



Standard Operating Procedure

Abrasive Blasting and High-Pressure Cleaning



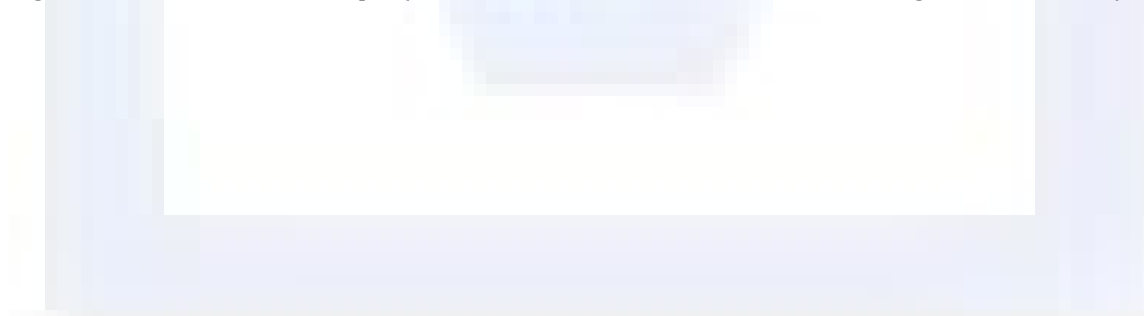


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1. PURPOSE

The purpose of this procedure is to describe requirements and to manage hazards and risks associated with abrasive blasting and high pressure, chemical and mechanical cleaning at the Vulcan Mine.

This procedure has been developed to ensure compliance with section 96(c)(i) of the CSMHR.

- Section 96(c)(i) abrasive blasting and high pressure, chemical and mechanical cleaning;

2. SCOPE

This procedure is applicable to all persons at the mine including employees, contractors and visitors.

The controls within this procedure are mandatory.

3. DEFINITIONS

Authorised Person	A Person who has been assessed as competent and authorised under the authority of the SSE/SSE delegate to undertake a specific task at Vulcan Mine.
Competent Person	A person for a task at a coal mine that has the demonstrated skill and knowledge required to carry out the task to a standard necessary for the safety and health of persons.
CMSHA	Queensland Coal Mining Safety and Health Act (1999).
CSMHR	Queensland Coal Mining Safety and Health Regulation (2017).
CMW	Coal Mine Worker.
CoP	Code of Practice.
EMP	Environmental Management Plan.
MOP	Mine Operating Procedure
OEM	Original Equipment Manufacturer.
PPE	Personal Protective Equipment.
JHA	Job Hazard Analysis.
RPE	Respiratory Protective Equipment.
SDS	Safety Data Sheet.
SHMS	Safety and Health Management System.
SOP	Standard Operating Procedure.
SSE	Site Senior Executive.
Take 5	Personal Risk Assessment.



4. RISK MANAGEMENT

Where Abrasive Blasting and High Pressure Cleaning works are to be conducted onsite or where there is a potential of injury when performing Abrasive Blasting and High Pressure Cleaning work, the risk management process shall be followed to the level of the task being undertaken in accordance with **VUL-MOP-049-Risk Management**.

Risk management is a systematic process to eliminate or minimise the potential for harm to people.

The risk management process should consider the following points:

- Airborne contaminants like dust;
- Hazardous chemicals, particulate matter, for example small particles or pieces of the substrate or blasting medium;
- Noise; and
- Abrasive blasting plant and equipment.

NOTE - Workers have a duty to take reasonable care for their own health and safety and to not adversely affect the health and safety of other persons. Workers must comply with reasonable instructions, as far as they are reasonably able, and cooperate with reasonable health and safety policies or procedures that has been notified to workers, including information, instructions and training in relation to work carried out by the worker in a confined space. If personal protective equipment (PPE) is provided, the worker must so far as they are reasonably able, use or wear it in accordance with the information, instructions and training provided.

5. PROCEDURE

5.1. Stand By Person

Stand-by personnel may be required if determined by a risk assessment. The stand-by person shall be a person assigned to:

- Remain outside but in close proximity to the work area;
- Be capable of continuous verbal or visual communication;
- Observe those undertaking the task;
- Render emergency assistance (e.g., resuscitation, first aid etc.) and initiate rescue protocols when required; and
- Operate and monitor equipment used to ensure safety during entry and work in the area.

NOTE – The Stand-By person is to be out of the immediate work area and distance determined by the risk assessment. By a minimum of 10m.

5.2. Abrasive Blasting Equipment

Abrasive blasting equipment shall have the following:

- A fast-acting mechanism, under the direct control of the nozzle operator to quickly stop the flow of abrasive material;
- Hose anti-whip checks or hose coupling safety locks e.g., Minsup clips;
- For dry blasting – A way of discharging static electrical charge from the abrasive blasting nozzle, e.g., earth bonding, fire resistant and anti-static hose (this will normally consist of a static earth between the nozzle and the general body of earth);
- For wet abrasive blasting – A water flow rate capable of preventing dust forming from the blasting operation;
- Blast cabinets or chambers will be used where applicable;
- All equipment shall be correctly installed (i.e., as per the OEM manual/instruction) and air supplies checked before work starts;
- Regular inspections and maintenance of equipment shall take place to ensure it is fit for purpose prior to use; and
- Abrasive Blasting equipment must be fit for purpose and determined if it is High Pressure or Low Pressure blasting by risk assessment.



5.3. Abrasive Blasting Materials

The following techniques and equipment may be used to minimise airborne dust levels. These include:

- Sodium bicarbonate blasting
- Blast cleaning with re-usable sponge abrasives
- Carbon dioxide (dry ice) blast cleaning.

You should also consider other cleaning techniques than abrasive blasting, particularly for smaller jobs. These include:

- Chemical strippers
- Heat guns
- Power tools with dust collection systems
- Manual sanding
- Scraping.

These restricted chemicals include any substance that contains greater than:

- 1% free silica (crystalline silicon dioxide)
- 0.1% antimony
- 0.1% arsenic
- 0.1% beryllium
- 0.1% cadmium
- 0.5% chromium (except as specified for wet abrasive blasting)
- 0.1% cobalt
- 0.1% lead (or which would expose the operator to levels in excess of those set in the WHS Regulation covering lead)
- 0.1% nickel
- 0.1% tin.

NOTE - Blasting materials containing more than 1% free silica (crystalline silicon dioxide) shall not be used.

5.4. Exclusion Zone and Signage

The following guidelines must be complied with when not utilising a designated blast chamber:

- Abrasive blasting shall be undertaken to prevent abrasive overspray, siliceous or toxic dust escaping from the area;
- Overspray or dust cleaned from surfaces as soon as practicable following blasting work;
- Sheeting or other suitable enclosure used to contain abrasive blasting dust; and
- Designated exclusion zones.

An exclusion zone shall be established and maintained to exclude workers and other persons who are not wearing RPE.

The size of the exclusion zone should be determined after assessing the risk to all unprotected people. At a minimum of 10m is to be established. The prevailing conditions at the time of blasting should be taken into account, for example, the exclusion zone may need to be extended down-wind.

When an exclusion zone has been determined, signs and barricades shall be used. The signs shall indicate:

- Abrasive blasting is in progress;
- Work areas are to be clearly delineated and access restricted to authorised persons only;
- Signage shall be erected at the edge of the restricted access area that describes restrictions to access and the hazards that may be faced in the restricted area –
 - An example is provided in Figure 1;
- Workers will follow the direction of all signage as if given as an instruction by their supervisor;
- There shall be adequate separation distance around the blasting site and the use of screens to minimise the potential for injury around the site; and
- Respiratory protection must be worn.

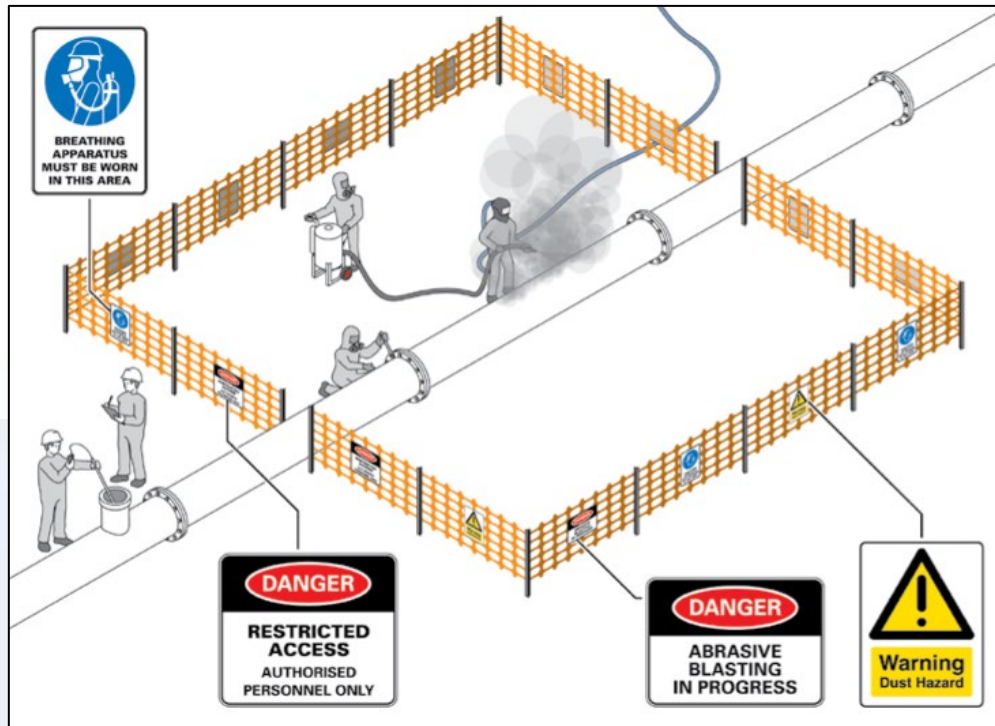


Figure 1: Exclusion Zone Example (Source: SafeWork Australia Abrasive Blasting Code of Practice)

An exclusion zone should be established and maintained to exclude workers and other people who are not wearing respiratory protective equipment (RPE).

- Warning signs should be located so they are clearly visible before entering the area.
- Signs should warn that: Abrasive blasting is in progress and there is a dust hazard
- Access to the area is restricted to authorised persons
- RPE should be worn in the exclusion zone.

NOTE - Where an exclusion zone interferes with other activities at a workplace, other workers should only work within the exclusion zone after being provided with RPE.

5.5. PPE for Abrasive Blasting

PPE used when Abrasive Blasting and High Pressure Cleaning shall be in accordance with **VUL-SOP-065-PPE**.

Each person engaged in abrasive blasting shall have for the task:

- An airline respirator of the hood or helmet type, fitted with an inner bib and a high visibility shoulder cape
- Protective clothing (a jacket or protective suit)
- Protective gloves (canvas or leather)
- Protective footwear
- Air fed Respirators must be individual and not shared.

Personal hearing protectors. Air breathed from airline respiratory equipment shall:

- Be supplied at a rate of at least 170 litres per minute; and
- Contain at least 19.5% but not more than 22.5% oxygen by volume.

The air breathed from airline respiratory equipment shall have first passed through the following:

- A purifying device to ensure it does not have any objectionable or nauseous odour and, when measured at 15°C and 100kPa contains not more than:
 - 900ppm carbon dioxide;
 - 11ppm carbon monoxide;



- 1mg per cubic metre of oil;
- A conditioner to ensure it is supplied;
- Within a humidity range of at least 20% but not more than 85%;
- A condensate trap fitted with a drain cock to remove condensed liquid; and
- A controlled leak-off to eliminate stale air.

Equipment for supplying air for a person to breathe is to be kept in working order and in a place where it is protected from contamination. The equipment must have:

- A thermostatically controlled interlock to cut off the air supply if it overheats beyond the manufacturer's specification; and
- Fittings which cannot be connected to other compressed air equipment.

NOTE - As abrasive blasting is a high hazard activity, some PPE should always be worn regardless of other control measures in place.

5.6. Compressed Air

Airlines and tools must be inspected prior to use to identify any defective equipment tagged Out of Service. As per **VUL-SOP-078-Isolation and Tagging**.

A pressure gauge must be fitted to every pressure regulator to allow the pressure to be reduced to the appropriate pressure rating of the hoses and tools.

Air-line connectors placed at air service outlets, shall be installed to face downwards.

Where practicable, hoses should be secured against inadvertently coming loose e.g., safety clips on 'Minsup' couplings.

Air hoses shall be purged before connecting to machinery or air tools.

NOTE - Compressed air shall never be used to blow clean clothing or skin. Whip checks must be fitted to all air lines involved with Abrasive Blasting.

5.7. High Pressure and Steam Cleaning

High-pressure and steam cleaning equipment is to comply with AS 3350.2.79 and shall have:

- A fast-acting mechanism, under the direct control of the nozzle operator, to quickly stop the flow of water and/or steam;
- Hose anti-whip checks or hose coupling safety locks; and

Personnel using the light vehicle wash bay facility must be Authorised to by **VUL-FRM-07-12-Light Vehicle Wash Bay Familiarisation**.

5.8. Mechanical and Chemical Cleaning

The CMW undertaking mechanical and/or chemical cleaning shall follow the OEM instructions for the use of the designated cleaning equipment or carry out risk control by:

- Identifying the name of the chemical used;
- Controlling hazard in the work area or equipment to be cleaned;
- Reading the instructions on the SDS;
- Reading the label for the chemical or cleaning agent;
- Following the instructions given and wearing the PPE prescribed; and
- Observing environmental controls as per the EMP.

All Chemicals for cleaning must have a relevant SDS and be added on Chem Alert.

5.9. Housekeeping

Housekeeping shall be in accordance with **VUL-MOP-094.1(b)Housekeeping**.

Drift from abrasive blasting can be harmful not only to workers but also to members of the public. Good housekeeping can minimise the risk of exposure.

While other control measures should prevent dust escaping from the area where blasting is being done, dust or residue that does make its way into the workplace should be removed as soon as practicable after blasting has finished.



This includes the surfaces in an exclusion zone.

NOTE - Where practicable, accumulated dust should be removed using wet cleaning methods, or high efficiency filter vacuum methods. Because workers undertaking cleaning work may be exposed to dust levels exceeding the exposure standard, they should wear PPE.

5.10. Clean-up, Storage and Disposal

A clean-up of spent abrasive cleaning residue shall be conducted upon termination of abrasive blasting activities each day and the completion of the work task. Clean-up of spent abrasive cleaning residue shall include:

- Daily collection of visible residues in the vicinity of the blasting site;
- Stockpiles of new or recycled abrasive materials covered when not in use;
- For abrasive blasting not involving lead paint, vacuuming using an industrial vacuum cleaner equipped with an exhaust filter;
- For all abrasive blasting involving lead paint, vacuuming using an industrial vacuum cleaner equipped with a HEPA filter;
- Wet abrasive blasting areas shall be bunded to prevent the run-off of contaminated water.
- All used abrasive and waste products generated during abrasive blasting shall be contained and securely stored before disposal;
- Dry blasting waste is to be stored in covered containers; and
- All waste is to be disposed of in accordance with environmental requirements – **Refer to VUL-PLN-005-Environmental Management Plan.**

NOTE - Stockpiles of new or recycled abrasive materials shall be covered at all times, except and only to the extent necessary to remove or add materials to the piles.

6. ROLES AND RESPONSIBILITIES

SSE	• Shall review and approve this procedure.
Asset Manager	• Ensure the Registers are being maintained • Shall ensure that all provisions of this procedure are implemented, and that compliance is achieved.
HST Manager	• Ensure CMW's are familiar with and have access to this SOP and associated documents • Provide adequate training and information for this SOP
Supervisor	• Shall be responsible for their area of operations and the implementation and application of this procedure; • Provide adequate supervision to ensure that this procedure is implemented; • Carry-out a periodic review of activities to ensure the appropriate application and understanding of this procedure; and • Ensure immediate and appropriate steps are taken to investigate and rectify any risks to health and safety arising from these activities. • Ensure all CMWs are familiar with, have access to and comply with the requirements set out in this procedure. • Ensure the Registered are being updated and maintained.
All CMWs (including visitors and contactor)	• Shall comply with the requirements of this procedure.



7. REFERENCES

- AS/NZS 1716:2012 Respiratory protective devices
- AS/NZS 3350.2.79:2001 Safety of household and similar electrical appliances - Particular requirements for high pressure cleaners and steam cleaners, for industrial and commercial use
- Coal Mining Safety and Health Act 1999 (Qld)
- Coal Mining Safety and Health Regulation 2017 (Qld)
- SafeWork Australia Abrasive Blasting Code of Practice 2021
- VUL-PLN-005-Environmental Management Plan
- Mines safety alert no. 332 | 28 November 2016 | Version 1 Abrasive blasting incident
- Petroleum & Gas Inspectorate | Alert| No.102 V 1 | 20 May 2022 High Pressure Water Jetting System operations and compliance requirements

8. RELEVANT DOCUMENTS

- VUL-SOP-078-Isolation and Tagging
- VUL-SOP-065-PPE
- VUL-MOP-049-Risk Management
- VUL-MOP-094.1(b)Housekeeping
- VUL-FRM-07-12-Light Vehicle Wash Bay Familiarisation.
- VUL-PLN-005-Environmental Management Plan

9. REVIEW

This document shall be reviewed at a minimum every two years, or as follows:

- When there is a change of method and/or technology and/or legal or other requirement that may affect the accuracy of this document;
- When operational changes occur that effect the currency of the document;
- When there has been a significant event to which this document was relevant; and
- As a result of relevant audit findings.

10. DOCUMENT CONTROL

Version	Date	Description	Document Controller
01	20/05/2020	Initial draft	Rachael Dacker
02	22/06/2020	Risk workshop	Shane Johnson
03	28/04/2021	Review and formatting	Nicole Davey
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05	20/09/2023	Review and Update	Kelly Jensen