Hot Work

Procedure

Document No.: Safety / Hot Work
Issue #: 06
Date of Issue: 01/25/2023

Authorized by: The Mill Safety Department

Invalid 24 hours After Printing

Contents

Purpose
Scope
References – Not Included
Responsibilities
Definitions
Procedure
Documentation – Not Included
Distribution – Not Included

Newest Updates are highlighted yellow.

Purpose

To prevent loss of life and property from fire or explosion because of hot work, this procedure provides guidelines ensuring a safe work environment for Woodland employees, as well as outside contractors and for those who supervise and perform hot work involving ignition source activities such as welding, open flame work, cutting, grinding, power sanding and heat-treating.

Scope

This Procedure applies to all work involving ignition sources.

1. Define the responsibilities and provide guidelines to minimize the exposure of ignition sources to combustible, flammable, or explosive mixtures.
2. Implement controls for on-site personnel performing work that involves the use of ignition sources.
3. Establish criteria for evaluating safety precautions for work involving ignition sources.
4. Outline monitoring guidance for initial fire watch monitoring and additional fire watch surveillance monitoring.

Responsibilities:

Prior to, during, and after hot work the following requirements must be fulfilled.

Supervisors Note: The supervisor may delegate their authority to perform his/her tasks and duties as delineated in this procedure to a designated qualified individual.

- The maintenance and operations supervisor are responsible for inspection of the work site prior to commencement of work involving ignition sources to determine the fire and explosion precautions necessary for the safe performance of the work. This inspection will provide necessary information for completing the hot work permit. Sign off that this is complete will be required before the permit can be issued.
- Ensures checklist on back of permit has been completed and all precautions have been met.
- After normal hours it is acceptable for operations to sign both lines when they are acting in the capacity of maintenance/operations supervisor for emergency work.
- Indicates in writing the precautions and actions that must be taken prior to starting hot work. This is accomplished by completing the Hot Work Permit. Special precautions must be noted.
- Ensures there is a continuous water supply available for high-risk areas.
- Protects critical equipment.
- Reviews the Hot Work Management Procedure Checklist to ensure compliance with the items listed.
- Signs and issues the hot work permit for each specific job. (With legible signature)
- Issues separate hot work permits for each area where hot work is to be done.
- Issues separate hot work permits for instrumentation and electrical equipment that is brought into an area on a temporary basis that does not meet the area's electrical classification.

Precautions must be established prior to turning on the instrument or connecting the equipment to the energy source.

- Designates an additional fire watch and issues a hot work permit when a fire watch cannot perform the entire scope of his/her assigned tasks. Examples of conditions requiring additional watches and hot work permits include:
    - Compressed gas cylinders containing flammable gas, or an oxidizer located outside an approved area that cannot be seen from the watch location.
    - Welding and cutting that may impact cable trays which cannot be seen from the watch location near the hot work or extinguished using the media assigned for the hot work.
- Posts the hot work permit or provides it to the individual, for posting, who will be performing the hot work.
- Makes a modification in the work performed or implement precautions to address new hazards before continuing the hot work if the job site changes. The permit should be reviewed and updated as needed or a new permit issued if required.
- Inspects the work area or has their designee inspect the area each shift that involves hot work.
- Ensures a final inspection is done after the job is complete.
- Ensures a surveillance program has been established with an initial 60-minute monitoring starting immediately after the job has been completed.
- Ensures operations sign off and take over for the 6-hour surveillance when the initial 60 minutes has been completed. Operations then provides the completed hot work permits to the safety manager for record keeping and auditing purposes, with PSM permits provided to PSM Coordinator.

Safety Department

- Evaluates and verifies that the requirements of this procedure are being strictly followed.
- Provides guidance in resolving issues involving the fire protection program requirements of this procedure after considering NFPA 51B.
- Determines if practices at the facility are acceptable based on Woodland Mill Safety Procedures, Loss Prevention Guidelines, and Regulatory Requirements.
- Leads in the investigation of fires associated with hot work at the facility.
- Implement measures to improve or correct unsatisfactory results associated with the performance of hot work.

Fire Watch **Note- Fire watch will be required for all hot work jobs!**

- Designated person other than the person doing the hot work that monitors and ensures that safe conditions are maintained during and after the hot work.
- A fire watch is required for each ignition source if designated on the hot work permit for the job or area. A fire watch may cover more than one ignition source as long as:
    - It is physically possible to do so, and the issuer of the hot work permit deems it acceptable.
    - Each ignition source can easily be seen or monitored.
    - Additional hazards are not created.
    - It is communicated to personnel performing the hot work.
- Fire Watch needs to be competent in the following matters:
    - The difference between incipient stage and structural fires
    - Incipient stage fire fighting
    - Selection of the appropriate extinguisher and media for different types of fire hazards
    - Selection and use of required personal protective equipment.

  - Activation and use of appropriate firefighting equipment. Note: training must be provided on an annual basis for personnel that may use a fire extinguisher.
- Duties of the Fire Watch:
  - In the event of a fire emergency, the fire watch must call 9-1-1 from a mill phone or radio 700911 or cell phone (207)427-6400.
  - Review the hot work permit and verify that the precautions indicated on the permit have been implemented.
  - Identify the nearest alarms or means of communication at the job site.
  - Remain in position to observe the area while work is in progress. Personal safety and health issues must be considered when selecting watch locations.
  - Implement action to correct deteriorating job site conditions. This includes the use of on-the-job authority to halt hot work. Examples of deteriorating conditions include flammable or combustible materials being introduced into the area, conditions for a fire become eminent, additional hazards beyond the capacity of the extinguishing media are created.
  - Watch for fires in all exposed areas and try to extinguish them only if they are in the obvious capacity of the equipment available and the training the fire watch has received.
  - Notify the Fire Protection Crew if fire equipment (fire hoses and extinguishers) is used.
  - Remain at the site of activity for at least an hour after hot work is completed to detect and extinguish smoldering sparks or fires. This includes coffee and lunch breaks, etc.
  - Sign off on the hot work permit when the initial fire watch is completed. and show Operations Supervision the permit for their sign off and transition to 6-hour surveillance.
  - Additional duties of the fire watch include wetting down combustible material with water prior to beginning hot work or using water to extinguish sparks that fall to the floor.

Individual Performing the Work:

- Obtains hot work permit(s) in completed form prior to performing hot work.
- Maintains the hot work permit at the job site for the duration of the hot work.
- Does not initiate hot work until the fire watch is present.
- Adheres to the requirements of the hot work permit.
- Stops work when conditions change that impacts fire safety. For example, the fire watch is not present, or flammable or combustible materials are introduced into the work area.
- Stops hot work when directed to do so by the fire watch.
- If arc welding in a confined space and work is to be suspended for any substantial period, 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 be disconnected from the power source.
- When gas welding or cutting in a confined space, the torch valves shall be closed and the gas supply to the torch positively shutoff at some point outside the confined area whenever the torch is not to be used for a substantial period, such as during lunch or overnight. Where practical, the torch and hose shall also be removed from the confined space.

Contractors who are directing Hot Work but are not authorized to issue hot work permits must fulfill the following requirements: Note- Contractors will no longer be allowed to issue hot work permits all permits must be issued VIA Woodland mill personnel.

- Inspect the work area with the Mill Contact that will issue the hot work permit to verify what steps must be taken prior to performing the hot work.
- Post and maintain the hot work permit at the job site.
- When required, assure the removal or protection of combustible, flammable, or explosive material at the job site in accordance with the requirements outlined on the hot work permit.
- Determine with Mill operation's guidance if critical equipment may be affected by the hot work and take action as directed. Operations personnel or the mill contact person should note any additional precautions that are recommended on the hot work permit, along with approval.
- Evaluate compliance with the requirements of the hot work permit by personnel under his/her direction.
  - Ensure a final inspection is completed as specified on the permit. This includes the 60-minute fire watch and ensuring a 6-hour surveillance takes place after the fire watch is completed.
- Operations returns the hot work permit in completed form to the safety manager for record keeping purposes after the job is complete.

Definitions

Note: Class III liquids with flash points greater than 100° F are excluded from the requirements of this procedure if they are not being heated within 30° F of their flash point.

Combustible Liquid - Any liquid with a flash point at or above 100° F for example diesel, kerosene

Flammable / Combustible Materials -Any solid, liquid, or gas which can burn and/or is classified as a flammable and explosive gas, a flammable liquid, a combustible liquid, or a highly combustible solid, for example NCG, Propane, or CLO2

Flammable / explosive gases - Any gas that will burn or explode in the presence of normal concentrations of oxygen in the air.

Flammable liquid - Any liquid with a flash point below 100° F

Combustible Solid - Any material ***Highly*** such as dry wood, Sodium Chlorate, paper, plastic, or rubber that can be ignited.

Hot work -Any activity that involves an ignition source.

Ignition Source - Any process, equipment, tool, or accessory capable of causing a fire or explosion. Open flames, sparks, static electricity, and hot surfaces are all possible ignition sources.

Ex: Grinding, welding, cutting, Etc:

Procedure

Prior to, during, and after hot work the following requirements must be fulfilled.

Permit Areas

Permissible Areas

Hot work may only be performed in areas that have been evaluated prior to introducing the ignition source. The area should be designed for hot work, or appropriate fire prevention measures must be established before the hot work commences.

Areas requiring written permits:

- Written permits are required in all areas of the mill that have not been designated as suitable for hot work on a routine basis.
- Permits may be issued for a period of up to 12 hours, however, under certain conditions the permit may stay in place longer. Work areas must be reviewed for safety and fire protection requirements whenever the work area has been left unattended for more than 2 hours. Regardless of designation, hot work permits are required in the following, locations, or circumstances:
    - Areas where flammable or explosive gases are present in process components or storage containers.
    - Hot work that may impact flammable or combustible liquids.

Areas not requiring written permits:

- Written permits are not required in areas that have been evaluated by the Safety Department and found to be suitable for hot work. These areas shall be designated with a permanent sign.

Prohibited Areas

- Hot work shall not be permitted in areas prohibited by the Safety Department.
- Hot work shall not be permitted on tanks, piping, or equipment, which previously contained flammable or combustible materials that have not been cleaned or prepared to prevent flammable or explosive atmospheres from developing.
- Hot work is prohibited in sprinkled buildings while the sprinklers are impaired without establishing equivalent protection.
- There shall be typically no hot work, such as grinding, welding or other hot work activities, to be performed within 50 feet of flammable storage areas. These areas include but are not limited to: the methanol unloading area and pump house, the propane bulk storage areas and vaporizer building, the remote storage cabinets for lift truck propane cylinders, the flammable paint storage buildings, the paint shop, flammable storage cabinets, the gas cylinder storage building, the gasoline pumps, or any remote storage area of flammable gas cylinder storage areas, areas where temporary flammables are used such as resins for fiberglass repairs, and other areas where flammables may be used.
- Any exceptions to performing hot work in prohibited areas must include agreement of the Safety Department, the department manager of the area and others as deemed necessary. Special requirements that render the area(s) safe must be established to include pre-testing and continuous testing of flammable vapors.
- In general, no hot work will be allowed in the CTS or old screen room building during operation without first evaluating and eliminating combustible dust hazards.

Procedure

Instructions

Systems Containing Flammable or Combustible Liquids or Gases:

- Welding, open flame work, cutting, grinding, or other spark producing work performed on any system or tank, vessel, or piping that may contain residual flammable gases or vapors must be performed following NFPA 327 as well as other applicable sections of this procedure.
- Suitable, calibrated instrumentation must be used to verify a safe atmosphere. The person performing the monitoring should be knowledgeable about the operation and limitations of the instruments.
- Potential sources of flammable or combustible materials must be isolated before hot work begins.
- The concentration of flammable gases or vapors must be below 10% of the lower explosive limit (LEL).
- Care must be taken to verify that the concentration is not higher in pockets or other levels.
- Oxygen concentration must be monitored where higher than ambient concentrations are possible. Hot work should not be performed if the oxygen concentration exceeds 23.5%.
- The potential for oxidizers, combustible residues, or higher reactant materials to be present must be evaluated and appropriate controls implemented before hot work begins.
- If an inert gas is used as a safeguard, the oxygen concentration should be zero before hot work is performed.
- Open flames must not be used for leak testing. Only procedures or instruments suitable for the gas, piping or equipment in question may be used.

Enclosed Systems Containing Materials Under Pressure

- Hot work should not be performed on systems under pressure if it will result in a significant increase in pressure that will have an adverse impact on process equipment or present a health and safety hazard to personnel.
- Hot work may be performed if adverse consequences are not created by the activity.
- Prior to starting work, precautionary measures must be established.
    - Relieving the pressure inside the system and isolating the pressure source or removing it from service
    - Opening the system
    - Analyzing the system to verify:
        - The structural integrity of the system will not be affected by the hot work.
        - Suitable relief devices exist.
        - The pressure increase will be less than the maximum pressure rating of the lowest rated process component.

System Containing Materials Capable of Rapid Thermal Expansion

- Hot work should not be performed on enclosed systems or piping containing materials capable of rapid thermal expansion unless appropriate safety precautions have been implemented prior to starting hot work. Examples include:
    - The system or pipe has been purged.

- The process has been opened.
- Analysis indicates that:
  - The structural integrity of the process will not be diminished by the work.
  - Suitable relief devices exist that can relieve the highest-pressure increase associated with the hot work without adverse impact on the health and safety of personnel or equipment.
  - The pressure increase will be less than the maximum pressure rating of the effected component(s)

Hot Work Permits

- Personnel authorized to issue hot work permits must be familiar with site requirements, this procedure, and the inherent fire hazards associated with the hot work.
- The individual authorizing the hot work and other approvals (as required) must be identified in writing on the permit.
- If entry into a confined space will be accomplished the monitoring data does not have to be listed on the hot work permit if the data has been recorded on the confined space entry permit posted at the job site.
- If a fire occurs the permit is void. The conditions must be upgraded, and a new permit issued before hot work may resume.
- The hot work permits will be reviewed for completion by maintenance and or operation supervision prior to sending them to the Safety Manager.
- The hot work permits are to be collected and returned to the Safety Manager upon completion of the hot work or the end of a shift after hot work is completed and all precautions are taken.
- The safety department will conduct periodic audits of the hot work permits to assure adherence to the hot work procedure.

Hot Tapping

Hot tapping refers to welding, cutting, boring, or drilling on equipment such as tanks or piping while in service.

- Hot Tapping requires a review of the Line and Equipment Opening Procedure to ensure compliance with this procedure as well.
- Hot tapping may not be initiated unless the activity has been approved by the supervisor of the job (contractors or lead person), the Mill's management official directing the work, and the department or area business team leader.
- Prior to starting the hot tap, the following precautions should be performed:
  - Verify the equipment metal thickness and type of material.
  - Identify if special safety precautions must be implemented and list them on the hot work permit or as an attachment to the permit.
  - If performing hot work on a pipe in service, establish and monitor a positive flow. The flow must be adequate to disperse the heat generated by the hot work.
  - If performing hot work on a tank or vessel, maintain the liquid level above the hot work unless additional health or safety issues are created.
- Hot taps involving gas or liquid pipelines or containers in the presence of flammable or combustible gases or vapors.
  - Hot tapping on equipment containing flammable or combustible gases and vapors will be performed only after it has been determined by the Mill's management official

requesting the work and the site Safety Department that it is impractical to perform the work using other methods which would isolate flammable materials in process.
- Hot tapping will be performed under the immediate supervision of an individual qualified by experience or education to direct the job.
- Hot tap must be performed by a trained and experienced crew.
- A detailed procedure for conducting the hot tap must be prepared in writing by an individual qualified by education or experience to do so.
- The procedure for performing the tap should address safe work practices, job parameters, precautionary measures, and emergency procedures.
- Prior to starting the job, the procedure must be approved by the Mill's management official directing the hot work, area business team leader, safety department representative and the supervisor in charge of the work (contractor or lead person).
- The personnel performing the tap and assigned fire watch must be trained and competent in the appropriate elements of the procedure before beginning work.
- The elements of the hot tap procedure must be in effect as delineated.

Special Instructions for Sulfuric Acid Tank at Water Treatment Plant

The Sulfuric Acid Tank at the Water Treatment Plant is an unlined tank, and the associated fill piping is unlined as well. The fact that the tank and piping are unlined creates a flammable hazard for completing hot work in the bermed area surrounding this tank. Sulfuric Acid is not flammable on its own, however, when it has contact with the tank or piping, hydrogen is created, which is highly flammable.

- No Hot Work within the berm surrounding the Sulfuric Acid Tank at the Water Treatment Plant will be allowed without authorization. If work must be completed in this area a JSA for the task will be developed incorporating the dangers of a confined space, continuous gas monitoring and have the approval of operations, maintenance and the safety department before work begins.

Special Instructions for PSM/RMP Controlled Areas

- In PSM/RMP controlled areas a qualified operations employee must sign the hot work permit in the box titled "PSM Operations to Sign".

Special Instructions for CE 33 Locked Areas (Electric Rooms)

- In CE 33 locked areas the initial 60-minute fire watch will be as described above. The six-hour surveillance monitoring will then be completed by the Shift E & I Technician on duty.

Hot Work Management Procedures Checklist

- Available sprinklers, hose streams, and extinguishers are in service/operable.
- Hot work equipment in good working condition

Requirements within 35 ft. (11 m) of hot work

- Flammable liquid, dust, lint, and oily deposits removed.
- Explosive atmosphere in area eliminated.
- Floors were swept clean.
- Combustible floors wet down, covered with damp sand or fire-resistive sheets.
- Remove other combustible material where possible. Otherwise, protect with FM Approved welding pads, blankets and curtains, fire-resistive tarpaulins or metal shields.
- All wall and floor openings are covered.
- FM Approved welding pads, blankets and curtains installed under and around work.
- Protect or shut down ducts and conveyors that might carry sparks to distant combustible material.

Hot work on walls, ceilings, or roofs.

- Construction is noncombustible and without combustion covering or insulation.
- Combustible material on other side of walls, ceiling or roofs is moved away.

Hot work on enclosed equipment.

- Enclosed equipment cleaned of all combustible material.
- Containers purged of flammable liquid/vapor.
- 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 60 min. after work, including during any break activity.
- For areas where there are multiple jobs and jobs are within visual line of sight, during the 60 minute period after the work , fire watch can between rotate between multiple jobs on a frequency based on the potential risk of the work.
- Fire watch is supplied with suitable extinguishers, and where practical, a charged small hose.
- Fire watch is trained in use of equipment and in sounding alarm.
- Fire watch may be required in adjoining areas, above and below.
- Monitor hot work area for an additional six (6) hours after the 60 min. fire watch

Audit of the Hot work Management Procedure

- Regular review/audit of the permits process for consistency completion
- Periodic Site Audits to ensure procedures are being practiced.