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Section I **Purpose** **of the Plan**

Policy

This safety policy and procedure provides guidelines for safely performing welding and hot work operations. It presents provisions for:

- Training;
- Discussion On Types of Welding;
- Safe Work Practices
- Employee Protection Requirements;
- Hot Work Permits;
- Fire Watch Requirements
- Working in Confined Spaces;
- Ventilation Requirements When Performing Welding Operations;
- Inspection Requirements

This safety policy and procedure affects any employees who, as a result of his or her job duties, are exposed to “Hot Work”.

- For purposes of this policy “Hot Work” authorization shall be required for all spark producing operations including, but not limited to, cutting, burning, welding, grinding, brazing, use of non-explosion proof power tools or electrical equipment, or vehicle entry into a customer’s “regulated areas”. Any exceptions to the aforementioned must be approved and granted (in writing) by the customer’s EHS department head or designated Hot Work Competent Person who will then review their specific work guidelines and reasons for declassification of the described work activity to Hilscher-Clarke’s Competent Person for agreement.

Hilscher-Clarke has established that Hot Work *is not* permitted when the following conditions exist:

- In sprinklered buildings where the entire sprinkler system is impaired;
- When an entire building fire detection system is shut down;
- In the presence of explosive atmospheres, where mixtures of flammable gases, vapors, liquids or dusts may exist;
- In tanks, drums, or other containers and equipment that contain or previously contained materials that could create explosive atmospheres.

This safety policy and procedure is established in accordance with Occupational Safety and Health Standards for General Industry (29 CFR 1910.251-.257 and Occupational Safety and Health Standards for Construction Industry (29 CFR 1926.350-.354).

It is the responsibility of each Manager, Supervisor and Employee to ensure implementation of Hilscher-Clarke’s safety policy and procedure on Welding and Torch Cutting Operations. It is also the responsibility of each Hilscher-Clarke employee to report immediately any unsafe act or condition to the Safety Manager or his/her immediate Supervisor. Specific Responsibilities are found in Section II (General Program Management).

Section II **General Program** **Management**

Program Administration

The President is responsible for the development, implementation, and overall administration of the welding and torch cutting operations. These responsibilities include, but are not limited to:

- ❑ Reviewing, maintaining, and updating the welding and torch cutting written program annually and whenever necessary to include new or modified tasks, procedures, equipment, training and/or recordkeeping.
- ❑ Ensuring compliance through the auditing process as outlined in Hilscher-Clarke's Disciplinary Program.
- ❑ The President may delegate the responsibility of various aspects of the Welding and Torch Cutting Operations Program to a Qualified Organization (as approved by the President). However, the President's ultimate responsibility for his/her aspects of the program cannot be delegated.

Safety Manager is responsible for:

- ❑ Ensuring that a responsible Supervisor or Authorized Employee is in the immediate area of work on the Hilscher-Clarke controlled jobsite during all hot work operations.
- ❑ Communicates and ensures implementation of the Hot Work Permit program with all employees and subcontractors.
- ❑ Ensures a site specific work safety and health plan is submitted by any and all subcontractors for Hot Work operations.
- ❑ Ensuring that only NIOSH approved respiratory protection equipment and related supplies are purchased and utilized by Hilscher-Clarke employees and/or sub-contractors employees.
- ❑ Employee Training - Obtaining and coordinating welding and torch cutting operations training programs for all Affected Employees.
- ❑ Ensures that all requirements of Hilscher-Clarke's Respiratory Protection Program are being met and adhered to by all Affected Employees.
- ❑ Monitors implementation and assesses overall effectiveness of the Welding and Torch Cutting Operations program, including specifically the Hot Work Permit and Fire Watch processes.
- ❑ Retains a copy of every Hot Work Permit at the corporate office for a period of at least 6 months.
- ❑ With the approval of the President the Safety Manager may delegate the responsibility of various aspects of the Welding and Torch Cutting Operations program to another Competent Person, or qualified organization (as approved by the President). However, the Safety Manager's ultimate responsibility for his/her aspects of the program cannot be delegated.

Supervisory Personnel are responsible for:

- ❑ Overseeing the Hot Work Permit program for hot work operations under their supervision. Supervisory Personnel are responsible for fulfilling the duties of a Permit Authorizing Individual (PAI), who will issue Hot Work Permits.
 - Employees who have successfully completed hot work safety training may be a PAI. Hot work operators are allowed to be PAI, but they are not allowed to issue their own permits.
- ❑ Ensuring that all welding equipment, including cables, lines and any accessories, are in good working condition. If any indication of damaged equipment is present (i.e., broken/cut insulation on cables), tagging and immediately removing the equipment from service and repaired.
- ❑ Supervisors will not allow any employee who has not received the required training to perform any Hot Work activity.

Program Administration (cont.)

Supervisory Personnel are responsible for (cont.):

- ❑ Ensure that respirators are properly worn and maintained as outlined in Hilscher-Clarke's Respiratory Protection Program when required.
- ❑ With the approval of the Safety Manager the Supervisor may delegate the responsibility of various aspects of the Welding and Torch Cutting Operations program to another qualified person, competent person or qualified organization (as approved by the Safety Manager). However, the Supervisor's ultimate responsibility for his/her aspects of the program cannot be delegated

Permit Authorizing Individual (*herein referred to as PAI*) is responsible for:

- ❑ Identifying and notifying the Supervisor of tasks/procedures which may require a Hot Work Permit.
- ❑ Inspects Hot Work sites prior to the start of Hot Work Operations using the checklist found on the Hot Work Permit form.
- ❑ When a Fire Watch is required, the PAI will designate a trained employee to serve as Fire Watch and confirm their training.
- ❑ Once all requirements on the Hot Work Permit have been satisfied the PAI shall sign the Hot Work Permit and post in the area where the hot work is to be performed.
- ❑ **Revoking the permit** under the following conditions:
 - When circumstances would make the continued use of the source of ignition hazardous.
 - Any time the conditions of its issuance change.
 - Inactivity of permitted hot work in excess of two hours unless test(s) determine the LEL is less than 10%
- ❑ Collecting and reviewing with the participants all completed Hot Work Permits which shall then be given to the Site Supervisor and/or Safety Manager.

Employees Conducting Hot Work

- ❑ Shall be familiar with the site and procedures for sounding a local alarm and notifying the proper authorities in the event of a fire. A phone shall be available at the work site.
- ❑ Shall be trained in the use of fire extinguishers (as outlined in Hilscher-Clarke's Fire Protection program).
- ❑ Conduct hot work operations in a safe and controlled manner, including all identified conditions and restrictions listed on the Hot Work Permit.
- ❑ Continue to perform hot work only so long as conditions are unchanged from those under which the Permit was granted.

Employees Conducting "Fire Watch" shall

- ❑ Have fire extinguishing equipment readily available and be trained in its use. They shall be familiar with facilities for sounding an alarm in the event of a fire. They shall watch for fires in all exposed areas, try to extinguish them only when obviously within the capacity of the equipment available, or otherwise sound the alarm.
- ❑ Maintain their post for at least a half hour after completion of hot work activity to detect, extinguish, and report ignition sources, fires, and potential ignition sources.
- ❑ Watch for fires in the exposed and hidden areas near to the hot work activity. Use proper fire extinguisher equipment to deal with small incipient fire incidents but be ready to sound the fire alarm immediately if a fire does not appear to be quickly extinguishable with hand extinguisher.

Program Administration (cont.)

Employees Conducting “Fire Watch” (cont.)

- Immediately notifying the PAI of the need to revoke the permit under the following conditions:
 - When circumstances would make the continued use of the source of ignition hazardous.
 - Any time the conditions of its issuance change.
 - Inactivity of permitted hot work in excess of two hours unless test(s) determine the LEL is less than 10%
- When applicable assure emergency personnel are advised of the Hot Work and its exact location.

Employees

- Shall comply with all applicable guidelines contained in this safety policy and procedure.
- Employees directly involved in welding and torch cutting operations are responsible for ensuring that all fire prevention and fire protection measures have been taken before any torch cutting or welding begins.
- Report any problems or malfunction with welding or torch cutting equipment to the Supervisor immediately.
- Ensuring that all PPE’s worn properly for the specific hazard involved and that all equipment is in good working condition, cleaned and stored properly when not in use.
- Each employee is responsible for bringing hazards to the attention of his or her immediate supervisor for correction as soon as the hazard is recognized.

The Designated Human Resources representative is responsible for:

- The designated human resources representative will prepare and maintain an Employee Education and Training Record (*see Appendix A*) upon completion of training and any retraining. These documents will include, but not be limited to;
 - Names or other identities of employees trained;
 - Signature of the person receiving the training;
 - Date of the training;
 - Date of retraining;
 - Specific topics addressed during the training session;
 - Specific topic(s) addressed during the retraining session;
 - Signature of the person, or company, conducting the training;
 - Signature of the person, or company, conducting the retraining.

Section III **Definitions**

General Plan Definitions

Approved – Listed or approved by a nationally recognized testing laboratory.

Confined Space – A space that is not designed for human occupancy, has limited openings for entry and exit, may lack adequate ventilation and may contain or produce dangerous contamination.

Hazardous – Any act, condition, or substance which poses health and safety risks to employees.

Hot Work – All heat, spark, or flame producing operations including cutting, welding, brazing, soldering, grinding, thermal spraying, thawing pipe, torch-applied roofing, or any other similar situation. Operations such as chipping, chiseling, sandblasting, drilling, and power hand tool use in areas or on equipment where flammable or combustible gases, vapors, dusts, or liquids may be present, shall require the use of non-sparking tools. **If non-sparking tools are not used, a Hot Work Permit shall be required.**

Hot Work Permit – Process/application/signoff mechanism to assure that Hot Work operations are carried out in a safe and controlled manner. A permit allows employees to perform work involving welding, cutting, or any task that would deplete oxygen, create toxic fumes and vapors, or create the potential for fire or explosion.

Fire Watch – An individual assigned to be in an area for the express purpose of preventing a fire from occurring, extinguishing small fires, protecting other individuals from fire or life safety dangers and notifying appropriate personnel in case of an emergency. This individual cannot be the person performing the hot work.

Pulmonary – Any body function related to the lungs.

Requestor – The person/organization that needs the hot work completed and that are responsible for coordinating all hot work activities for a given task. Activities include completing the Hot Work permit (including all the necessary signatures), maintaining all documentation in the field, and assuring that the daily precautions/fire watch is present and processes adhered to.

Welding/Welding Operator – Any operator of electric or gas welding and cutting equipment.

Section IV
Policy & Procedure

1.0 GENERAL TRAINING REQUIREMENTS

- 1.1** All employees (regardless of status) who perform Hot Work or Fire Watch duties on any Hilscher-Clarke job site, or at Hilscher-Clarke's permanent facility, will be (at a minimum) trained to:
- Recognize the hazards associated with various welding operations;
 - Know the safe work practices for welding operations;
 - Understand the importance and requirements of Hot Work Permits;
 - Use the appropriate personal protective equipment (PPE) for the job.
 - Recognize confined spaces and the requirements associated with them;
 - Understand the importance of regular inspections of welding equipment, attachments, and accessories.
 - Know the identification of Permit Authorizing Individuals and how they can be contacted.
 - Where to return copies of completed Hot Work Permits.
 - Conditions for the revoking of a Hot Work Permit.
 - Housekeeping.
 - Fire Prevention.
- 1.2** Fire Extinguisher Training – Required once a year. This shall include, but not be limited to:
- Fuel classifications and proper fire extinguisher selection.
 - Extinguisher placement (travel distance).
 - Conditions for fighting a fire with a portable fire fighting device.
 - Portable fire extinguisher inspection requirements (i.e., pre-use, monthly, annual)
- 1.3** This training shall be made available upon initial employment or job reassignment. Refresher training shall be provided upon the discretion of the Safety Manager and/or Supervisor.

2.0 GAS WELDING & CUTTING

The gas welding process unites metals by heating. The gases commonly used as the fuel gas are oxygen and acetylene. The gas cutting process removes metal by a chemical reaction of the base metal with oxygen at an elevated temperature.

- 2.1 Only personnel who have been properly instructed and qualified by their immediate supervisor may operate oxygen-fuel gas welding equipment on an Hilscher-Clarke job site.
- 2.2 When transporting, moving and storing compressed gas cylinders, the valve protection cap shall be in place and secured.
- 2.3 When cylinders are hoisted, they shall be secured on a cradle, slingboard or pallet, not hoisted or transported with magnets or choker slings.
- 2.4 Cylinders shall be moved by tilting and rolling them on their bottom edges. They shall not be dropped, struck or permitted to strike each other.
- 2.5 When transported in a vehicle, cylinders shall be secured in a vertical position.
- 2.6 Valve protection shall not be used to lift cylinders.
- 2.7 Unless cylinders are firmly secured on specially designed carriers, regulators shall be removed and valve protections in place before cylinders are moved.
- 2.8 Suitable cylinder truck, chain or other steadying device shall be used to keep cylinders from being knocked over while in use.
- 2.9 When work is finished, when cylinders are empty, or when cylinders are moved, cylinder valves shall be closed.
- 2.10 Cylinders shall be kept far enough away from the actual welding or cutting operation to avoid contact from sparks, hot slag, or flame' or fire resistant shields shall be used.
- 2.11 Cylinders containing oxygen or any fuel gas **shall not** be taken into any confined space on any Hilscher-Clarke worksite.
- 2.12 Cylinder valves shall be opened slowly to prevent damage to regulators. Fuel cylinders shall not be opened more than 1½ turns. When a special wrench is required, it shall be left on the stem of the valve while the cylinder is in use so that gas flow can be shut off quickly in the event of an emergency.
- 2.13 Before a regulator is removed from a cylinder valve, the cylinder valve shall be closed and gas released from the regulator.
- 2.14 Cylinders that develop leaks in or around the valve stem or fuse plug shall be tagged and removed from service immediately. Leaking cylinders shall be stored with caution and separate from good cylinders.
- 2.15 Hoses and connections shall be kept free of grease and oil and inspected for defects before each use. Damaged or defective hoses shall be tagged and removed from service immediately.
- 2.16 Torches shall be inspected before each use. Defective torches shall be removed from service.
- 2.17 Torches shall be lighted by friction lighters or other approved devices, not by matches or from hot work.
- 2.18 Regulators and gauges shall be in proper working order.
- 2.19 Back flow prevention devices (flash back arresters) are required. Torches certified by the manufacturer to comply with this requirement are acceptable.
- 2.20 Non-combustible or flameproof screens shall be used to protect employees working in adjacent areas, whenever feasible.
- 2.21 Welders are to be instructed to report all defects to their immediate supervisor and to not use defective, or machinery that is suspected of being defective, until it has been tested and/or repaired by "Qualified" personnel.

3.0 ARC WELDING & CUTTING

The arc welding and cutting processes uses electric current and two welding leads. One welding lead is connected to the electric power supply while the other lead is attached to the work surface.

- 3.1** Only personnel who have been properly instructed and qualified by their immediate supervisor may operate arc welding equipment on an Hilscher-Clarke job site.
- 3.2** Welders shall use only arc welding equipment which meets standards set by a nationally recognized authority such as ANSI or Underwriters Laboratories.
- 3.3** Do not exceed voltage limits specified by the equipment manufacturer or OSHA. OSHA gives the following voltage requirements:
 - 3.3.1** Manual (alternating current machines) arc welding and cutting: 80 VAC or 100 VDC;
 - 3.3.2** Automatic (direct-current machines) arc welding and cutting: 100 VAC or 100 VDC.
 - 3.3.3** If special processes require higher voltages, the operator must be protected from accidental contact by taking special precautions, such as wearing nonconducting gloves.
- 3.4** Personnel must be protected from accidental electrical contact with welding lead terminals by such means as recessed openings, heavy insulating sleeving, and mechanical protection.
 - 3.4.1** Electrode holders not in use shall be stored to prevent electrical contact with persons, conductors, fuel or compressed gas tanks.
- 3.5** Welding and cutting equipment shall be inspected before each use.
- 3.6** All connections shall be checked before each use.
- 3.7** Cables with damaged or exposed conductors shall be replaced.
- 3.8** Cables with splices within 10 feet of the holder shall not be used.
- 3.9** Cables shall be uncoiled to prevent overheating.
- 3.10** Welding machines shall be grounded according to manufacturer specifications.
- 3.11** All foot switches are to be guarded in such a way as to prevent accidental operation.
- 3.12** Secondary and casing of all portable welding transformers are to be grounded by conductors capable of carrying the full welding current.
- 3.13** Machines which become wet must be thoroughly dried and tested for electrical faults before reuse.
- 3.14** Welders are to be instructed to report all defects to their immediate supervisor and to not use defective, or machinery that is suspected of being defective, until it has been tested and/or repaired by "Qualified" personnel.
- 3.15** Non-combustible or flameproof screens shall be used to protect employees working in adjacent areas, whenever feasible.

4.0 RESISTANCE WELDING & CUTTING

Resistance welding is a metal-joining process where welding heat is generated at the joint by the resistance to the flow electric current.

- 4.1 Only personnel who have been properly instructed and qualified by their immediate supervisor may operate resistance welding equipment on an Hilscher-Clarke job site.
- 4.2 Only a qualified electrician may install resistance welding equipment. A correct installation includes a safety-type disconnect switch or circuit breaker which is conveniently close to the machine to shut off each power circuit for servicing.
- 4.3 All doors and panels of all resistance welding machines and control panels are kept locked and are interlocked to prevent unauthorized persons from contact with electrical power.
- 4.4 The welder shall ensure that the secondary and casing of all portable welding transformers are grounded.
- 4.5 Welders are to be instructed to report all defects to their immediate supervisor and to not use defective, or machinery that is suspected of being defective, until it has been tested and/or repaired by "Qualified" personnel.
- 4.6 Non-combustible or flameproof screens shall be used to protect employees working in adjacent areas, whenever feasible.

5.0 HEALTH HAZARDS - RESPIRATORY

Airborne contaminants from welding, cutting, brazing and heating operations can pose health hazards. Most hazardous airborne materials are heavy metals found in welding fumes. Metals are present in paint coatings (chromium and lead), in surface coatings such as zinc on galvanized, and cadmium used to protect surfaces. The base material, the filler material, and the shielding gas if any. Very high temperatures that occur during welding, cutting, brazing or heating release these materials in the form of :

- Toxic gases;
- Primary pulmonary gases;
- Nonpulmonary gases;
- Particulate matter;
- Irritants and toxic inhalants

Air sampling, by a “Qualified Individual or Organization,” (as outlined in Hilscher-Clarke’s Respiratory Protection Program) to identify the fumes and gases emitted from a specific operation.

- 5.1** Whenever practical, surfaces shall have coatings removed for at least 4 inches in all directions from the location where the heat or weld will be applied.
 - 5.1.1** Wherever practical, surfaces shall have coatings removed for at least 4 inches in all directions from the location where the heat or weld will be applied.
 - 5.1.2** The backside of the piece shall also be cleaned of coating in the immediate area of the work, if burning this coating will cause hazardous fumes.
 - 5.1.3** Removal shall be by means other than burning (i.e., abrasive blasting or grinding.)
- 5.2** Many welding rods contain additives (flux, for example) which can produce hazardous fumes. MSDS’s for any welding rods used shall be present on the job site and reviewed prior to beginning any welding or cutting task, to determine if a hazard exists from the welding rod itself.
- 5.3** Employees over exposed to hazardous fumes due to the location of the operation, the material worked on, and/or the rod used, shall use appropriate respiratory protection, as outlined in Hilscher-Clarke’s Respiratory Protection Program this program includes, but is not limited to, the following minimum guidelines:
 - 5.3.1** Employees shall receive physician certification that they are physically capable of wearing the type of respirator for their assigned duties. Certification may contain limitations as required for individual employees and have a specified length of time for which the certification is valid (usually one to three years).
 - 5.3.2** Employees exposed to hazardous materials shall receive proper periodic medical monitoring required by the specific standards that govern the various materials to which they are exposed (i.e., lead, cadmium).
 - 5.3.3** Cartridge type respirators shall be supplied with filters designed specifically to protect against contaminants found in welding fumes.
 - 5.3.4** Air supplied respirators shall be used where the concentration of hazardous materials may exceed the capabilities of filter type respirators.
 - 5.3.5** Respirators shall be regularly cleaned and disinfected after each use. Those used by more than one employee shall be thoroughly cleaned and disinfected, per the manufacturer’s instructions, after each use.
 - 5.3.6** Respirators shall be stored in a convenient, clean, and sanitary location.
 - 5.3.7** Respirators used routinely shall be inspected during cleaning.

5.0 HEALTH HAZARDS – RESPIRATORY (CONT.)

- 5.3.8 Worn or deteriorated parts shall be replaced immediately with manufacturer approved replacement parts only.
- 5.3.9 Employees shall be properly instructed in the use, maintenance, and limitations of the assigned respirator.
- 5.3.10 Respirators found to be damaged or inoperative shall be taken out of service immediately.
- 5.4 Employees required to wear a half or full face cartridge, or a supplied air respirator shall be fit tested for the proper face piece.
 - 5.4.1 Facial hair, hats, or any other obstruction shall not be allowed to interfere with a proper seal between face and respirator.

6.0 EMPLOYEE PROTECTION

Employee protection during welding and cutting operations must include, but not be limited to:

- 6.1 All areas that have been just welded or cut will be clearly marked to inform other employees that the material or the area is hot.
- 6.2 **Fall Protection** – Employees will be provided either with fall protection such as harnesses, lifelines or railings where falls from heights of 6 feet or more are possible.
- 6.3 **Tripping Hazards** – Will be minimized by welding lines being placed in such an order so as not to create trip and fall hazards. Cables will not block passageways, stairways, or other exits.
- 6.4 **Eye Protection** – Will be provided by helmets or hand shields being used during all arc welding or arc cutting operations. Helpers or attendants will be provided with proper eye protection.
 - 6.4.1 **Arc Welding & Arc Cutting.** Helmets and hand held shields shall be used by personnel viewing the arc during welding and cutting operations. Safety spectacles or goggles shall be worn during arc welding and cutting operations to provide protection from injurious rays from adjacent work and from flying objects. The spectacles or goggles may have either clear or colored glass, depending upon the amount of exposure to adjacent welding or cutting operations. Shade no.s 9 thru 14 are recommended for Safety Glasses or goggles used for gas metal-arc and shielded metal-arc welding. All employees shall be provided with proper eye protection in accordance with ANSI Standard Z87.1.
 - 6.4.2 **Gas Welding and Oxygen Cutting.** Goggles or other suitable eye protection shall be used during all gas welding or oxygen-cutting operations. Spectacles with suitable filter lenses are permitted for use during gas welding operations on light work, for torch brazing, or for inspection. Common sunglasses or safety issue sunglasses are not considered an acceptable alternative.
 - 6.4.3 **Resistance Welding and Brazing.** All operators of resistance welding or resistance brazing equipment and their helpers shall use face shields, spectacles, or goggles, depending on the particular job, to protect their faces or eyes, as required.
- 6.5 Specifications for “**Protectors**”:
 - 6.5.1 **Material Properties.** Helmet and hand-held shield bodies shall be made of material which is thermally and electrically insulating, non-combustible or self-extinguishing, and opaque to visible ultra-violet, and infrared radiation. Helmets, shields, and goggles shall be capable of withstanding disinfecting.
 - 6.5.2 **Area of Protection.** Helmets and hand held shields shall be designed to protect the face, forehead, neck, and ears to the vertical lines back of the ears from weld spatter and from direct radiant energy from the arc.
 - 6.5.3 **Window for Filter & Cover Plates.** Helmets and hand-held shields shall be provided with a window for filter plates and cover plates, and shall be designed for easy removal and replacement of plates.
 - 6.5.4 **Materials Effect on Skin.** All protective parts shall be constructed of a material which will not readily irritate or discolor the skin.
 - 6.5.5 **Ventilation.** Goggles shall be ventilated to deter fogging of the lenses. Ventilation of cup-type goggles shall be baffled to prevent passage of light rays into the interior of the eyecup.

6.0 EMPLOYEE PROTECTION (CONT.)

- 6.5.6 Cover Lens or Plates.** Cover lenses or plates shall be provided to protect the filter lens or filter plate in goggles, helmets, or hand-held shields from welding spatter, pitting, and scratching. Cover lenses and plates shall be clear, glass, or self-extinguishing plastic, and need not be impact resistant.
- 6.5.7 Filter Lenses or Plates.** All filter lenses and plates shall be impact resistant. All filter lenses and plates shall be substantially free from bubbles, waves, and other flaws. Except when a lens is ground to provide proper optical correction for defective vision, the front and rear surfaces of lenses and plates shall be smooth and parallel.
- 6.5.8 Marking.** Filter lenses and plates shall bear some permanent distinctive marking by which the manufacturer and shade number may be readily identified. In addition, all glass filter lenses and plates, when treated for impact resistance, shall be marked with the letter “H” to designate impact resistance.
- 6.5.9 Guide for Selection of Filters.** A guide for the selection of appropriate shade numbers is given in Hilscher-Clarke’s Personal Protective Equipment policy and procedure.
- 6.5.10 Maintenance.** Helmets and goggles shall be well-maintained. Helmets and goggles should not be transferred from one employee to another without being properly cleaned and disinfected.
- 6.6 Arc Welding Rays** protection will be provided by non-combustible or flame resistant screens, shields or suitable eye protection to workers or other persons adjacent to the welding operations. Booths and screens shall permit circulation of air at floor level.
- 6.7 Protective Clothing** will vary with the size, nature, and location of the work. Criteria for selection of protective clothing is as follows:
- 6.7.1 Gloves.** All welders and oxygen cutters shall wear protective gloves.
- For light work, durable flame-resistant cotton gloves should be used;
 - For heavier work, leather or other suitable durable flame-resistant materials should be used;
 - Insulated linings should be used to protect areas exposed to high radiant energy.
- 6.7.2 Aprons.** Aprons made of leather or other suitable flame-resistant materials should be used when additional protection against sparks and radiant energy is desired.
- 6.7.3 Treated Clothing.** Clothing treated with non-durable flame-retardant materials shall be retreated after each wetting or cleaning.
- Woolen clothing is preferable to cotton because it is not so readily ignited and helps protect the welder from changes in temperature;
 - Cotton clothing, if used, should be chemically treated to reduce its combustibility.
 - All outer clothing such as jumpers or overalls should be reasonably free from oil or grease.
- 6.7.4** Sparks may lodge in rolled-up sleeves or pockets of clothing or cuffs of overalls or trousers. It is recommended that sleeves and collars be kept buttoned and pockets be eliminated from the front of clothing. Trousers or overalls should not be turned up on the outside

6.0 EMPLOYEE PROTECTION (CONT.)

- 6.7.5 *Cape sleeves or shoulder covers* with bibs made of leather or other flame-resistant material should be worn during overhead welding or torch cutting operations.
- 6.7.6 *Skull Caps* made from flame-resistant material may be worn under helmets to prevent head burns.
- 6.7.7 *Leggings*. For heavy work, fire-resistant leggings or other equivalent means should be used.
- 6.8 **Hearing Protection**. For overhead welding and torch cutting, or welding and torch cutting in extremely confined spaces, ear protection is required. This may be accomplished by following Hilscher-Clarke's Hearing Conservation Program, and using the type of hearing protector.
- 6.9 **Electrical Protective Devices** will be used to protect employees from the possibility of electric shock when welding operations are performed in wet areas or areas where high humidity is present. Refer to Hilscher-Clarke's Electrical Safety policy and procedures for additional guidelines.

7.0 WORK IN CONFINED SPACES

No work is to commence until all requirements of Hilscher-Clarke's Confined Space Entry Policy and Procedure are met and a Hot Work Permit (Appendix B) is submitted, authorized and posted (at the confined space).

- 7.1** Mechanical ventilation will be provided during any confined space welding operation to prevent the accumulation of toxic materials or possible oxygen enrichment or deficiency.
- 7.2** All heavy and portable equipment used in confined space welding or torch cutting operations will be secured (in a location outside of the confined space) before operations begin.
- 7.3** When a welder must enter a confined space through a manhole or other small opening, the welder will be attached to a manned lifeline.
 - 7.3.1** The lifeline will be attached to not interfere with the welding operation or with the removal of the welder in case of an emergency.
 - 7.3.2** A preplanned emergency rescue procedure will be in place prior to the welding operations.
- 7.4** When arc welding operations are completed or temporarily stopped, all electrodes will be removed from the holders.
 - 7.4.1** The holders are to be carefully positioned and stored so that accidental contact cannot occur.
 - 7.4.2** Additionally, all machines will be disconnected from their power source.
- 7.5** Never use oxygen for, or in place of, ventilation.
- 7.6** Use continuous mechanical ventilation and a respirator whenever an employee welds or performs welding or torch cutting operations in a confined space.
- 7.7** All pipes, ducts, and power lines connected to the space, but not necessary to the operation should be disconnected or shut off. All shutoff valves and switches should be tagged and locked out (per Hilscher-Clarke's Lockout/Tagout policy) so they cannot accidentally be restarted.
- 7.8** All unnecessary torches and other gas or oxygen-supplied equipment should be removed from the confined space.

8.0 FIRE PREVENTION OR PROTECTION

- 8.1** The PAI, along with the designated Fire Watch will inspect areas where Hot Work is to take place and take proper measure to ensure fire hazards are eliminated or protected against.
- 8.1.1** If combustibles are within 35 feet of the welding area, welders will use guards and/or shields to contain sparks and slag.
- 8.2** Sweep floors clear of combustible material. If the floor itself is combustible, cover it with noncombustible material, such as sand, or wet it down. In the latter case, welders must be protected from possible shock by such means as standing on fire resistant, non-conducting mats.
- 8.3** A Hot Work Permit must be completed and followed where torch cutting and welding operations are conducted in close proximity to flammable, combustibles, hazardous materials or processes, and in confined spaces. Hot Work Permits are issued to assure that employees are aware of, and use, appropriate safeguards when conducting welding operations in these environments.
- 8.4** Welding or cutting activities will not be allowed in or near rooms containing flammable or combustible vapors, liquids, or dusts. If welding is required in these locations, all of the surrounding premises should be thoroughly ventilated and have frequent gas testing performed.
- 8.5** Closed containers that have held flammable liquids or other combustibles will be thoroughly cleaned and declared free of flammable or combustible materials and/or gases before welding or cutting.
- 8.6** A *Fire Watch* shall be required whenever welding or cutting is performed in locations where major fires could develop, or any of the following conditions exist:
- A significant amount of combustible material is closer than 35 ft. to the point of operation;
 - A significant amount of combustible material is more than 35 ft. away, but could be easily ignited by sparks;
 - Wall or floor openings within a 35 ft. radius expose combustible materials in adjacent areas, including concealed spaces in walls or floors.
 - Combustible materials are adjacent to the opposite side of metal partitions, walls, ceilings, or roofs and could be ignited by conduction or radiation.
- 8.6.1** More than one Fire Watch may be required, depending on the situation.
- 8.6.2** Fire Watch personnel shall have fire extinguishing equipment readily available and be trained in its use, as outlined in Hilscher-Clarke's Fire Safety Policy & Procedure.
- 8.6.3** A Fire Watch shall be maintained for at least 30 minutes after completion of welding or cutting operations when the above conditions exist.

10.0 VENTILATION GUIDELINES FOR WELDING OPERATIONS

- 10.1** Mechanical ventilation will be provided for welders and helpers when:
 - 10.1.1** Welding is being performed in a space less than 10,000 cubic feet per welder.
 - 10.1.2** A room has a ceiling height less than 16 feet.
 - 10.1.3** A confined space or welding space contains partitions, balconies, or other structural barriers to the extent that obstruct cross ventilation.
- 10.2** The minimum rate for mechanical ventilation will be 2,000 cubic feet per minute per welder unless exhaust hoods or air-supplied respirators are provided.
- 10.3** When using local exhaust hoods, they will be placed as close to the operation as possible.
 - 10.3.1** The exhaust hood will provide a rate of 100 linear feet per minute of air flow in the welding zone.
- 10.4** Air-supplied respirators will be used when mechanical ventilating is not possible or when materials such as beryllium and cadmium are used. Refer to Hilscher-Clarke's Respiratory Protection Program and/or Hilscher-Clarke's Cadmium Program for additional details.
- 10.5** Local exhaust ventilation or supplied respirators will be used when welding or torch cutting on coated metals (i.e., zinc, mercury, cadmium, lead, etc.) indoors or in confined spaces.
 - 10.5.1** Outdoors operations shall be done using respiratory protective equipment.

11.0 INSPECTIONS

- 11.1** All welding equipment including attachments and accessories will be inspected on a monthly basis by the site supervisor or his or her designee.
- 11.2** A written record, of this inspection, shall be made and kept in the job trailer for review by regulatory agencies.
- 11.2.1** This record shall include, at a minimum:
- Date of inspection;
 - Type of Equipment;
 - Equipment Number;
 - Equipment Serial Number;
 - Signature of employee performing the inspection.

12.0 FIRST AID EQUIPMENT

OSHA states “*In the absence of an infirmary, clinic, or hospital in near proximity 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. Adequate first aid supplies shall be readily available.*”

To achieve these requirements, Hilscher-Clarke shall, as far as is required by OSHA and is reasonably practicable, provide medical and first aid services during the performance of any and all Hot Work activity such as:

- ***Trained & Certified First Aid Providers;***
- ***First Aid Supplies, in accordance with 29 CFR 1910.151; and***
- ***Emergency/Evacuation procedures for injured person(s).***

When Hot Work activities are being performed an ANSI Z308.1 Type III 1st Aid Kit must be readily available at the work site. Hot Work activity shall not commence until the required 1st Aid Kit is inspected and in place.

- TYPE III – Intended for portable use in mobile industries and/or outdoor applications. Kits should be moisture resistant, equipped with a carrying handle, have the means for being mounted in a fixed position, and should also be corrosion resistant.

Appendix

Hot Work Permit (page 1 of 2)

This Hot Work Permit is required for any operation involving open flames or producing heat and/or sparks and must be completed by a Competent Hot Work Supervisor and posted at the site. Hot work includes but is not limited to: Brazing, Torch Cutting, Grinding, Soldering, and Welding.

If the required precautions cannot be met, and maintained, Hot Work is not permitted.

This permit is good for this shift only.	
Date Issued: _____	From: _____ Time
To: _____ Time	
Work to be done: _____ _____ _____	
Work Performed by:	
_____ Name	_____ Name
_____ Name	_____ Name
Fire Watcher(s) assigned? Yes <input type="checkbox"/> No <input type="checkbox"/>	
Name of Fire Watcher(s): _____	
Safety Checklist	
<input type="checkbox"/> Available sprinklers, hose streams, & extinguishers are in service/operable. <input type="checkbox"/> Hot work equipment in good repair. Requirements within 35 ft. of work <input type="checkbox"/> Flammable liquids, dust, lint and oil deposits removed. <input type="checkbox"/> Explosive atmosphere in area eliminated. <input type="checkbox"/> Floors swept clean of combustibles. <input type="checkbox"/> Combustible floors wet down, covered with damp sand or fire resistant sheets. <input type="checkbox"/> Remove other combustibles where possible. Otherwise protect with fire-resistant tarpaulins, screens or shields. <input type="checkbox"/> All wall and floor openings covered. <input type="checkbox"/> Fire resistant tarpaulins suspended beneath elevated hot work. Work on walls, ceilings or enclosed equipment <input type="checkbox"/> Construction is noncombustible and without combustible covering or insulation. <input type="checkbox"/> Combustibles on other side of walls moved away. <input type="checkbox"/> No danger exists by conduction of heat into another room or area. <input type="checkbox"/> Enclosed equipment cleaned of all combustibles. <input type="checkbox"/> Containers purged of flammable liquids and vapors.	Fire Watch/Hot work area monitoring <input type="checkbox"/> Fire watch will be provided during and continuously for 30 minutes after work, including during any work breaks. <input type="checkbox"/> Fire watch is supplied with suitable extinguishers. <input type="checkbox"/> Fire watch is trained in use of this assigned equipment and in sounding alarm. <input type="checkbox"/> Fire watch may be required for adjoining areas, above and below. <input type="checkbox"/> Hot work area inspected 30 minutes after job is completed. Other precautions taken <input type="checkbox"/> Confined space entry permit required. <input type="checkbox"/> Area is protected with smoke or heat detection. <input type="checkbox"/> Ample ventilation to remove smoke/vapor from work area. <input type="checkbox"/> First Aid equipment readily available at work site. <input type="checkbox"/> Lockout/Tagout required. <input type="checkbox"/> Respiratory protection required. <input type="checkbox"/> Comments:

Hot Work Permit (page 2 of 2)

Signatures Required Before Beginning Work (all employees involved in the performing of work, as identified on page one of this form must sign):

I have been instructed and I understand the hazards as well as the precautions necessary to do this work safely.

Signature of person performing work

Signature of person performing work

Signature of person performing work

Signature of person performing work

Signatures Required After Completing Work (all employees involved in the performing of work, as identified on page one of this form must sign):

This work was completed: _____ am pm
Date Time

Signature of person performing work

Signature of person performing work

Signature of person performing work

Signature of person performing work

I have personally inspected the worksite after completion of the work and find the area to be in safe condition.

Signature of Permit Authorizing Individual

Date

Time

am pm

Fire Watch Checksheet

Building or Adjacent Structure:		Site or Specific Location:		
Prime Contractor	Subcontractor		Onsite Contractor	
General Set-Up				
	Yes	No	N/A	Remarks
Has a Hot Work Permit been issued?				
Has Hot Work equipment to be used been inspected?				
Potential for fumes/by-products to travel to other areas?				
Are all guards/barriers/barricades in place?				
Do detectors/suppression systems require deactivation?				
ANSI Z308.1 Type III 1 st Aid Kit inspected & readily available				
Precautions To Be Taken Within 35 Feet Of Hot Work Operations				
	Yes	No	N/A	Remarks
All flammable liquids, dusts, lint and oil deposits removed?				
Explosive atmosphere in area eliminated?				
Floors swept clean?				
Combustible floors wet down or covered with fire blankets?				
All wall openings and floor openings/drains covered?				
Fire resistant tarpaulins suspended beneath work?				
Any adjacent combustible coverings/insulation present in area of hot work?				
Any heat transfer/condition potential to any combustible material through wall?				
Any enclosed equipment being worked on cleaned of all combustibles?				
Any enclosed container being worked on purged of flammable liquids/vapors?				
Competent Person and/or Permit Authorizing Individual				
Area checked for explosive gases and low oxygen?				
Set-up and precautions verified?				
Fire Watch/Hot Work Monitoring				
Nearest Location of Pull Station/Telephone:				
Fire Extinguisher(s) at Work Site:		Type:	Size:	
<input type="checkbox"/> Prime Contractor Supervisor Signature: _____ <input type="checkbox"/> Onsite/Other Supervisor Signature: _____ <input type="checkbox"/> Fire Watch Signature: _____				
Hot Work Operation Started: _____ <input type="checkbox"/> am <input type="checkbox"/> pm Hot Work Operation Ended: _____ <input type="checkbox"/> am <input type="checkbox"/> pm				

Return Original Permit and Daily Checksheet(s) to Site Supervisor when operations are complete.