



VUL-SWP-023- Air Conditioning & Refrigeration Works

STANDARD WORK PROCEDURE (SWP)	
Description	Air Conditioning and Refrigeration Works (including maintenance and general cleaning)
Site	Vulcan Mine
Department	Construction
Purpose	The purpose of this SWP is to provide a documented way of working to achieve an acceptable level of risk. The steps outlined pertain to the titled task only. All other SHMS requirements such as SOPs VUL-SOP-056-PPE and VUL-SOP-Dust must be followed.
PPE Required	
 HEAD PROTECTION (HARD HAT)	 EYE PROTECTION (SAFETY GLASSES)
 BODY PROTECTION (HIGH VIS - LONG SLEEVE / PANTS)	 FOOT PROTECTION (SAFETY BOOTS)
 HAND PROTECTION (GLOVES)	
Job Step Analysis Reference	
Other Relevant Information	
Task Specific PPE	
 FACE PROTECTION (FULL FACE SHIELD)	 LUNG PROTECTION (P2 MASK MINIMUM)
 EAR PROTECTION (EAR PLUGS / EAR MUFFS)	
ERT resources available on-site during operations.	
Personnel performing Air Conditioning and Refrigeration Works shall be fully inducted and hold the relevant training and competencies to complete the work and adhere to fitness for work requirements.	
Work Instruction is based on working in a controlled environment. If the environment, tools, equipment changes and or a deviation from this Work Instruction, a new JHA must be created and approved by all workers conducting the task.	
Critical (Hazard) Risks	
Ensure controls are in place for critical risks associated with this task. These include:	• Hazardous Substances • Fall from height • Working Alone • Uncontrolled Movement • Heat, Exposure to Biological Hazards • Vehicle/Pedestrian Contact • Lifting & Moving of loads • Weather • Falling objects • Exposure to fire



1. PLANNING AND PREPARATION
1.1 Plan & Prepare for Site
- Conduct pre-start meeting to discuss tasks, hazards and controls - Wear required site PPE (reference document) including hard hat, safety glasses, long sleeved high-vis shirt, sleeves down, long pants, high ankle zip and/or laced up steel capped boots, Cut 5 rated safety gloves on person and personal isolation lock - Ensure fundamental stability of vehicle during loading - Ensure all sharp edges are protected and suitable gloves are worn when handling equipment - Secure all loads to vehicle in an approved manner - Coordination for the communication of isolation, commissioning, and testing - Advise workers onsite they will lose power temporary to A/C equipment if “dead testing” is required.
2. GENERAL
2.1 Travel and transport materials around site
- Conduct a Take 5 to identify hazards and controls before commencing travel - Trained, Assessed and Authorised operator of vehicle - Ensure positive communications when interacting with other equipment - Abide by speed limits and give way to fauna. - All persons must comply with site traffic rules - Drive to conditions - Monitor weather and adhere to VUL-TAR-004-TARP-Weather
2.2 Manual Handling
- Use correct manual handling and lifting techniques VUL-SOP-096b-Manual Handling Tasks & Ergonomics - Appropriate gloves for task - Ensure the work area and path from pick up to destination is clear and unobstructed and ground conditions are acceptable.
2.3 Work area housekeeping
- Maintain cleanliness of worksite - Clean up as the job progresses - Remove all excess material from the worksite - Use correct containers for rubbish - Ensure no loose objects are stored/placed where they can fall - Conduct regular area inspections/cleanup of work area - Store all materials in an orderly manner - Remove all barricading and signage after job complete - Correct segregation of waste in bins provided
2.4 Working Outdoors
- Ensure regular rest breaks/utilisation of shaded areas provided - Keep hydrated and ensure regular fluid intake - Utilise temporary shades, if needed - Wear hard hat brims, where required - Use sunscreen SPF 50 and above - Keep alert for snakes, spiders, and other biting insects/fauna. Report to the environmental department - Monitor weather and adhere to VUL-TAR-004-Weather - Apply insect barrier sprays/creams - Maintain correct PPE and wear correctly - Dust suppression as required - If possible, work outside in cooler parts of the day and inside during the hotter parts of the day



2.5 Working at Night (including driving light vehicles)
- Adequate lighting; Mobile lighting towers (if required), Personal hand torch (battery), Vehicle head lights - Drive on designated roads. Drive to conditions, obey speed limits - If collision with fauna – contact environmental department - Ensure positive communication is maintained - Where possible, do not work alone
2.6 Access work area, set up equipment and materials
- Spotter to communicate and direct light vehicle operator and control the work access area - Ensure the work access and egress routes are free of obstacles and slip and trip hazards - Set up Entry/Exit point signage and/or barricading for work areas of high-risk, where required - Monitor weather and adhere to VUL-TAR-004-TARP-Weather
3. TOOLING AND EQUIPMENT USE
3.1 Use platform ladders to access work areas
- Use only site approved platform ladders. - Do not use portable ladders for general work activities. - Ensure ladders are set up on stable/flat surfaces and suitably braced - Do not carry anything while using a platform ladder to access an area. Engage only handrail, fall prevention devices - Visually inspect ladder and ensure all ladders are in good condition and test and tagged. - All ladders to be numbered, registered and labelled with approval stickers - Maintain three points of contact at all times - All tools to be connected to lanyard
3.2 Work from Elevated Work Platform (EWP)
- Ensure working at heights permit is completed - Ensure all tools are secured to basket or individual and always secured to a lanyard - Ensure area is barricaded and appropriate signage applied - Operator to be trained, assessed and authorised for EWP - Pre-start completed on EWP prior to use - Ensure ground is even and stable - Safety harness must comply with AS/NZS 1891.1 worn and secured to suitable anchor point - Spotter must be in place with two-way radio - Monitor weather and adhere to VUL-TAR-004-Weather
3.3 Use Portable Electrical Hand Tools to Perform Task
- Obtain Permit to Work - Penetration Excavation Permit VUL-FRM-19-12-Penetration Excavation Permit - When operating any tools always ensure good body position and that you are well balanced and sure footed - Ensure good grip on the tool to prevent straining or over exertion - Visually inspect the tools and equipment before use - Ensure tool is in good working order - Ensure tool is within testing and tagging date - Ensure competency to operate is complete for all power tools - Select correct tool e.g. drill / drill bits for the task - Ensure correct eye & hand protection is fit for task - Ensure correct eye protection is worn for overhead drilling and grinding tasks - Beware of metal swarf & sharps - Secure the work appropriately - Secure loose clothing tie back long hair - Visual inspection is to be made on the underside of floor and walls for service before penetration e.g. drilling - As Built drawings are required when penetrations are to be made through walls, floors and ceilings. Visual should also be done as an extra control measure



- Complete a visual inspection of electrical leads before each use to ensure plug tops are not damaged and no exposed conductors - Keep leads out of areas where damage is likely to occur (doorways or other pinch points), ground and out of wet areas
3.4 Using oxygen/acetylene, map gas, nitrogen and refrigerant
- Obtain Permit to Work – Hot Work - Wear full PPE, as required - Competent to operate - Setup Exclusion zone - Fire extinguisher and worker who knows how to use the fire extinguisher - Use correct regulating devices on nitrogen and oxygen/acetylene. - Suitable storage of gasses before and after use - Use in well-ventilated area - Only licences refrigeration mechanics to apply/handle refrigerant gas - Inspect area prior to using open flame and remove all possible sources of combustion
4. AIR CONDITIONING AND REFRIGERATION WORKS
4.1 Inspection of air conditioning and refrigeration equipment, permanent HVAC units, pipe work, electrical cable, supports and fixings
- Licensed and appointed electrical worker for electrical inspections - Ensure additional personnel are appropriately trained and competent for tasks taking place - Ensure a Working at Heights Permit is completed - Personal isolation and de-energize equipment and test for dead - Always ensure positive radio communication - Wear full PPE including dust masks are worn - Use correct manual handling techniques when lifting and or pulling cable, pipe, units. - Ensure work area where inspections are taking place is adequate for personnel, tidy and free of loose objects - File off any sharp edges. Cover any edges that may cause damage to plant, equipment or personnel. - Inspect all hand tools before use - Ensure only competent individuals use tools - Ensure that personnel in commissioning areas understand the correct procedure when entering and performing inspections and/or maintenance tasks - Interface with other contractors where required when entering pre-commissioned/ commissioned areas - Control area when required with use of barricading and signage - Monitor weather and adhere to VUL-TAR-004-Weather
4.2 Fault-finding on-air conditioning and refrigeration equipment and permanent HVAC units
- Licensed and appointed electrical worker for electrical inspections - Erect appropriate exclusion zones and signage - Conduct test for dead before commencing, if possible, to fault find with no power - Permit to Work – Working at Height completed, if required - Personal isolation and de-energize equipment and test for dead - Use of insulated tools, where required - Allow hot motors to cool down prior to fault finding - Wear full PPE including dust masks (P2), hearing protection, eye protection and gloves (Cut-5 rated), when required - Use correct manual handling and lifting techniques VUL-SOP-096b-Manual Handling Tasks & Ergonomics - Monitor weather and adhere to VUL-TAR-004-Weather
4.3 Maintenance, repair and cleaning works on-air conditioning and refrigeration equipment and permanent HVAC units
- Licensed and appointed electrical worker for electrical work - Check isolation of incoming mains as per Isolation Procedure - Use correct lockout and tag out procedure



- Test for de-energised before commencing work
- Use correct tools for task (drivers, pliers etc)
- Inspect tools for wear and tear prior to use
- For large scale repairs where heavy lifting may be required, increase manpower or mechanical lifting aid where needed
- Gloves must be worn for all other tasks
- Turn off air conditioning units at remote prior to removing filter to reduce spread of dust
- Inspect immediate work area for potential dangers caused by other trades
- Clean up all oil spills, grease, etc
- All spills are to be reported to a supervisor immediately
- Be sure to remove all metal shavings and cuttings from area of work upon completion
- Ensure all labelling is in place including ID tags, isolation points
- Segregate waste i.e. Plastics/metals into designated waste receptacles.
- SDS is required when using chemicals be sure to read and understand the SDS and use the chemical as stated in the SDS
- If water is spilt be sure to stop works and barricade around wet surface until the water has been cleaned up
- When opening permanent HVAC AHUs, personnel are required to leave door open a minimum of 5 minutes before entering
- Work in teams of minimum 2 when required to access inside Permanent HVAC AHU
- When accessing AHU, all personnel are to carry radios, and spotter is required to maintain sentry at entry point till all personnel have exited unit.

4.4 Installation of Air conditioning & refrigeration equipment, pipe work, electrical cable, supports & fixings

- Licensed and appointed electrical worker
- Ensure additional personnel are appropriately trained and competent for tasks taking place
- Permit to Work – Working at Height completed
- Personal isolation and de-energize equipment and test for dead (replacing unit).
- Ensure positive radio communication is maintained at all times.
- Identify correct unit type, pipe size, cable type, location and destination before installing.
- Wear all PPE including dust masks (P2), hearing protection, eye protection and gloves (Cut-5 rated), when required
- Use correct manual handling and lifting techniques, including two-person lifts or mechanical aids for heavy items or work in awkward positions when lifting and or pulling cable, pipe, units.
- Ensure work area where cable pulling will take place is adequate for personnel, tidy and free of loose objects.
- Always maintain control of fixing supports. Ensure all fixings/supports are spaced and installed correctly to ensure no protrusions or pinch points are created.
- Use multiple personnel to pull cable, lift heavy objects, etc. when required.
- File off any sharp edges. Cover any edges that may cause damage to plant, equipment, or personnel.
- Stay clear of cable drum when winding off cable
- Inspect all hand tools before use
- Ensure electrical tooling is tested and tagged
- Ensure only competent individual use hand tools.
- Ensure that personnel in commissioning areas understand the correct procedure when entering and performing inspections or maintenance tasks
- Install signage and barricading for immediate work area
- Communication with other contractors where required when entering pre-commissioned/ commissioned areas
- Control area when required with use of barricading and signage

4.5 Final commissioning and testing of air conditioning & refrigeration equipment, pipe work, electrical cable, supports & fixings

- Signage and barricading to remain in place throughout commissioning phase
- Commissioning activities discussed at prestart meeting
- All live systems under commissioning control shall have identification and warning signs placed on them highlighting "live".
- All affected personnel to be informed that commissioning process is being conducted.



- Wear all PPE including dust masks (P2), hearing protection, eye protection and gloves (Cut-5 rated), when required - Check system running pressures to ensure system is running as required. - Ensure installed equipment is effectively earthed. - Visually inspect the tester for damage. - Testing personnel must follow all testing procedures. - LV Rescue kit to be visually inspected to ensure complete, in good condition with all contents as per requirements. - LV testing equipment to be tested on a known source of supply before and after use.	
5. CLEAN-UP WORK AREA	
5.1 Clean Work Area and Removal of Equipment	
- Regular assessment of ground conditions - Maintain communication between personnel and plant - Utilisation of skip bins	

