



Principal Hazard Management Plan Explosives



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1. PURPOSE

The purpose of this PHMP is to identify principal hazards associated with Explosives at the Vulcan Mine and to specify their management by reducing identified risks to an acceptable level.

Vulcan Mine Management through a Broad-Brush Risk Assessment, have deemed Explosives to be a Principal Hazard and therefore has developed and implemented a PHMP in alignment to the requirements of section 115 and 116 of the Coal Mining Safety and Health Regulation 2017.

This PHMP describes how risks associated with the use of explosives, detonators and shot firing equipment in the open cut mine environment are managed.

2. DEFINITIONS

AEISG	Australian Explosives Industry Safety Group.
ASIO	Australian Security Intelligence Organisation.
BBRA	Broad Brush Risk Assessment.
BMA	BHP Billiton Mitsubishi Alliance.
CMW	Coal Mine Worker.
DNRM	Department of Natural Resources and Mines.
HE	High Explosive
IE	Initiating Explosives
SSAN	Security Sensitive Ammonium Nitrate
JHA	Job Hazard Analysis.
MOP	Mine Operating Procedure.
MPUs	Mobile Processing Units.
NOx	Nitrogen Oxide.
OCE	Open Cut Examiner.
PHMP	Principal Hazard Management Plan.
RSHQ	Resources Safety Health Queensland.
SHET	Safety, Health, Environment and Training.
SOP	Standard Operating Procedure.
SSAN	Security Sensitive Ammonium Nitrate.
SSE	Site Senior Executive.
SWP	Safe Work Procedure.
TARP	Trigger Action Response Plan.
WRAC	Workplace Risk Assessment and Control.
VUL	Vulcan Mine



3. OPERATION OVERVIEW

The Vulcan Mining Project comprises a new small-scale coking coal mine located approximately 30 km north-west of Dysart and 35 km south-east of Moranbah in Queensland's Bowen Basin. The Project lies immediately west of BMA Peak Downs Mine. The project operates at 1.95M ROM tonnes capacity from the Jupiter pit with ROM coal transported offsite for washing at nearby operations.

In summary, the mining method comprises the following stages:

- topsoil removal and stockpiling;
- drilling and blasting;
- overburden, interburden and partings removal and dumping;
- selective coal mining to maximise recovery and minimise dilution;
- truck and shovel operation;
- coal haulage to ROM stockpile;
- dry-sorting and road haulage off-site;
- maintain reject co-disposal system;
- manage and maintain all site services;
- mine planning and development; and
- progressive re-contouring of waste dumps and re-spreading of topsoil.

4. SCOPE

This document applies to all coal mine workers who handle and/or use explosives, detonators and shot firing equipment at Vulcan Mine.

5. ROLES AND RESPONSIBILITY

Position	Responsibilities	Reporting To
Coal Mine Operator	• Ensure that a PHMP has been developed. • Conduct audits of the SHMS. • Provide adequate resources for ongoing implementation of the PHMP.	N/A
Site Senior Executive	• Review the control monitoring and effectiveness requirements as defined by this PHMP. • Ensure adequate resources are available for the ongoing implementation of the PHMP. • Understand the intent and content of this PHMP. • Ensure the PHMP is audited and reviewed as required and audits are actioned in a timely manner. • Ensure statutory obligation are met.	Coal Mine Operator
Site Operations Manager	• Ensure the control monitoring and effectiveness system is implemented and operational. • Ensure adequate resources are available for the ongoing implementation of the PHMP. • Ensure that the systems and procedures established as part of the PHMP are implemented and followed. • Oversee the mining operations and adherence to the PHMP.	Site Senior Executive



Position	Responsibilities	Reporting To
HST Manager	- Ensure the control monitoring and effectiveness system is implemented and operational. - Ensure adequate resources are available for the ongoing implementation of the PHMP. - Ensure surface mobile equipment is fit-for-purpose. - Verify that all persons with responsibilities under this PHMP, including external service providers, have the necessary competencies and resources available to them to comply with this PHMP.	Site Senior Executive
Drill and Blast Engineer	To ensure that the mine is designed to comply with all the requirements of this PHMP.	Site Senior Executive
Open Cut Examiners	- Comply with the requirements of the PHMP and monitor that the systems and procedures established as part of the PHMP are being implemented and followed. - Ensure that all work areas and traffic flow areas are maintained in a satisfactory condition. - Ensure that all findings and actions are recorded and communicated to all coal mine workers. - Promptly highlight any hazards to all Coal Mine Workers.	Site Operations Manager
Supervisors	- Comply with the requirements of the PHMP and monitor that the systems and procedures established as part of the PHMP are being implemented and followed in practice. - Ensure personnel under their direction remain aware of their responsibilities under the PHMP and carry them out. - Ensure that only competent and authorised personnel operate mobile equipment. - Promptly highlight to the OCE any increased risk of an incident related to operation of mobile equipment.	Site Operations Manager
Coal Mine Workers	Observe the requirements of this PHMP.	Supervisor

6. HAZARD MANAGEMENT

The SSE shall appoint personnel involved in explosives handling, blast guarding, blast controlling, magazine keeping and shot firing at Vulcan Mine.

Before appointing any person to have access to explosives or explosive precursors the SSE shall check that the person is an 'appropriate person' as defined in the Explosive Act 1999 section 33 and the Explosive Regulations 2017 section 121 and the Explosive Information Bulletin 41 as:

A person having access to explosives must have an Explosives Security Clearance, issued in Queensland under the Explosives Act 1999.

A copy of the persons Explosives Security Clearance shall be provided to Vulcan Mine Management, which will be kept with the person's training records.

Any person appointed to an explosive handling role shall notify Vulcan Mine Management immediately if there is any change to their records of criminal history, domestic violence orders or explosives security clearance.



Evidence of competency must be supplied to Vulcan Mine Management before any person may be appointed to a role associated with explosive use on site. This evidence includes, but is not limited to:

- Queensland shotfirers licence issued by the Explosives Inspectorate;
- RIIBLA201 Support Shot firing Operations;
- RIIBLA301 Conduct Shot firing Operations;
 - Security Check (as per Explosives Information Bulletin 74); and
 - Obligations under the Explosives Act 1999; Section 15. Person's appropriateness in deciding whether the person is an appropriate person.

All current appointments shall be kept on the Mine Record / training matrix.

7. STORAGE

Storage of explosives shall be in accordance with legislative requirements, VUL-PLN-014-SSAN Explosives Security Management Plan and the conditions attached to the magazine Licence.

Only authorised (by the Chief Inspector) explosives, detonators and shot firing equipment shall be used on site. Refer to DNRM Explosives Information Bulletin # 71 for the current list of authorised explosives V35 (1st July 2020).

To prevent unauthorised access or use of explosives and stored onsite:

- All high explosives products shall be stored as required by relevant explosive legislation and to the minimum standard outlined in AS2187 Part 1 – Storage of explosives and site operating procedures.
- All SSAN shall be stored, to a minimum set out under AS4326 - The storage and handling of oxidizing agents, Information Bulletin 7 and 53 and the AEISG Code for Precursors and documented in Explosives Site Security Plan
- Procedures associated with storage and handling of explosives can be found in VUL-SOP-116a Transporting, Storage and handling Explosives including:
 - The site magazines shall be situated within a licensed fenced-in compound.
 - Separate storage for explosives; detonators and Bulk Explosives (SSAN) with applicable separation distances
 - An inventory system that records the delivery, issue and return of stock movements.
 - Confirm existing stock in magazine is counted and balances to the magazine record prior to receiving new stock into magazine
 - Only appointed and authorised (by SSE) shotfirers and magazine keepers shall issue or receive explosives and detonators

Regular inspections of the magazine shall be undertaken by the licensed holder or their nominated representative with the shotfirer. Records of inspections shall be maintained in accordance with section 95(3) of the Explosives Regulations 2017.

8. TRANSPORT

Procedures associated with transporting of explosives can be found in VUL-SOP-116(a,b,c,d,e,f) Transport and Storage of Explosives including:

- IE and HE are to be transported in separate containers on an approved site compliant vehicle in control of an appointed shotfirer.
- SSAN may only be transported in a vehicle that meets the requirements relevant to the type of activity the vehicle is being used for.
- Explosive vehicles shall only be parked in designated areas.

The explosives vehicles shall be operated in accordance with VUL-SOP-076 Using Mobile Plant.



9. DESIGNING BLASTS

Blasts shall be designed by appointed, suitably qualified and competent drill and blast engineers, using appropriate electronic programs for drill and blast design. Records associated with blasts are kept electronically and as hard copy.

Use of data from previous drill pattern design experience from blasts in similar areas, knowledge of present ground conditions, referring to OCE inspection and geotechnical reports, shall be used to develop Loading and Initiation Plans for the shotfirer.

The design process shall minimise the risk of fly rock to persons and or damage to equipment, post blast (NOx) fumes as well as vibration limits. Design requirements listed in the *Aurizon Asset protection plan* (APP) must be adhered to also. Prior to issuing of charge designs, all exclusion zones shall be accounted for based on the shot design and in situ conditions.

At a minimum a 300m equipment exclusion zone will be implemented unless risk assessed utilising shot parameters for fly rock calculations and approved by the SSE. A minimum of 600m personnel exclusion zone must be maintained during the firing process.

10. CHARGING AND FIRING

Procedures associated with charging and firing explosives, including the prepping, loading, stemming and firing of all blast holes can be found in VUL-SOP-116g Charging and Firing of Explosives including:

- Quality assurance/quality control methodology to confirm quality control of drilling, loading, stemming and tie-up;
- Controls for risks associated with drilling, loading, stemming and tie-up with nearby lightning are contained within VUL-TAR-005 Lightning.
- On-bench manufacture of explosives shall be carried out only by authorised personnel in accordance with site procedures and product specifications for ammonium nitrate and emulsion using licensed MPUs;
- Barricading and sign posting loaded shots to prevent unauthorised entry and to prevent inadvertent access by persons, plant and equipment, in accordance with restricted areas and barricading;
- Establishment of exclusion zones, pre-blast inspection, clearance and blast guard placement, safety of persons, plant and equipment during blasting;
- The blast controller/OCE is responsible for clearing the shot area; and
- The shotfirer shall only initiate the shot on confirmation of clearance of Blast Area.

11. POST BLAST

Once the shotfirer has checked the blast area and is satisfied that it is safe, the shotfirer shall communicate "all clear" to the Blast Controller.

The OCE/blast controller shall conduct an inspection of work areas following the clearance of the shot to establish the need for bunding and safety barriers prior to recommencement of further activities.

Procedures associated with managing misfires and for the recovery and disposal of undetonated explosives can be found in VUL-SOP-116(h,i) Dealing with and recording Misfires including:

- Only a shotfirer, or an assistant shotfirer under the direct supervision of a shotfirer, are permitted to manage a misfire.
- If a misfire cannot be dealt with immediately, it must be barricaded at a minimum of 10m, and clearly demarcated.
- A misfire must be surveyed and location checked against drill and blast plans.
- A misfire location must be included into mine plans until cleared.
- Where a misfire has occurred in hot or reactive ground, all activities must be stopped and all persons removed to no less than 600m (or as governed by the shot parameters) from the misfired explosives, until a risk assessment has been completed to ensure the risk has been managed and controlled.



The shotfirer shall raise an incident report giving details of the misfire and recorded as per Incident Management. Notice of a misfire shall be made by the SSE or their delegate to the Inspectors of Explosives, Mines Inspectorate, Industry Safety & Health Representative and SSHR as soon as possible after becoming aware.

12. IMPLEMENTING AND MAINTAINING THE PLAN

12.1. Training

All CMWs shall receive training during site inductions covering explosives awareness.

Requirements for competencies required by equipment drivers/operators, including requirements from industry competency standards are specified within the Vulcan mine training scheme.

12.2. Communicating the Plan

The SSE is accountable for ensuring the PHMP and an overview of its content is communicated to all affected people, including contractors and service providers.

The effectiveness of this PHMP relies on all employees playing an active role and notifying other people of any potentially hazardous areas.

Any potential hazards shall be communicated to workers at shift prestart meetings, toolbox talks and OCE reports.

12.3. Document Control

All documents associated with this PHMP will be stored within the Vulcan Mine SHMS. The electronic version is the controlled copy and any hard copy document must be reviewed in the light of the controlled copy.

12.3.1 Records

Vulcan Mine will maintain records that demonstrate conformance with this PHMP. These records shall include but not be limited to:

- training records;
- results of risk assessments, audits and reviews;
- monitoring data, including survey; and
- pit designs and traffic management plans.

13. REVIEWS AND AUDITS

This PHMP shall be audited and reviewed at minimum every two years, or if the any of the following occur:

- a significant explosives incident;
- proposed changes that may impact on managing explosives at Vulcan Mine;
- a change in relevant legislation, codes, and standards; or
- evidence of explosives risks that are not satisfactorily managed by the PHMP.

14. REFERENCES

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|--|----------------------------------|
| • CSMH Act 1999 | • AS 4326 |
| • Explosives Act 1999 | • VUL-SOP-116 Suite of documents |
| • Explosives Regulation 2017 | • QGN10 |
| • DNRM Explosives Information Bulletin | • AEC |
| • CSMH Regulation 2017 | • AEISG |
| • AS2187 | • QGN20 |



15. DOCUMENT CONTROL

Version	Date	Description	Document Controller
01		Document development	Rachael Dacker
02	31/03/2021	WRAC and Document Review	Nicole Davey
03	16/11/2021	Formatting review	Rachael Dacker
04	06/03/2023	Review and update	Allira Spencer
05	03/12/2025	Administration changes	Kelly Jensen
06	11/02/2026	WRAC and Document Review	Chris Payne