Hot Work Risk Management Standard

Purpose

To establish the minimum requirements to safely control the critical risks associated with hot works.

Hot work is defined as any activity that involves open flames or produces heat and/or sparks capable of initiating fires or explosions.

Essential Rules

People

- ✓ Trained people to carry out hot work and fire watch activities

Plant

- ✓ The correct equipment is used and is in good, safe condition.

Process

- ✓ 'Cold work' is considered first
- ✓ Designated Hot work bay used as preference where possible
- ✓ Hot work permit and associated procedures followed where hot work undertaken outside of hot work bay

Planning & Risk Assessment

A risk assessment was conducted to identify and assess potential critical risks of hot work activities and the control measures required to eliminate or minimise the risk. The assessment determined the following critical risks and controls.

Critical Risk Factors

The following activities are considered to be Hot Work and could result in fire or release of toxic gases if not adequately controlled.

- ☐ Heating metal using a flame
- ☐ Welding
- ☐ Grinding
- ☐ Gas Cutting/gouging
- ☐ Plasma and arc air cutting
- ☐ Heat shrinking, on a small or large scale
- ☐ Brazing and gas soldering
- ☐ Taping joins on asphalt
- ☐ Using heat guns (e.g., paint stripping)
- ☐ Heating sulphur lines, sulphur guns and pumps
- ☐ Hot work in potentially explosive atmospheres

Summary of Critical Controls

- ☐ Use 'cold' methods as first option instead of hot work where practicable.
  - Use cold cutting methods as first option for cutting e.g. sabre saw, hacksaw, bandsaw, hydraulic nutcracker.
  - Use cold methods as first option for cleaning up metal rather than a grinder e.g. handheld wire brush, emery, sanding, filing.
  - Use adhesives as first option instead of heat shrink.
  - Use sandblasting as first option instead of paint stripping.
- ☐ Designated Hot Work Area should be made available and meet the Designated Hot Work Areas key rules. Any temporary designated hot work areas must meet the designated hot work area rules and cannot be located within a building.
- ☐ A Hot Work Permit must be completed for all hot work outside of a designated hot work area.
- ☐ Remove and/or protect flammable material within 15 metres from any direction of the work (including above and below) including fuels, gases (including hydrogen gas in acid plant vessels), Sulphur and material containing sulphur.
  - Wet down the area around activity before starting.

- Use welding blankets to protect equipment that cannot be removed.
- Use a fine spray misting hose on area where sparks are landing.

- The condition of the hot work equipment must be checked prior to use including flashback arrestors, gas bottle is secured.
- Housekeeping must be maintained, ensure equipment for the job is out of the way of sparks (including gas bottles).
- Conveyors in work zone must be shut down.
- Create an inert atmosphere or block off vents from vessels where there is a potential for a gas build up (e.g. hydrogen in acid plant vessel).
- If hot work is carried out on thermally conductive material at or near penetrations into combustible building material, additional controls and precautions must be in place. This must be included in the risk assessment as part of the JSA/Permitting process.
- Gas detection prior to starting work and during hot work in potentially explosive atmospheres.
- Have an emergency response plan in place for fire response including fire watch(s), firefighting equipment, raising the alarm and first aid equipment.
- Respiratory protection on hand if carrying out hot work where sulphur or other gases may be present or generated.
- Correct PPE must be worn including eye protection, fire-retardant overalls, suitable gloves and suitable hearing protection. The national welding SOP must be followed if carrying out welding work, this includes wearing a welding helmet, fire retardant overalls, safety boots, respiratory protection, and welding gloves.

Work Environment, Equipment & Activities

Designated Hot Work Bay Rules

- Designated Hot Works Areas must be approved by the maintenance manager or site manager.
- These areas must be clearly identified on site with appropriate signage (refer below).
- Signs to be displayed at all entry ways to clearly show area is for hot work. The sign must include the following wording (or similar):
  - Hot work designated area
  - No flammable or combustible materials
  - No smoking
  - Clean area after use
- No combustible/flammable material to be stored in these areas.
- No combustible materials to be within these areas when hot work is taking place.
- Area to be left tidy once task completed.
- Correct respiratory protection to be worn for the job in conjunction with fume extraction. Also consider emergency response requirements.
- The designated area must be audited by the maintenance manager or site manager monthly.

Laboratories

- Hot plates are to be used instead of open flame for heating.
- Materials must not be heated to ignition temperature without carrying out additional risk assessments and having a laboratory method in place for the task.
- Work that may generate flammable vapours to be carried out in a fume hood.

Controls to be considered for hot work

- Heat shrink new equipment outside of operational areas if practicable.
- Consider habitat construction, this is a temporary enclosed chamber used to conduct hot work constructed of flame retardant material, non-pressurised and naturally or forced air ventilated.
- Consider the environment being worked in. For example, is the area a zone 0, 1, 21 or 22?
- New plant designed to reduce need to weld e.g., use of boltable equipment.
- Replace equipment instead of welding.
- Prefabrication.
- Induction heater instead of flame or oil bath for heating bearings and fittings.
- Liquid nitrogen for shrinking parts.

- Use of an electric soldering iron instead of a gas-powered soldering iron.
- Early warning fire alarm systems and emergency shut down systems.

People & Training

- Trained people to use equipment involved in hot work.
- All staff and contractors must be inducted, and the induction must cover the rules of the hot work standard.
- A fire watch must always be in place when hot work is occurring outside of the designated hot work bay. The fire watch must sign off the monitoring requirements of the hot work permit. There may be need for more than one fire watch if the task is multi levelled.
- The fire watch must be trained in extinguishing a minor fire and understand the actions to take in the event of a major fire or other emergency event such as gas release or explosion

Reporting (ravSafe)

- Any incident (no matter how insignificant) must be reported using ravSafe.
- For any significant type events, including potentially significant, a full investigation or ICAM may be required to be completed. Operational leaders and/or HSW team can advise if this is required.
- Fire specific questions are asked for an event, if fire or a suspected fire (contained in vessel) was thought to occur or did occur.
- Fire related incident data is presented via the ravSafe S&W Audit Dashboard.
- Any significant events are to be communicated to the business.

Documentation (and retention of documents)

- Hot Work Permit
- Designated Hot Work Bay Rule and Audit sheet
- Site Specific Emergency Response Plan
- National Welding SOP

Retention:

Hot Work Permits (along with JSAs) are to be stored for 12 months prior to the work being completed. Any incident information is retained in ravSafe without an end date. CCV's and corrective actions relating to audits, incidents etc, is retained in ravSafe without an end date.