

Linn Benton Community College
Hot Work Program

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I. Hot Work Management

Introduction

Hot work comes in a variety of applications, each with its own heat source. All hot work is a fire hazard that can ignite products and create a high probability for property loss.

Hot work is a temporary or permanent operation involving open flames and producing heat and/or sparks. Such work may be due to normal processes, periodic maintenance activities, new construction, or emergency repairs and may involve: cutting, brazing, welding, grinding, soldering, torch applied roofing, etc.

Alternatives

Avoid hot work when possible. Some alternative methods include:

- Manual hydraulic shears vs. saw/torch cutting
- Mechanical bolting vs. welding
- Screwed or flanged pipe vs. sweat soldering
- Reciprocating saw vs. radial saw
- Standard mechanically attached/fully adhered approved roof system vs. a torch applied roof system
- Mechanical pipe cutter vs. torch or radial saw cutting
- Approved self-drilling or compressed air-actuated steel roof deck fasteners vs. puddle welding
- A roof covering system that is not torch-applied instead of one which is torch-applied.

Prohibited Hot Work Areas

Areas where hot work cannot be conducted safely under any conditions or where preparation required would be so extensive to make the area fire-safe, should be designated as a “No Hot Work Area” and posted as such. These areas could include:

- Areas containing or handling flammable liquids, gases, combustible dusts or metals.
- Partitions, walls, ceilings or roofs with combustible plastic coverings or cores (e.g., expanded plastic insulation, sandwich panels)
- Rubber lined equipment
- Oxygen enriched atmosphere
- Areas storing and handling oxidizer materials
- Areas storing and handling explosives

Relocate

When hot work cannot be conducted in areas containing hazardous processes, the work should be

relocated to a suitable hot work station or in an area that can be made suitable - noncombustible buildings or combustible building areas with secured and sealed 1 hr fire rated noncombustible barriers over combustible floors, walls and ceilings. Maintain the fixed hot work station free of combustible materials and isolate it from surrounding combustible occupancies with physical non-combustible enclosures or open space of at least 35 ft from where the hot work will occur. If hot work is unavoidable, use the least hazardous form of hot work that will get the job done.

II. Hot Work Permit System

Manage any hot work conducted outside of a designated, fixed (non-permitted) hot work station using a formal hot work permit system.

Precautions

Fire prevention precautions for areas where permitted hot work include:

- Maintain fire protections systems in service and fully operational (sprinkler valves/risers).
- Provide manual firefighting equipment appropriate for the construction/occupancy hazards
- Separate hot work operations from combustibles by a minimum of 35 ft (11 m) of open space from grade level hot work areas. An alternative is to use proper fire resistive welding blankets and screens to properly isolate the hot work from the adjacent combustible occupancies.
 - a) Sweep floors clean, removing any spilled grease or oil. Cover floors made of combustible material (e.g., boards on joist, plank on steel, wood block) with fire-resistant tarpaulins or other noncombustible material.
 - b) Remove any flammable liquids (paints, oils and lacquers) from the hot work area.
 - c) Protect combustibles that cannot be moved with fire resistive tarpaulins or metal shields including all storage or machinery with grease or lint deposits.
 - d) Cover all wall and floor openings. Plug floor openings with an approved fire stop material. Seal ductwork and duct openings with metal covers or cover them with fire-resistive tarpaulins. Close all doors and fire doors to prevent sparks from escaping.
- Eliminate explosive atmospheres (dust or vapor) or prohibit the hot work. Shut down any process that produces explosive atmospheres, and continuously monitor the area for accumulation of combustible gases before, during, and after hot work. Prohibit hot work where accumulations of volatiles or combustibles are cannot be eliminated.
- Prohibit hot work on partitions, walls, ceilings or roofs with combustible plastic coverings or cores (e.g., expanded plastic insulation, sandwich panels).
- Schedule hot work during shutdown periods if possible.

- Secure, isolate, and vent pressurized vessels, piping, and equipment as needed prior to initiating hot work.
- Clean combustible and/or flammable liquids, gases and solids whenever present within the equipment, prior to initiating hot work.
- For hot work on vessels or boilers, use only contractors who are qualified by a nationally or internationally recognized boiler and pressure vessel code.
- Assign a designated fire watch to the hot work operation before this work is started. **Maintain a continuous fire watch during the hot work activity**, throughout all break and lunch periods, **and for at least one hour following** the completion of the hot work. Beyond this, **monitor the area for up to an additional 3 hours**, depending on local conditions.
- 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 should be implemented:
 - a) Drain all equipment or piping in the area of flammable and combustible liquids.
 - b) Steam clean equipment or pipe to be worked on or provide with an inert atmosphere to prevent creation of a flammable atmosphere
 - c) Shut off pipe supplying the area with flammable and combustible liquids off at the source (valve should be locked shut to prevent unexpected opening). If the piping is to be worked on, blank it off.
 - d) Check equipment or piping with an approved portable oxygen analyzer before and during the hot work. This is to ensure that sufficient oxygen to support combustion is not present inside the equipment or piping.
 - e) Protect all permanent storage tanks or piping (that cannot be moved or drained) against physical contact and heat from hot work equipment. Preferably all equipment that is within reach of the hot work equipment (grinder, welding rod holder, cutting torch, etc.) will be drained, purged and inerted. If this is not possible due to the quantities of flammable liquids, provide physical protection for closed flammable liquid equipment by placing welding curtains and temporary barriers between the equipment and the hot work. Carefully review the area to ensure that no vents or other openings are near the hot work that could allow fumes to come into contact with any sparks or hot surfaces.
 - f) Keep mechanical exhaust ventilation in the room/building in operation.
 - g) Use a portable combustible gas analyzer before and during the work. If any detectable readings are obtained, then work cannot begin or continue until the source is found and suitably mitigated such that the concentration is maintained below 10% of the LFL.

- Negotiate contracts with the following considerations:
 - Contractors must be required to adhere to policies and procedures established for hot work operations at the facility. Contractors should be formally indoctrinated prior to starting work.
 - Does the contract spell out exactly what services or work is expected?
 - Especially for hot work, does the contract stipulate that LBCC's policies are to be followed?
 - Is the contractor required to have liability insurance to the limit of what could go wrong and be able to produce a certificate of that insurance before work starts?

LBCC's Hot Work Permit

A Hot Work Permit is required before beginning any operation involving open flames or producing heat and/or sparks. This includes, but is not limited to:

welding, brazing, cutting, grinding, soldering, thawing pipes or using a torch to heat material or apply roofing, the use of propane heaters, and/or the use of any pyrotechnic device.

A Hot Work Permit is NOT required in locations that have been identified by Safety & Loss Prevention as "Designated Hot Work Areas." Designated hot work areas are locations such as the Welding, Heavy Equipment/Diesel, Machine Tool, Auto Tech, Grounds or Maintenance shops or other permanent hot work stations where hot work is a regular part of the process. Hot Work Permits will be issued in these areas on an annual basis each August or September, following a successful annual inspection.

Hot work is not permitted in certain confined space (as identified by Safety & Loss Prevention and/or Maintenance) or in potentially explosive atmospheres, unpurged gas cylinders, chemical lines or chemical containers. If there is any question regarding the safety of the operation, an onsite inspection will be performed by personnel qualified to evaluate the hazard in question.

Hot Work Permits are issued by the **Facilities Director, Safety & Loss Prevention Director, or designated personnel** that are trained in recognizing the hazards (see attached inspection checklist). The list of those authorized to issue permits will be reviewed annually by Safety & Loss Prevention, attached to this plan, and available in the Safety & Loss Prevention Office, Red Cedar Hall Room 119. Those designated to issue Hot Work Permits must annually complete Hot Work Program training found at the online safety training Moodle site - <http://elearning.linnbenton.edu/course/category.php?id=67>

This program applies to all hot work performed on Linn-Benton Community College property, including hot work activities conducted by outside contractors during remodel, renovation, or repair projects. The only exception to this rule exists if/when Linn-Benton Community College authorizes work to be done under a general construction permit during new construction, when hot work (including fall out) is confined to the secured construction site.

☐ **To obtain a Hot Work Permit, fill out the “Hot Work Permit” form in the appendix (Appendix A) or available online, read and review the Hot Work Decision Tree (Appendix B) and Fire Watch Guidelines (Appendix C).**

Your permit must be completed prior to the start of the work and posted on site during the work. A copy must be given to Safety & Loss Prevention at (541) 917-4309 in RCH-119.

Fire Watch

The fire watch should be assigned and initiated when the hot work permit is issued. This function **should be maintained throughout the hot work operation including breaks/lunch and for 1 hour continuously following** the completion of hot work. A fire watch should be posted and maintained in the immediate area of the hot work and in any adjacent areas that may be exposed by this operation. Additionally, the area must be monitored for up to an additional 3 hours, depending on local conditions.

The fire watch should be trained to recognize the area construction and occupancy hazards. That person also should be capable of operating manual firefighting equipment in the hot work area. Additionally, he or she should know the facility procedures for emergency notification to the Campus Public Safety Office and emergency responders in the event of an emergency condition.

For any hot work operations on a building roof or adjacent to building walls where combustible content exists within the structure or the building has any combustible construction, a second fire watch should be posted in the exposed adjacent areas. **For roof level hot work, a second fire watch should be posted on the floor immediately below** for roof hot work. Where suspended ceilings are present between the building occupancy and the underside of the structural roof, this space should be inspected periodically during the hot work operation.

Hot work conducted on any building floors/walls or adjacent to building walls with unprotected openings **where combustible content or construction exists on the opposite side should include assignment of a second fire** watch on the opposite side of the wall. This same approach should apply when hot work is conducted on pipe/ building shafts, HVAC ductwork, etc.

A facility employee should always be assigned to directly supervise outside contractors. Contractors should not be allowed to authorize their own hot work permits and should never be allowed to impair fixed fire protection equipment without direct authorization from designated campus personnel. *Review* hot work safety procedures and the Hot Work permit system used at your facility with contractors before performing hot work.

Managing Hot Work

Managing hot work and minimizing the risk of property loss caused by hot work involves education of management, employees, and contractors about the causes of hot work fires and explosions and factors that make them more severe. Management, employees, and contractors must accept full responsibility for controlling hot work operations. A hot work program is effective only if it is properly maintained, reviewed, and updated as needed. Facility personnel involved with overseeing this process must understand all the construction and occupancy hazards within their facility. Alternative methods to hot work should be seriously considered for every job. Personnel who directly authorize and supervise hot work management should not allow shortcuts in fire prevention efforts when hot work is the only acceptable alternative.

Hot Work permits issued will be logged by the issuing department personnel (facilities or Safety & Loss Prevention) in a shared spreadsheet. Process audits will be conducted by department management and Public Safety Officers to ensure compliance to this program.

Permit Issued By: _____

(by issuing this permit, I acknowledge assessment of the work area and that proper precautions have been taken for hot work to be done)

Email Address: _____ Phone Number: _____

Permit Issued To: _____ Signature: _____

Location of Work: _____

Work Start Date: _____ Time: _____

Nature of Work: _____

Comments: _____

Fire Watch Designation: _____

REQUIRED: If you cannot check each of the following boxes, contact Safety & Loss Prevention before beginning hot work.

You have reviewed the Hot Work Decision Tree, and there is no acceptable alternative to hot work.

Flammable liquids, dust, oily deposits, and combustibles within 35 feet of the hot work have been removed, or non-combustible shields/covers are provided.
 Combustible materials on other side of wall, floor, roof moved away.

[] And wall openings, if present, are covered and protected.

Tools and equipment are in safe working condition, with guards and safety devices in place.

The correct type and size of fire extinguisher is at the hot work site.

Fire sprinkler protection, if installed, is fully open and is operational.

Fire-resistant tarps will be suspended beneath the work area if needed, vent and floor openings and combustible structures covered (if they are unable to be removed).
 Floor wet down if necessary.

Explosive atmosphere must be eliminated. [containers purged of flammable liquids/gasses]

Constant mechanical ventilation and/or combustible gas monitoring equipment will be provided if needed. Monitoring will be continued throughout the work period.

Post copy in the work area & submit a copy of this permit to Safety & Loss Prevention.

Warning!

**Hot Work in Progress
Watch for Fire!**

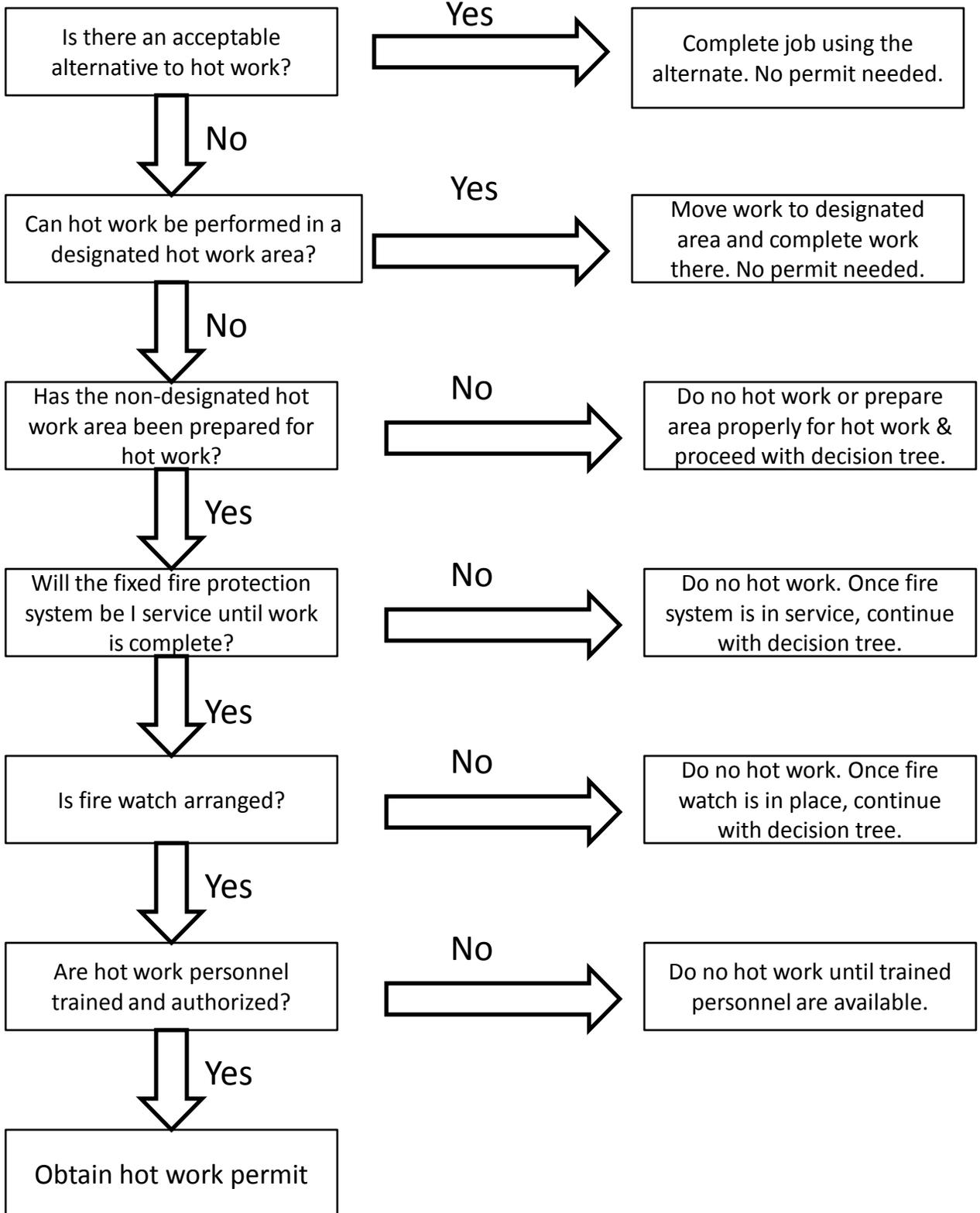
In case of Emergency:

Call: _____

At: _____

Hot Work Decision Tree

Appendix B



Appendix C

Fire Watch Guideline

