Non-Electrical Hot Work (NEHW) Program

1 Purpose and Scope:

1.1 This program provides guidance for developing an effective process to manage hot work operations. All property losses caused by hot work as an ignition source are preventable. Under the right conditions, hot work heat sources with the lowest temperature ratings can easily ignite products that seem most difficult to burn.

2 Responsibility:

2.1 It is the responsibility of all supervisors to ensure employees involved in hot operations are trained in the requirements of the NEHW program. This includes the safe operation of their equipment and safe operation of the process.
2.2 It is the responsibility of the supervisor (foreman) to inspect the work area and authorize the NEHW.
2.3 It is the responsibility of the supervisor (foreman) to notify the safety department if NEHW is to be conducted in a confined space.
2.4 It is the responsibility of all employees involved in NEHW to follow the requirements of the NEHW program.
2.5 The Safety Department Manager is responsible for reviewing and updating the NEHW program annually.
2.6 The safety department is responsible for authorizing NEHW in a confined space.

3 Policy:

3.1 Definitions:

3.1.1 NEHW is any operation involving open flames or producing heat and/or sparks. This includes but is not limited to: brazing, cutting, soldering, welding, heat guns and grinding.

3.1.2 NEHW Permit is the document required when any temporary or non-routine operation involving open flame or spark-producing work consistent with Article 49 of the California Fire Code.

3.1.3 Fire Watch is a person who is trained in the use of fire extinguishing equipment and maintains constant watch during NEHW operations and initiates incipient level fire suppression when fire occurs.

3.2 Planning:

3.2.1 Avoid hot work whenever possible. Consider alternative methods to hot work. Some alternatives include:

a. Manual hydraulic shears vs. saw/torch cutting.
b. Mechanical bolting vs. welding.
c. Screw or flanged pipe vs. sweat soldering.
d. Reciprocating saw vs. radial saw.

3.2.2 Prohibit hot work in areas where hot work cannot be conducted safely under any conditions or where extensive preparation and planning are required to make the area/equipment fire safe. These areas may include:

a. Areas/equipment that contain/handle flammable liquids, flammable gases, combustible dusts or combustible metals.
b. Partitions, walls, ceilings or roofs with combustible plastic coverings or cores (e.g. expandable plastic insulation, sandwich cores).
c. Oxygen enriched atmosphere.
d. Areas which handle/store oxidizer materials.
e. Areas which handle/store explosive materials.

3.2.3 Fire extinguishing equipment shall be readily available during all hot work operations.

3.2.4 The jobsite Foreman is responsible for site inspection and authorization of hot work.

3.2.5 Before hot work is authorized, the area will be inspected. Inspections shall be documented on the hot work permit.

3.2.6 First Aid equipment shall be made available at all times.

3.2.7 Employees responsible for the maintenance, use, or repair of oxygen, or fuel gas supply equipment, must be trained and evaluated by a competent person prior to the assignment of duties

3.2.8 Prior to the assignment of duties, supervisors must ensure that all employees have been properly trained and certified to operate arc welding and cutting equipment.

3.2.9 Employees who operate welding and cutting equipment shall operate the equipment according to the manufacturer's instructions and / or recommendations.

3.2.10 Employees that maintain and / or repair welding and cutting equipment shall be trained by the manufacturer and / or their authorized representative.

3.3 When hot work must be conducted in areas or equipment containing hazardous processes described above, follow the precautions outlined below.

3.3.1 When possible, relocate hot work to a suitably arranged and isolated fixed hot work station. Locate fixed hot work in areas with secured and sealed one-hour fire-rated non-combustible barriers over combustible floors, walls and ceilings. Maintain the hot work station free of combustible material or an open space not less than 35 feet. Provide manual fire extinguishers throughout the hot work station area.

3.3.2 If materials cannot be relocated to a fixed hot work station and hot work is unavoidable, implement the Non-Electrical Hot Work Permit System. Ensure the following fire prevention precautions are in place prior to starting the hot work.

a. Ensure sprinklers and other fixed fire protection equipment is in service and operable.
b. Provide manual firefighting equipment appropriate for the construction/occupancy hazards in the hot work area.
c. Inspect and maintain hot work equipment prior to use.
d. Separate hot work operations from combustibles by a minimum of 35 feet. An alternative is to use proper fire-resistive welding blankets and screens to isolate hot work from adjacent combustibles and/or occupancies.
e. Sweep floor clean. Remove grease or oil. Cover with fire-resistive tarps/covers.
f. Remove flammable liquids, dust and/or lint from hot work area.
g. Cover all floor and wall openings with fire-resistive tarps/covers.
h. Close all doors and fire doors to prevent sparks from escaping.
i. Eliminate any present or potential explosive atmospheres (dust or vapor). Continuously monitor the area for accumulation of combustible gases before, during and after hot work.
j. Secure, isolate and vent pressurized vessels, piping and equipment as needed prior to initiating hot work. Clean

combustible and/or flammable materials whenever present.

3.3.3 Avoid hot work of any kind in areas handling, processing or storing flammable liquids or gases. Ideally, relocate any hot work operation within a flammable liquid or gas occupancy to a non-hazardous location. When relocation is not possible, the following additional precautions shall be implemented:

a. Drain all equipment or piping in the area of flammable and combustible liquids.
b. Steam clean all equipment/piping to be worked on or purge with an inert atmosphere to prevent creation of flammable vapors.
c. Shut off pipe supplying the area with flammable liquids/gases at the source. LOTO all valves to prevent unexpected opening. If the pipe is to be worked on, blank it off.
d. Use a portable 02 monitor to ensure the pipe/equipment does not contain sufficient oxygen to support combustion.
e. Protect all permanent tanks or piping that cannot be drained from physical contact and heat from hot work equipment.
f. Keep mechanical exhaust ventilation in the room/building in operation.
g. Use portable combustible gas monitor before and during work. If any detectable readings are obtained work cannot begin until the source is located and eliminated.

3.3.4 NEHW in confined space (for complete entry guidelines, reference Confined Space Entry Program).

a. Ventilation is a pre-requisite for work in a confined space.
b. Local exhaust ventilation must be provided when welding, cutting, or heating in a confined space.
c. When sufficient ventilation cannot be obtained without blocking the means of access, workers in the confined space must be provided with supplied air respirators.
d. Workers must be attached to a lifeline at all times while in the confined space. Means must be provided to quickly remove the worker in case of an emergency and another employee capable of initiating rescue operations must be outside at all time.
e. Continuous air monitoring shall be conducted while the work is being performed on NEHW in a confined space.
f. An attendant shall be stationed outside the confined space and shall maintain communication with the worker at all times.
g. Cylinders containing fuel gas or oxygen must not be taken into a confined space.

3.3.5 Protecting workers from the hazards associated with NEHW.

a. Local ventilation or air supplied respirators must be provided in enclosed space when welding, cutting, or heating metals containing zinc, lead, cadmium, chromium, mercury and beryllium (beryllium requires both local ventilation and air supplied respirators).
b. Torch gas supply must be shut off outside an enclosed space when not in use and left unattended for a substantial period of time such as a lunch break.
c. Torches and hoses must be removed from enclosed spaces overnight and at shift changes.
d. Open-end fuel gas and oxygen hoses must be immediately removed from enclosed spaces when they are disconnected from the torch or other gas-consuming device.

3.4 Equipment:

3.4.1 Gas Welding and Cutting:

a. Valve protection caps must be in place and secured when transporting gas cylinders.
b. Hoisted cylinders must be secured on a cradle, slingboard or pallet.
c. Cylinders must be in vertical position when transported by powered vehicles.
d. Valve protection caps must not be used for lifting cylinders.
e. Cylinders not firmly secured on a specially designed carrier must have regulators removed and caps put in place before moving.
f. A cylinder truck, chain or other steadying device must be used to keep cylinders from being knocked over while in use.
g. Cylinder valves must be closed when empty or being moved.
h. Compressed gas cylinders must be secured in an upright position at all times.
i. Oxygen and fuel-gas cylinders in storage must be separated from each other or combustible materials at least 20 feet or a 5-foot high noncombustible wall with a minimum fire resistance rating of one-half hour.
j. Cylinders should be stored in assigned places away from elevators, stairs or gangways.
k. Cylinders in use must not be within reach of sparks, hot slag or flame unless fire resistant shields are provided.

l. Cylinders must be placed where they cannot become part of an electrical circuit.
m. Electrodes must not be stuck against a cylinder.
n. Cylinders containing oxygen or fuel gas must not be taken into confined spaces.
o. Cylinders, whether full or empty, must not be used as rollers or supports.
p. Damaged or defective cylinders must not be used and must be removed from service.
q. Before connecting the regulator, the cylinder valve must be opened slightly, and then closed.
r. Cylinder valves must always be opened slowly to prevent damage to the regulator.
s. The cylinder valve must always be closed and gas released before removing the regulator.
t. Hoses must be inspected before each shift and removed from service if defective.
u. Hoses, cables and other equipment must be kept clear of passageways, ladders and stairs.
v. Torches must be lighted by friction lighters and not by matches or hot work.

3.4.2 Arc Welding and Cutting:

a. Employers must instruct employees in the safe means of arc welding and cutting.
b. Only manual electrode holders designed for arc welding and cutting are allowed to be used.
c. Any current-carrying parts passing through the portion of the holder and outer surfaces of the jaws must be fully insulated.
d. All arc welding and cutting cables must be of the completely insulated, flexible type.
e. Only Undamaged cable, free of repair, can be used within 10 feet from the electrode holder.
f. Connected or spliced lengths of cable must have substantial insulation connectors of a capacity at least equivalent to that of the cable in use.
g. Cables connected by metal lugs must be securely fastened together for good electrical contact and exposed metal parts must be completely insulated.
h. Damaged cables in need of repair must not be used.
i. A ground return cable must have safe current-carrying capacity equal to or exceeding the maximum output capacity of the arc welding and cutting unit.
j. A ground return cable serving more than one unit must have safe current-carrying capacity of the total maximum output capacity of all connected units.

k. Pipelines containing gases or flammable liquids, or conduits containing electrical circuits, must not be used as a ground return.
l. Structures or pipelines used as ground return circuits must have electrical contact at all joints.
m. The generation of an arc, sparks, or heat at any point must cause rejection of the structure or pipeline as a ground return circuit.
n. Structures or pipelines used as a ground return must have all joints bonded and periodically inspected to ensure no unsafe conditions such as a fire hazard or condition of electrolysis.
o. The frames of arc welding and cutting machines must be grounded through a third wire in the cable or a separate wire grounded at the source of current.
p. Ground connections must be inspected to ensure they are mechanically strong and electrically adequate for required current.
q. Electrode holders left unattended must have electrodes removed and holders must be placed to prevent contact with employees or conduction objects.
r. Hot electrode holders must not be dipped in water.
s. The equipment power switch must be turned off whenever leaving the machine, stopping work for any appreciable length of time, or moving the machine.
t. Whenever practicable, arc welding and cutting operations must be shielded by non-combustible or flameproof screens, which protect other employees from direct rays.

3.5 Fire Watch:

3.5.1 Fire Watch is required whenever welding or cutting is performed in locations where other than a minor fire might develop, or any of the following conditions exist:
a. Appreciable combustible material, in building construction or contents, closer than 35 feet to the point of operation.
b. Appreciable combustible materials are more than 35 feet away but are easily ignited by sparks.
c. Wall or floor openings within a 35-foot radius which expose combustible material in adjacent areas including concealed spaces in walls or floors.
d. Combustible materials are adjacent to the opposite side of metal partitions, walls, ceilings, or roofs and are likely to be ignited by conduction or radiation.

3.5.2 The assigned Fire Watch shall be trained in the use of fire extinguishing equipment and be familiar with the facility for sounding an alarm in the event of a fire.

3.5.3 Fire Watch shall be in place and monitor the area during, and for 45 minutes after the hot work is completed, including coffee or lunch breaks.

3.5.4 Fire Watch shall be equipped with suitable fire extinguishing equipment.

3.5.5 Fire Watch is responsible for inspecting his/her fire extinguishing equipment prior to any hot work.

3.5.6 Fire Watch shall watch for fires in all exposed areas and try to extinguish them when obviously within the capacity of the equipment or otherwise sound the alarm.

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NON-ELECTRICAL HOT WORK PERMIT

BEFORE INITIATING HOT WORK: CAN THIS JOB BE AVOIDED?
IS THERE A SAFER WAY?

This Non-Electrical Hot Work/Open Flame Permit is required for any temporary or non-routine operation involving open flame or spark-producing work consistent with Article 49 of the California Fire code. This includes, but is not limited to: Brazing, Cutting, Grinding, Soldering, Chop Saws, Thawing Pipe, Torch applied Roofing Hot Guns, Space Heaters, Heat or Hot Air Guns, Hot boxes and all Welding.

PERMIT INSTRUCTIONS

1. Firesafety Supervisor:
   A. Verify precautions listed at right (or do not proceed with the work)
   B. Complete and retain PART 1
   C. Issue PART 2 to Security
   D. Issue PART 3 to Job Site

HOT WORK BEING DONE BY:
☐ Sub-Contractor _____
☐ Employee _____

DATE	JOB NO.

LOCATION - BUILDING, FLOOR, POLE

NATURE OF JOB

NAME OF PERSON DOING HOT WORK

I verify the above location has been examined, the precautions checked on the Required Precautions Checklist have been taken to prevent fire, and permission is authorized for this work.

SIGNED: (FIRESAFETY SUPERVISOR/OPERATIONS SUPERVISOR)

PERMIT EXPIRES	DATE	TIME	AM PM

NOTE EMERGENCY NOTIFICATION ON BACK OF FORM

THERMA

REQUIRED JOB START CHECKLIST:

- ☐ Available sprinklers, hose streams and extinguishers are in service/operable
- ☐ Hot Work equipment in good repair
- ☐ Building fire alarm system placed in appropriate mode

Required within 35ft (11m) of work

- ☐ Flammable liquids, dust, lint and oily deposits removed
- ☐ Explosive atmosphere in area eliminated
- ☐ Floor swept clean
- ☐ Combustible floors wet down, covered with damp sand or fire-resistent sheets
- ☐ Remove other combustibles where possible. Otherwise protect with fire resistent tarpaulins or metal shields
- ☐ All wall and floor openings covered
- ☐ Fire-resistent tarpaulins suspended beneath work

Work on walls or ceilings

- ☐ Construction is noncombustible and without combustible covering or insulation.
- ☐ Combustibles on either side of walls moved away.

Work on enclosed equipment

- ☐ Enclosed equipment cleaned of all combustibles.
- ☐ Containers purged of flammable liquids/ vapors.
- ☐ Pressurized vessels, piping and equipment removed from service, isolated, and vented.

Fire Watch/Hot Work area monitoring

- ☐ Fire Watch will be provided during and for 45 minutes after work, including any coffee or lunch breaks.
- ☐ Fire watch is supplied with suitable extinguishers, and, where practicable, charged small hoselines.
- ☐ Fire watch is trained in use of this equipment and sounding the alarm.
- ☐ Fire watch may be required for adjoining areas, above and below.
- ☐ Monitor Hot Work for 4 hours after job is completed.

Other Precautions Taken

☐ _____

(PART 1 GOLD - Firesafety Supervisor) (PART 2 PINK - Security) (PART 3 MANILA - Job Site)