be equipped with a cargo net or equivalent to separate the storage area.
- Vehicles (light vehicles, heavy vehicles and trailers) may not be modified without the endorsement of a qualified engineer or the manufacturer.
- Signs, stickers or labels are to be fitted in such a manner that they do not obstruct the driver's vision or impede the driver's use of any controls.

Reporting of Traffic Violations - Authorized drivers will report any traffic violation to their supervisor.

Reporting of Vehicle Accidents & Damage - Authorized drivers will report any collision, traffic accident, or damage to the vehicle- the report should first go to the employees supervisor and then be documented on the Incident Notification form located at the Arrow S Energy Operating office.

Safe Driver Behaviors/Practices:

- Authorized drivers will follow the Arrow S Energy Operating Safe Driver Behaviors/Practices as outlined on this procedure.
- Obey all federal and local driving laws and regulations as well as requirements of landowners and/or partners.
- Immediately report any restriction or change to their driving privileges to their supervisor.
- Seatbelts shall be worn by all occupants at all times whenever a vehicle is in motion.
- Continually assess conditions and hazards and remain prepared for any challenge that may approach them.
- When speaking with a passenger, always keep your eyes on the road.
- Drivers shall not exceed the posted speed limit.
- Drivers shall maintain a safe distance between other vehicles.
- Slow down around construction, large vehicles, wildlife, fog, rain, snow, or anything else that adds additional hazard/s to driving.
- Illegal drugs are not allowed to be in a company owned or leased vehicle at any time.

Pre Trip Procedures:

Drivers of Arrow S Energy Operating owned or leased vehicles must perform a vehicle inspection prior to the first operations of the day.

- Perform 360 walk around – report new damage.
- Check windshield for cracks that could interfere with vision.
- Inspect for vehicle damage and immediately report any damage to the supervisor if not previously observed.
- Make sure dirt or snow is removed from lights on all sides of the vehicle.
- Brush or clean off snow or ice on all windows to ensure complete vision.
- Check fuel level to be certain the destination can be reached.
- Check to ensure the license plates and inspection tag on vehicle are current.
- Ensure that there is a first aid kit and inspected fire extinguisher in the company vehicle.
- Driver must be rested and alert for driving.
- A daily inspection must be documented on the form located under the 'Forms' tab of the solution center.

Vehicle Requirements

- Vehicles shall be maintained in safe working order.
- Vehicles shall be of the correct size and designed for the intended use.
- Do not load vehicle beyond manufacturer listed capacity.
- Tires, including spares if full size, are to be of same type, profile and tread pattern, except when the vehicle or tire Manufacturer recommends a different type for certain axles.
- Vehicles are to be fitted with a spare wheel and changing equipment to safely change a wheel, or a suitable alternative.
- All seats are to be fitted with headrests
- All light duty vehicles are to be equipped with an adjustable left, right and central rear view mirrors.
- Loads shall be secured and within the manufacturer and legal limits and shall not exceed the manufacturer's specifications and legal limits for the vehicle.

- All vehicles are to be equipped with a multipurpose fire extinguisher with a capacity of at least 0.9 kg/2 lb. The fire extinguisher shall be securely mounted on a bracket and located so that it is easily accessible in an emergency without becoming a hazard in case of an incident.
- All light vehicles shall be equipped with a securely stowed first aid kit.
- All drivers of light vehicles shall carry a high visibility jacket for use in case of emergency stops.
- All light duty vehicles carry a minimum of one collapsible hazard warning triangle.

Transportation

If workers are required to travel in a worker transportation vehicle Arrow S Energy Operating must ensure that reasonable measures are taken to evaluate road, weather and traffic conditions to ensure the safe transit of the workers.

The operator of a worker transportation vehicle must ensure that the worker transportation vehicle has been inspected by a qualified person before first use on a work shift.

Seated workers must wear seat belts while being transported in a vehicle equipped with seat belts.

A worker must not ride in a vehicle in a standing position, unless protected from being thrown off balance.

A worker must not ride in a vehicle with any part of the body outside the vehicle unless essential to the work process and then only if the worker is adequately restrained.

Materials, goods, tools or equipment carried in a portion or compartment of a vehicle in which workers are riding must be located and secured to prevent injury to the operator or workers.

Any enclosed portion or compartment of a vehicle in which workers are transported must have:

- effective ventilation, independent of doors, providing clean air,
- adequate lighting and means for heating and cooling,
- an effective means of communication between the operator and passengers, and
- more than one means of exit.

Traffic Control

Arrow S Energy Operating shall develop, in writing, and implement a traffic protection plan for its workers at a worksite if any of them may be exposed to a hazard from vehicular or pedestrian traffic that may endanger the safety of any worker. It shall include the following control measures:

- Effective means of traffic control shall be provided whenever the unregulated movement of vehicular traffic constitutes a hazard to workers.
- Traffic control shall include barricades and cones as the primary control and, where required, signs, flagmen or other techniques and devices made necessary by the prevailing circumstances.
- Operations or equipment, encroaching on the traveled way, shall be protected by barricades and cones as the primary control and, where required other effective devices.
- Arrow S Energy Operating must train workers in the traffic control safe work procedures.
- Arrow S Energy Operating will ensure that before a worker is designated as a flag person, the worker is trained in the safe work procedures for the safe control of traffic operations and wears the appropriate high visibility outer clothing and/or equipment.

- If a worker at a project on a highway may be endangered by vehicular traffic unrelated to the project, the project shall make use of as many measures as necessary to adequately protect the worker.
- A worker who is required to set up or remove traffic control measures on a roadway or a shoulder of a roadway shall be a competent worker, shall be equipped with the appropriate high visibility apparel, shall not perform any other work while setting up or removing the measures and shall be given adequate written and oral instructions in a language that he or she understands, with respect to setting up or removing the measures.

ATV Vehicles

If a Arrow S Energy Operating work site utilizes ATV vehicles, then the following shall apply:

- If the manufacturer has not set limits for operation of the ATV on sloping ground, 5% is the maximum allowable slope unless Arrow S Energy Operating has developed and implemented written safe work procedures appropriate for any steeper slope on which the equipment is to be used.
- Arrow S Energy Operating must ensure that each ATV operator is properly licensed and trained in the safe operation of the vehicle. The training program for an ATV operator must cover:
    - the operator's pre-trip inspection,
    - use of personal protective apparel,
    - operating skills according to the ATV manufacturer's instructions,
    - basic mechanical requirements, and
    - loading and unloading the vehicle, if this is a job requirement.
- An ATV operator and any passenger on an ATV must wear approved eye and hearing protection as required by local regulatory requirements and the Arrow S Energy Operating PPE Program. An ATV operator and any passenger on an ATV must wear clothing suitable for the environmental conditions and when necessary to protect against the hazards presented at the worksite, suitable gloves and clothing which covers the ankles and legs and the arms to the wrists and appropriate footwear.
- Arrow S Energy Operating requires that approved helmets shall be worn by the operator and passenger.
- Loading and unloading of an ATV onto or off a carrier vehicle must be done in a safe manner. If ramps are used when loading or unloading an ATV they must be placed at a suitable angle, be sufficiently wide and have a surface finish which provides an adequate grip for the ATV's tires.

WORKING ALONE

Purpose

Arrow S Energy Operating (the company) will provide a safe work environment for its employees. In doing so, Arrow S Energy Operating will take all reasonable and practical measures to eliminate or minimize injury or risks associated with the nature of the work performed when employees work alone.

Arrow S Energy Operating site supervisors shall establish site specific procedures for employees working alone.

Scope

When work is performed on a company owned or operated site, the contractor's program shall take precedence, however, this document covers Arrow S Energy Operating employees. This program may be adopted for use by contractors who do not have a formal Working Alone program.

Objectives

To minimize risk to employees who may work alone, and assistance is not readily available, Arrow S Energy Operating will:

- Conduct written hazard assessments to identify existing or potential working alone hazards.
- Take measures to eliminate or control the hazards of working alone at Arrow S Energy Operating worksites.
- Ensure that affected employees are informed of the hazards and methods used to control or eliminate them.
- Provide an effective system for communication between any employee who work alone and persons capable of assisting the employee.
- Ensure all incidents (working related or otherwise) are reported, investigated and documented.
- Review the Working Alone Plan at least annually or more frequently if there is a change in work arrangements which could adversely affect an employee's well-being or a report that the system is not working effectively.

Key Responsibilities

Arrow S Energy Operating HSE Director

- Conducts a hazard assessment to identify existing or potential hazards related to the nature of the work or the work environment given the circumstances of the work when working alone.
- Responsible for the review, implementation, and maintenance of the local worksite Working Alone Plan.
- Communicate this policy and its procedures to employees who work alone.
- Annually review the effectiveness of the hazard controls and procedures and make improvements as required.

Worksite Project Manager

- Responsible for the implementation and maintenance of the Working Alone Plan for their project and ensuring all assets are made available for compliance with the procedure.
- Take all reasonable and practical steps to minimize or eliminate identified working alone risks.
- Review the hazard assessment results and provide recommendations to management to minimize or eliminate identified working alone risks.

- Review annually the effectiveness of the policy and guidelines and make changes as required by consulting with management staff and employee representatives.
- Respond to employee concerns related to working alone and communicate these to management.
- Report all incidents of work site incidents immediately.
- Participate in work site hazard assessments and the implementing of procedures to eliminate or control hazards of working alone.

Safe Work Procedures

This procedure applies if an employee is working alone at a work site where assistance is not readily available if there is an emergency or the employee is ill or injured.

Worksite Assessment
A hazard assessment for working alone will anticipate work and travel time, weather, communication, type of work, employee medical conditions and training. The hazard assessment shall address hazards and identify control measures to minimize risk associated with working alone.

The hazard assessment will be conducted on a project by project or site basis as circumstances vary between locations and conditions. To assess this hazard Arrow S Energy Operating should review records, past incidents and identify measures or actions needed to correct any hazards. The assessment should involve:

- Consideration for the time interval between checks and the procedure to follow in case the employee cannot be contacted, including provisions for emergency rescue.

Plan

Arrow S Energy Operating must develop and implement a written procedure for checking the well-being of a worker assigned to work alone or in isolation under conditions which present a risk of disabling injury, if the worker might not be able to secure assistance in the event of injury or other misfortune.

Communication and Regular Contact Person System
Workers must always carry a cellular phone or electronic monitoring device while working alone. The use of a radio, cellular/satellite phone, electronic monitoring device or another form of direct, reliable correspondence shall be used to establish an effective means of communication between the lone employee and designated check person.

Each site-specific Working Alone Plan shall address a check-in/check-out process where employees are monitored or contacted at regular intervals.

Individual(s) by job function responsible for establishing contact with the affected employee, as well as a back-up form of communication will be established for each site-specific plan. The work alone employee's manager or designee is responsible for check-in with the lone employee at regular intervals.

A backup form of communication in the event primary communication (cell phone or land line) is unavailable should be via satellite phone or if electronic communication is not practicable or readily available at the worksite, the lone workers supervisor must ensure that a competent employee visits the employee at regular intervals. These visits or contacts shall be at intervals of time appropriate to the nature of the hazards associated with the employee's work.

Procedures to be Followed if a Worker Working Alone Does Not Respond

Considerations such as length of time missing, weather conditions, physical fitness, etc. must be factored into the site-specific working alone program. The program must specify procedures for emergency response including provisions for contacting appropriate local officials. The program shall identify specific criteria to determine when an employee search is necessary. The minimum requirements include:

- If the working alone employee fails to respond at the scheduled contact time repeated contact efforts will be made for 1 hour.
- If the employee working alone is not contacted within 1 hour of the scheduled contact, a designated individual will be dispatched for a search to the working location. If the working alone employee is not found, then the closest police (city) or governmental search and rescue authority shall be notified to conduct a search.

Limitations of Specific Activities

- No heavy equipment will be operated if a worker is alone.
- No hot work will occur if a worker is alone.
- No working at heights will occur if a worker is alone and requiring a personal fall arrest system.
- Other limitations will be placed based on the site-specific hazard assessment.

Minimum Training or Experience

All employees will be trained (if working alone is a hazard at that location) in:

- Being informed of working alone hazards at the worksite and the methods used to control or eliminate them.
- A worker required to work alone, and any person assigned to check on the worker must be trained on this procedure.

Provisions of PPE

- Cold weather clothing shall be worn when appropriate if a worker is alone.
- Additional PPE for workers working alone will be identified in the site-specific hazard and PPE assessment process.

Safe Work Practices

Controls implemented at Arrow S Energy Operating worksites shall, as a minimum:

- Office doors are to be locked when working alone after hours.
- Advise employees to travel with another employee when possible.
- Advise employees to park close to the building in the evening.
- Post emergency contact information and develop a communication system.
- Report suspicious activity to a supervisor.

Provision of Emergency Supplies

- All company owned vehicles shall contain appropriate emergency supplies including food, water, warm clothing during winter and other supplies as determined by the hazard assessment.
- If an employee requires personal medication, they must ensure they have enough supplies available.

Review & Updating Working Alone Plan

- The hazard assessment and Working Alone Plan at each company worksite must be reviewed at least on an annual basis or more frequently if there is a change in work processes or arrangements which could adversely affect an employee's well-being.
- The local Working Alone Plan shall also be revised if there is any indication or report that the plan is not working effectively or needs changing.