MGO

MT OWEN / GLENDELL

GLENCORE

# Blast Management Plan

06/12/2024

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# 1. Commitment and policy

## 1.1 Background

This Blast Management Plan (BMP, the Plan) is one of a series of Environmental Management Plans that together form the Environmental Management Strategy (EMS) for the Mount Owen Glendell Operations (MGO).

MGO is located within New South Wales (NSW), approximately 20 kilometres north-west of Singleton. Mount Owen Pty Limited (Mt Owen), a subsidiary of Glencore Coal Pty Limited currently owns the three open cut operations in MGO, including:

a) Mount Owen (North Pit), approved under Development Consent SSD – 5850;

b) Ravensworth East (Bayswater North Pit), approved under Development Consent SSD – 5850; and

c) Glendell (Barrett Pit) approved by Development Consent DA – 80/952.

Mount Owen Mine and Ravensworth East Mine collectively comprise the Mount Owen Continued Operations (MOCO). Mining operations at MGO include the integrated use of the Mount Owen Coal Handling and Preparation Plant (CHPP), coal stockpiles and rail load-out facility.

The BMP documents the procedures for management of blasting activities for MGO, incorporating MOCO (SSD-5850) and the Glendell (DA 80/952) as modified.

Seven modifications have been approved to SSD-5850, including:

- Modification 1 (MOCO MOD 1), to facilitate the construction of a water pipeline to convey mine water from Integra Underground Mine to MGO (Hansen Bailey 2017), which was granted on 15 September 2017;
- Modification 2 (MOCO MOD 2), to maximise reserve recovery within the Glencore mining tenements, whilst minimising the overall project disturbance area (Umwelt 2018a). MOCO MOD 2 was approved by the then NSW Department of Planning and Environment (DP&E) (now Department of Planning, Housing and Industry (DPHI)) on 4 September 2019;
- MOCO MOD 3, an administrative modification was approved by the then Department of Planning, Industry and Environment (DPIE) (now DPHI) on 30 January 2020. There were no changes to statutory conditions associated with MOCO MOD 3;
- Modification 5 (MOCO MOD 5), as approved by the then DPIE on 15 January 2021 to amend the MGO Biodiversity Offset Strategy (Umwelt 2020a);
- Modification 6 (MOCO MOD 6), as approved by the then DPIE on 11 June 2021. MOCO MOD 6 allows the construction and operation of an additional pipeline between MGO and Ravensworth Operations to transfer water under the already approved Greater Ravensworth Area Water and Tailings Scheme (GRAWTS) (Umwelt 2020b).
- Modification 7 (MOCO MOD 7), as approved by DPE on 15 May 2023. MOCO MOD 7 allows for operational efficiencies between Liddell Coal Operations and MGO by facilitating more efficient water and tailings transfers. This would enable additional tailings emplacement within the South Cut Void at Liddell Coal Operations to minimise the overall size and depth of the final void, as well as minimise the need to establish additional tailings emplacement areas at Mount Owen and Ravensworth Operations.

- Modification 9 (MOCO MOD 9) approved by DPHI on 21 August 2024 to make changes to minor errors within the consent and correct miscalculations in the offset areas.

DA 80/952 has been modified on four occasions, of which the following remain applicable:

- Glendell MOD2 was approved on 25 February 2008 and increased the production rate to 4.5 Mtpa of ROM coal and extended the period of mining until 30 June 2024;
- Glendell MOD3 was approved on 1 December 2016 and facilitated the realignment of a powerline;
- MOD 4 was approved by the then DPIE on 4 March 2020 for Glendell Mine. The modification allows for a minor extension to the approved pit shell in order to access an additional approximate 2 million tonnes run of mine (Mt ROM) coal from the Barrett Pit under the existing approval (Umwelt, 2018b).
- Glendell MOD5 was approved on 1 July 2024 and permits the carrying out of mining operations until the 30 June 2026 to enable recovery of the remaining coal reserves approved for mining in MOD 4.

This BMP has been updated in 2024 to incorporate the requirements of MOCO MOD 9 and Glendell MOD 5 and supersedes the previous version of the BMP.

## 1.2 Purpose

The purpose of the BMP is to describe the controls to be implemented for the management of blasting activities and details the blast monitoring requirements undertaken as part of the operations at MGO.

This Management Plan forms part of the MGO Environmental Management System (EMS) and should be read in conjunction with the MGO ***Environmental Management Strategy***.

## 1.3 Scope

This BMP applies to all blasting activities within the MGO and addresses the relevant conditions of development consents SSD-5850 (Mt Owen and Ravensworth East Mines) and DA80/952 (Glendell Mine) as well as conditions of Environmental Protection Licences (EPLs) 4460 (Mt Owen and Ravensworth East Mine) and 12840 (Glendell Mine), as detailed in ***Section 2.1*** and **Appendix A**.

Blasting operations at MGO will be undertaken at Mt Owen North Pit, Bayswater North Pit (BNP) (also referred as Ravensworth East) and Barrett Pit.

## 1.4 Objectives

The objectives of this BMP are to:

- Establish a blast monitoring system to assess the blast and vibration impact on surrounding receivers;
- Detail the controls to be implemented to minimise blasting impacts from the site;
- Provide a blast protocol to assess monitoring results against blast impact assessment criteria to evaluate compliance;
- Manage blast-related community complaints in a timely and effective manner; and
- Detail the procedure for reporting blast criteria exceedances to relevant stakeholders.

# 1.5 Requirements of the Blast Management Plan

## 1.5.1 Statutory Requirements

***Development Consents***

Both the Mount Owen Mine Continued Operations (SSD-5850) and Glendell Mine (DA 80/952) development consents stipulate requirements related to this BMP. Several commitments in relation to blasting practices are also contained within the supporting environmental assessments and internal procedures (***Section 9.2***). A summary of these requirements and where they are addressed within this plan are presented in **Appendix A**.

***Environmental Protection Licence***

MGO surrendered Ravensworth East Mine EPL No 10860 to the EPA on the 19th of September 2019. Activities from within this licence were amalgamated in the Mt Owen Mine EPL No 4460. Activities within Glendell Mine are captured under the EPL No. 12840.

Blast monitoring and reporting conditions are detailed in the respective Licence conditions. A summary of these requirements and where they are addressed within this plan are presented in **Appendix A**.

## 1.5.2 GCAA Requirements

The GCAA ***Blast Protocol (CAA HSEC PCL 0002)*** outlines the principles for effective blast management, including:

- Blast objectives and targets are consistent with regulatory and internal requirements;
- Blasting hours and frequency are conducted in accordance with the site's environmental approvals;
- Blast mitigation measures are implemented, referencing relevant site operating procedures with documented controls and, where relevant, automated control systems. The suitability of blast management controls is to be assessed on an annual basis as part of the environmental and community (E&C) operational risk assessment conducted for the site;
- Consultation process / procedures are in place to minimise the potential for simultaneous blasting with nearby operations;
- Details regarding road closure planning are maintained;
- A provision for general blast awareness training is in place, which identifies site specific objectives and targets for blast management, potential blast impacts, environmental commitments and the site's obligations in respect of blast management;
- Provision for job training/retraining for:
    - operators, referencing site operational procedures which incorporate blast management measures; and
    - personnel tasked with the operation of blast monitoring, dust monitoring and meteorological monitoring systems.
- Monitoring and reporting systems including:
    - blast monitoring and compliance reporting;

- meteorological monitoring to detect favourable / unfavourable conditions for blasting, to be conducted as a component of the Pre-Blast Assessment Procedures; (eg Blast Signoff (Blast Pack) Procedure)
- calibration / servicing requirements for blast monitoring equipment;
- where required by legislation or other regulatory requirement, rating and recording of blast fume generation;
- incident logging, review and reporting;
- complaints logging, review and reporting; and
- internal and external audits of the operational BMP.

- A Roles and Responsibilities matrix, with responsibilities being clearly defined, for communication through all levels within the operation.

The requirements of the GCAA ***Blast Protocol*** are detailed further in the sections below. Other internal technical instructions and procedures implemented at MGO are listed in ***Table 9-1***[1]. Due to the sensitivity of content held within these documents, these are not made publicly available and are strictly for internal use by MGO personnel only.

# 1.6 Consultation

## 1.6.1 Consultation with Internal (Mount Owen) Stakeholders

Internal communications listed in are conducted in accordance with the ***GCAA Internal Communication Standard (GCAA-625379177-10330)*** and the MGO EMS. These documents provide a protocol for achieving effective and timely internal communication.

This BMP has been reviewed by members of the MGO EMS Committee and endorsed at the meeting of 28 November 2016. Details of subsequent revisions of this document are summarised in ***Section 9.4***.

Details of Training and Communication arrangements are outlined in ***Section 4.6*****.**

## 1.6.2 Consultation with External Stakeholders

The BMP was revised in June 2021 following approval of MOCO MOD 5 and MOCO MOD 6 and submitted to the then DPIE in July 2021 for approval. A copy of the DPIE approval of the Plan is provided in **Appendix B**.

A further revision of the BMP was undertaken in August 2023 following approval of MOCO MOD 7, administrative name change of MGO Pre-Blasting Assessment Procedure to MGO Blast Signoff (Blast Pack) Procedure.

The original version of this BMP and any major revisions of this plan has been prepared in consultation with EPA. Correspondence undertaken in relation to the subsequent revisions is presented in ***Table 1-1***. A copy of the consultation record is provided in **Appendix C***.*

*Table 1-1 External Stakeholder Consultation*

[1] Internal procedures have not been reviewed or endorsed by DPHI. It is the responsibility of MGO to facilitate the implementation of site procedures and align them with this management plan and conditions of consent.

| Date | Consultation Undertaken |
|---|---|
| October 2017 | Draft BMP submitted to EPA and DPIE for review. |
| July 2018 | Comments received from DPIE. |
| September 2018 | Updated BMP re-submitted to DPIE. |
| December 2019 | BMP revised and provided to EPA and the then DPIE following approval of MOCO MOD 2. |
| March 2020 | Minor administrative update to BMP, submitted to DPIE following approval of Glendell MOD 4 and MOCO MOD 3. |
| August 2023 | Update to BMP, submitted to the then DPE following approval of MOCO MOD 7 SSD-5850, consisting of minor administrative revision and as such no further consultation was considered in accordance with Schedule 2 Condition 18 of SSD5850. |
| October 2024 | BMP revised following approval of MOCO MOD 9 and Glendell MOD 5. |

# 2. Planning

## 2.1 Performance Criteria

Blasting Criteria for MGO is provided in the respective development consents and EPL's and detailed in ***Table 2-1*** below.

*Table 2-1 MGO Blasting Criteria*

| Receiver | Operation | Peak Particle Velocity (mm/s) | Allowable Exceedance | Overpressure (dBL) | Allowable Exceedance |
|---|---|---|---|---|---|
| Residence on privately-owned land [a] | Mt Owen, Glendell | 5 | 5% of the total number of blasts over a period of 12 months | 115 | 5% of the total number of blasts over a period of 12 months |
| | Mt Owen, Glendell | 10 | 0% | 120 | 0% |
| **Historic Buildings and Structures** | | | | | |
| St Clements Church | Glendell | 2 | 5% of the total number of blasts over a period of 12 months | n/a | n/a |
| | Glendell | 5 | 0% | n/a | n/a |
| St Clements Church | Mt Owen | 2 | 5% of the total number of blasts over a period of 12 months | 115 | 5% of the total number of blasts over a period of 12 months |
| | Mt Owen | 5 | 0% | 120 | 0% |
| Ravensworth Homestead | Mt Owen | 5 | 0% | 126 | 0% |
| Chain of Ponds Inn | Mt Owen | 10 | 0% | 133 | 0% |
| Kangory (Dulwich) Homestead | Mt Owen | 5 | 0% | 126 | 0% |
| Former Hebden Public School | Mt Owen | 16 | 0% | n/a | n/a |
| John Winter Memorial | Mt Owen | 250 | 0% | n/a | n/a |
| **Infrastructure** | | | | | |
| Electricity transmission poles (132kV) [b] | Mt Owen, Glendell | 50 | 0% | n/a | n/a |
| Prescribed Dams [c] | Mt Owen, Glendell | 50 | 0% | n/a | n/a |

| Receiver | Operation | Peak Particle Velocity (mm/s) | Allowable Exceedance | Overpressure (dBL) | Allowable Exceedance |
|---|---|---|---|---|---|
| Main Northern Rail Line (incl culverts and bridges) [b] | Mt Owen, Glendell | 25 | 0% | n/a | n/a |
| Public Roads [b] | Mt Owen | 100 | 0% | n/a | n/a |
| Integra Underground Mine's Surface Facilities [d] | Mt Owen | 25 or 100 [e] | 0% | n/a | n/a |
| Integra Underground Mine's Underground Workings [d] | Mt Owen | 10 or 250 [f] | 0% | n/a | n/a |
| All Other Public Infrastructure [b] | Mt Owen | 50 | 0% | n/a | n/a |

**Notes**

*a) Unless otherwise agreed with the relevant owner/s of the residence, and the Applicant has advised the Department in writing of the terms of this agreement.*

*b) Unless otherwise agreed with the relevant infrastructure provider or owner, and the Applicant has advised the Department in writing of the terms of this agreement.*

*c) Unless otherwise agreed to by the Dam Safety Committee, and the Applicant has advised the Department in writing of the terms of this agreement.*

*d) Unless otherwise agreed to by the relevant infrastructure owner and the Secretary (in writing).*

*e) 25 mm/s for occupied non-sensitive sites (e.g. factories or commercial premises) or 100 mm/s for unoccupied structures of reinforced concrete or steel construction.*

*f) 10 mm/s safety and personnel withdrawal limit for occupied underground workings and 250 mm/s structural limit for unoccupied workings.*

Blasting activities shall be undertaken so that the ground vibration and overpressure from blasting does not exceed the criteria listed above through implementation of the measures outlined in ***Section 3***. However, if a written negotiated agreement with the relevant owner/s of the residence or infrastructure provider or owner or Dam Safety Committee (DSC), and a copy of this agreement has been forwarded to the DPIE, then MGO may exceed the criteria for that location in accordance with the negotiated agreement.

## 2.2 Revision of Blasting Criteria

The criteria presented in ***Table 2-1*** have been developed in consideration of existing development consent requirements and also through the completion of research in relation to the impacts of vibration on particular structures. The MGO may therefore in the future, alter the vibration criteria based on the results of further detailed assessments and / or through further consultation with relevant government agencies and infrastructure providers. As detailed in ***Section 3***, the MGO will advise DPIE in writing of any agreements reached with relevant service providers or surrounding mining operations regarding the revision of the criteria contained within ***Table 2-1***.

# 3. Implementation

To mitigate any potential impacts from blasting activities, a number of management controls will be implemented throughout the life of the operation. These controls are detailed in the following sections. Accountabilities for the implementation of these measures are presented in ***Section 7***.

## 3.1 Operational Controls

The MGO will implement the following blast management practices over the life of the mining operations.

### 3.1.1 Blast Timing and Frequency

Approved blast timing and frequency is specified in MGO's development consents and EPL's and summarised in ***Table 3-1*** below.

*Table 3-1 Approved blast timing and frequency*

| | Mt Owen | Ravensworth East | Mt Owen/ Ravensworth East | Glendell | |
|---|---|---|---|---|---|
| | SSD-5850 | SSD-5850 | EPL 4460 | DA 80/952 | EPL 12840 |
| Approved Blasting Hours[a] | Monday to Saturday<br>9am – 5pm | Monday to Saturday<br>9am – 5pm | - | Monday to Saturday[c]<br>9am – 5pm (EST)<br>9am – 6pm (DST) | Monday to Saturday[c]<br>9am – 5pm (EST)<br>9am – 6pm (DST) |
| Approved early blasts | Monday to Saturday[b]<br>7am -9am | Monday to Saturday[b]<br>7am -9am | N/A | | N/A |
| Approved Blasting Frequency[d,e] | Maximum of two blasts per day and no more than 8 blasts per week averaged over a 12 month period | Maximum of two blasts per day and no more than 5 blasts per week averaged over a 12 month period. | - | Maximum of two single blast events[f] a day and no more than 5 single blast events[f] per week averaged over a 12 month period | - |

**Notes**

*a) No blasting will be undertaken on Sundays, public holidays or at any other time, unless written approval is obtained from the Secretary of DPIE.*

*b) With the exception of an allowable maximum of 12 blasts in a calendar year which may be undertaken between 7.00 am and 9.00 am (Monday to Saturday inclusive).*

*c) EST = Eastern Standard Time, DST = Daylight Savings Time*

*d) The total number of blasts does not apply to blasts that generate ground vibration of 0.5 mm/s or less at any residence on privately owned land, or to blast misfires or blasts required to ensure the safety of the mine or its workers or the general public.*

*e) A blast refers to a single blast event, which may involve a number of individual blasts fired in quick succession in a discrete area of the mine. For the avoidance of doubt, should an additional blast be required after a blast misfire, this additional blast and the blast misfire are counted as a single blast (for the purposes of counting blasts per day or per week).*

*f) A 'single blast event' means a blast which involves either a single detonation or a number of individual blasts fired in quick succession in a discrete area of the development. Should an*

*additional blast be required after a blast misfire, this additional blast and the blast misfire are counted as a single blast event.*

### 3.1.2 Blast Design and Operating Controls

Blast design is completed by the MGO Technical Services team. A detailed design is undertaken for each blast in order to maximise the blast efficiency while minimising dust impacts, fume generation, ground vibration, air blast overpressure and the potential for flyrock. Blasts are designed so that compliance with site specific blasting conditions are met.

Blasts will be undertaken in accordance with MGO's Blast Signoff (Blast Pack) process which includes a range of meteorological assessments and notification procedures prior to blasting. All activities relating to each individual blast event are documented in the MGO blast pack which includes a checklist to be signed off by E&C staff prior to blasting taking place.

Blast operating conditions are specified in MGO's development consents (Schedule 3, Condition 13 and 14 of SSD-5850 and DA 80/952) and include the following:

- Blasting operations at MGO will be undertaken in accordance with the blasting protocols that have been implemented to reduce potential cumulative blasting impacts (refer to ***Section 3.2***).
- Blasts will be designed so that:
    - adequate height, quantity and type of stemming is utilised in the blasting process to maximise confinement of explosive charged;
    - consideration of any geology that may affect the blast i.e. reactive ground, faults and any other geological considerations;
    - Appropriate blast products (wet / dry) will be selected based on the ground and weather conditions for each blast to minimise fume generation;
    - Designing each blast to reduce vibration at the heritage items listed in ***Section 3.3***;
    - Minimise impacts on the Main Creek alluvial aquifer;
    - Utilising blast design software to limit the Maximum Instantaneous Charge; and
    - Provide for charge distributions suited to observed face burden.
- All blasts will have a blast exclusion zone that is generated by the Blast Engineer or their delegate. The blast exclusion zone is set to be at least 500 metres from the blast, with the blast exclusion area cleared prior to any blast to so that no persons, property or livestock are at risk from blasting activities.
- Detailed monitoring of blasts over the life of the mine at relevant blast sensitive locations (refer to ***Section 4.1***).
- No blasting will take place within 500 metres of any public road or any land outside the site not owned by MGO, unless a written agreement with the relevant infrastructure owner or landowner has been reached and the terms advised to DPIE. Alternatively, the MGO will update this BMP with specific mitigation measures to be implemented while blasting is being carried out within 500 metres of the infrastructure or land.
- Periodic review of blast management procedures to evaluate performance and identify corrective action, if required.

- The MGO will monitor blasts as mining progresses, in accordance with the existing blast monitoring system, so blast prediction site rules can be further refined and future blast designs be optimised based on more detailed site information.
- Evaluating new technology and alternative blasting methodologies via a continual improvement process.

## 3.2 Blast Consultation

### 3.2.1 Notification of Blasting Activities

MGO are required to notify the community of blasting activities in accordance with development consent conditions. MGO has established a blast notification process that includes:

- Advise private landholders within three kilometres of the Mt Owen mine, and two kilometres of Glendell Mine that they can register an interest in being informed of the blasting schedule via telephone, SMS or e-mail or as otherwise agreed between the parties.
- Notification of blasting schedule and its associated changes to private landholders registered to the blasting notification service via preferred method of contact.
- MGO operates a free-call Blasting Hotline, (**Glendell Blast Hotline - 1800 730 883** and **Mt Owen Blast Hotline – 6570 0800**), the hotline is updated each morning to advise of the blasting planned for that day;
- The Blasting Hotline will operate for the life of the development and the contact number will be advertised in local newspapers at least quarterly, via the Community Newsletter and on the MGO website;
- The blasting hotline number will be displayed on the MGO website, allowing the community to be notified of up to date blasting schedules; and

MGO website will be updated on a weekly basis to include details of the blasting schedule. In the event of a post blast fume event with a category 2 or higher that has the potential to travel offsite (however unlikely), MGO will attempt to notify any potentially impacted residents or tenants and advise them of any measures that should be taken to avoid harm.

Notifications and consultation associated with blasting activities within 500m of the public road are summarised in ***Section 3.5***.

### 3.2.2 Cumulative Blasting Impact Management

MGO are required to co-ordinate the timing of blasting at the mine with nearby mines in accordance with development consent conditions. To minimise the potential for blasting to occur simultaneously with neighbouring mines, communication is undertaken to notify of intended blast times. Where there is potential for blasts at the MGO to occur concurrently with blasting at other mines, blasting times will be varied where possible. The intent of this is to avoid the possibility of overpressure and vibration wave reinforcement due to simultaneous detonation.

### 3.2.3 Integra Underground

A risk-based protocol for *Blasting Interaction - Integra Underground* for Mt Owen blasts within 500m of any Integra workings has been developed and includes the following measures:

- Determination of the Mt Owen blast schedule in consultation with Integra Underground Mine, to avoid unnecessary disruption to Integra's operations;
- Notification of confirmed blast schedule at least 24 hours in advance;
- Blasting procedures enacted at Mt Owen once clearance of all personnel from the management zone is confirmed by Integra when required;
- Establishment of dedicated blast vibration monitoring point at the surface near the extent of the underground workings (this location will be used to assess the vibration limits of the underground workings through a modelling and verification process that is agreed between the parties);
- Establishment of a blast monitoring point at the surface facilities of the Integra Underground Mine Shaft; and
- Ongoing consultation and reporting of monitoring results.

Ongoing review and evaluation of the implementation of the protocol will occur throughout the life of the operation and this BMP will be updated as required.

In addition to these controls, Integra Underground Operations will be notified of any blast at MGO that is predicted to exceed either:

- 10 mm/s at occupied underground workings, or
- 250 mm/s (structural limit) at unoccupied workings.

### 3.2.4 Main Northern Rail Line

The Main Northern Rail Line, an asset of the Australian Rail and Track Corporation (ARTC) is located immediately to the south of the Glendell development consent area.

A blasting deed between Glendell Mine and ARTC was signed on 5 November 2013. This entitles Glendell to conduct blasting within 500 metres of the Main Northern Rail Line in accordance with the requirements of the Deed. A copy of this deed has been supplied to DPHI.

### 3.2.5 132kV Powerlines

A 132kV powerline is located west of the Glendell Mine Disturbance Boundary. The alignment of the powerline enters the northern boundary of the Glendell Mine site near the intersection of the mine's access road and Hebden Road. Traversing south, the powerline crosses Swamp Creek and runs generally along the alignment of the Disturbance Boundary until it is diverted west and heads outside of the DA 80/952 Boundary across the Main Northern Railway Line, Swamp Creek, Bowmans Creek and the New England Highway in the south.

Glendell Mine has implemented a self-imposed 200 m safety buffer between the existing powerline and mining activities so that any impacts from blasting activities on the powerline are minimised as far as possible.

### 3.2.6 Ashton Mine Infrastructure

When mining in the Southern area of the Glendell Pit, blasting will be undertaken with 500 metres of the Ashton Operations including the Infrastructure associated with the Ashton CHPP. Notification procedures are in place at Glendell to notify the Ashton operation of a planned blasts.

## 3.3 Managing Blasting Impacts on Heritage Items

To facilitate compliance with the vibration criteria identified in the development consents (refer **Appendix A**) monitoring will be undertaken in locations at the identified property, or in a representative location as detailed in ***Section 4.1***. In the event that a potential exceedance of the vibration limits for the heritage items is recorded at a representative location, an investigation will be undertaken in accordance with ***Section 4.3***.

The *Blast Impact Assessment undertaken for the Mt Owen Continued Operations Project* (Enviro Strata Consulting 2014) undertook modelling to assess the potential impact of blasting based on the model specified for MGO conditions. Results from Enviro Strata Consulting 2014 regarding indirect impacts to listed and non-listed heritage items are shown in ***Table 3-2.***

*Table 3-2 Indirect impacts to listed and non-listed Historical Heritage Items*

| Site | Listing | Predicted Range of Maximum Ground Vibration (mm/s) | Compliance Limit (mm/s) |
|---|---|---|---|
| Ravensworth Homestead | Local | 01 – 2.9 | 5 |
| Former Chain of Ponds Inn | State | 0.1 – 0.6 | 10 |
| Middle Falbrook Bridge over Glennies Creek | State | 0.1 to 1.3 | N/A |
| Greylands and Outbuildings | Local | Less than 0.1 to 0.5 | N/A |
| Ravensworth Public School (former) | Local | 0.1 to 0.5 | N/A |
| St Clements Church | Local | Less than 0.1 to 0.9 | 5<br>2 (5% of the year) |
| Community Hall, Camberwell | Local | Less than 0.1 to 0.8 | N/A |
| Camberwell Glennies Creek Underbridge | Local | 0.1 to 0.9 | N/A |
| Former Dulwich Homestead (Kangory Homestead) | Local | 0.1 to 0.7 | 5 |
| John Winter Memorial | Not Listed | 0.7 to 6.4 | 250 |
| Hebden Public School (Former) | Not Listed | 0.7 to 6.3 | 16 |

In accordance with Section 5.4 of the ***Historic Heritage Management Plan***, none of the 'listed items' detailed in ***Table 3-2*** have a predicted ground vibration level that exceeds 3 mm/s. As such, there are not expected to be any direct or indirect impacts to the listed items as part of the Project. As no impacts on these sites are proposed or predicted, no management measures are required in relation to these items.

The 'non-listed' sites include the John Winter Memorial and the (former) Hebden Public School where the predicted maximum ground vibration is expected to be 6.4 and 6.3 mm/s respectively. This is well within the compliance limit of 250 mm/s for the John Winter Memorial and 16 mm/s for the former Hebden Public School. There are not expected to be any impacts (either direct or indirect as a result of vibration from blasting) at either of the sites. As such, no further management measures are recommended.

The sites have both been photographically recorded as part of the preparation of the Mount Owen Continued Operations Project Environmental Impact Statement, Umwelt 2015. Operational blasting controls to manage impacts on heritage items are outlined in ***Section 3.1*** with the monitoring of the Heritage sites detailed in ***Section 4.1***.

## 3.4 Structural Property Inspections and Investigations

Structural Property inspections will be undertaken by MGO in accordance with the relevant MGO Development Consent and EPL requirements (refer **Appendix A**).

## 3.5 Road Closure and Notification

Blasting activities at MGO are not anticipated to be undertaken within 500 metres of a public road in current operational areas.

In accordance with Condition 15 (c) of SSD 5850, in, a Road Closure Management Plan will be developed in consultation with Council or relevant road authority to the satisfaction of the Secretary. This will be prepared if blasting is required within 500 m of a public road, as confirmed with DPIE in June 2021. **Appendix C** includes correspondence from DPIE confirming this requirement.

Consultation and notification measures undertaken in preparation of blasting within 500 metres of a public road would be detailed within the Road Closure Management Plan.

In brief, the Road Closure Management Plan would include provisions for:

- Notifying relevant roads authorities of any planned public road closures;
- Minimising the duration of closures, both on a per event basis and weekly basis;
- Avoiding peak traffic periods as far as practicable;
- Coordinating with neighbouring mines to minimise cumulative effect of road closures; and
- Notification measures of temporary road closure to local community prior to events, including but not limited to existing notification measures detailed in ***Section 3.2.1*** and advertisement within local newspapers when a public road is to be closed.

Blasting in the BNP will be undertaken within 500 metres of the Mt Owen access road (private road). When this is undertaken, the access road will be cleared and blast sentries will be positioned along the access road so that no personnel can enter within the restricted zone.

## 3.6 Fume Management

MGO minimises blast fume using all reasonable and feasible measures. Further detail describing the management and prevention of fume at the MGO is outlined in **Appendix D**.

## 3.7 Managing Blasting Impacts on Main Creek

Main Creek is located to the southeast of the Mt Owen open cut mining pit, see ***Figure 4-1***. The distance between the North Pit boundary and the top of the Main Creek high bank is approximately 160 m and approximately 150 m to the edge of the mapped alluvium (at the closest point). Mt Owen is committed to minimising blasting impacts on the Main Creek alluvial aquifer in accordance with Schedule 3 Condition 13 (a) of SSD-5850 (as modified).

As outlined in Section 6.3.5 of the MOCO MOD 2 SEE (Umwelt, 2018a), there are no specific geotechnical or geomorphological features either within Main Creek or between the North Pit boundary and Main Creek that would increase the potential effects of blasting on Main Creek and associated alluvium. Accordingly, the assessment undertaken (Enviro Strata Consulting, 2018) focussed on determining an appropriate blast impact limit to prevent impacts to Main Creek as well as examine the potential for proposed blasting activities to result in physical impacts beyond the North Pit boundary (i.e. risks of surface cracking).

The Main Creek blast assessment established a stability assessment criterion of 100 mm/s for the high bank of Main Creek (Enviro Strata Consulting, 2018). This criterion was established through a review of the geotechnical assessments undertaken for the North Pit and similar previous blast impact assessment studies undertaken. The associated alluvium material does not present any specific, distinct feature on the ground that could be affected by ground vibration, and therefore a specific vibration limit for the alluvium is not required.

Geotechnical assessments indicate the area surrounding Main Creek consists of moderately strong rock strata (i.e. average UCS range 36.5 -87.5 MPa), which can sustain substantial blast impacts. From a blasting perspective, it is not likely to be susceptible to fracturing from blast vibration and therefore presents a low to negligible risk of fracturing strata and subsequent water seepage from Main Creek (Enviro Strata Consulting, 2018).

It is estimated that the risks of strata fracturing due to blasting in North Pit near Main Creek are potentially limited to a distance of approximately 12 m from the blasting area. A 100 mm/s criterion has been established for the high bank of Main Creek, which in combination with regular inspections should provide adequate measure to alert/prevent surface damage (Enviro Strata Consulting, 2018).

When blasting within 300 m of Main Creek high bank predictive vibration modelling targeting established criterion of 100 mm/s will be used in association regular monthly and daily site inspections along the eastern highwall of the North Pit after each blast, in order to identify and monitor blast induced surface impacts such as surface cracking.

Additionally, Mt Owen will undertake basic geotechnical inspections of the surface conditions surrounding the immediate blast area following any blast located within 300m of the Main Creek high bank. Surface areas identified as significantly cracked due to blasting will be monitored before and after any blast located within 300m of the Main Creek high bank to identify any potential change in condition. A review of the blast design processed will be undertaken by a qualified geochemical engineer if surface cracking beyond 12 m is observed.

# 4. Measurement and Evaluation

## 4.1 Monitoring

Blast Monitoring will be undertaken as shown in ***Figure 4-1*** and ***Figure 4-2*** in accordance with the following requirements:

a) MGO will monitor blasts at locations that are representative of the closest private residences as detailed in the EPLs to determine whether air blast and ground vibration limits are met as outlined in ***Table 2-1***.

MGO will also monitor blasts from Glendell Mine at infrastructure locations including Powerlines, and the Main Northern Rail Line, to determine whether air blast and ground vibration limits detailed in ***Table 2-1*** are met. Vibration results from blasting in the BNP and Mt Owen Mine are not anticipated to impact on these infrastructure locations.

b) Prescribed Dams under the DSC have a defined Notification Area where blasting must not be conducted without the prior consent of the DSC. In the event Blasting is undertaken within the Notifications Areas of TP1 and Stage 2 Tailings Dams (refer to ***MGOOC-1779562647-587 – Tailings Management Plan***), notification will be made by the Technical Services Manager and blast monitoring locations will be defined for the prescribed dam. Following this, the BMP will be updated and submitted to the DPIE.

c) In the event blasting is required to be undertaken within 500 metres of a public road, a Road Closure Management Plan will be developed (as detailed in ***Section 3.5***) that will include monitoring of the road so that the vibration limit of 100 mm/s limit is not exceeded.

d) MGO will also monitor all blasts so that blasting on the site does not damage heritage items. Ensuring compliance with the limits specified in ***Table 2-1*** will be undertaken in accordance with the following:

- Blasts from Glendell Mine will be monitored at the St Clements Church.
- Blasts from Mt Owen and Bayswater North Pits will be monitored at the following locations:
  - Chain of Ponds Inn;
  - Ravensworth Homestead;
  - Former Hebden Public School and John Winter Memorial; and
  - St Clements Church.
- Kangory (Dulwich) Homestead – As the predicted vibration recordings from the Mt Owen and BNP pits are anticipated to be between 0.1 and 0.7 mm/s at the Kangory Homestead, direct monitoring at the homestead will not be required. However, an existing monitor (MOC 2) located between the Mt Owen and BNP pits and the Kangory Homestead on Glennies Creek Road (Refer to ***Figure 4-1***) will be used to facilitate compliance with the limits at this location.

Monitoring of blasts for the Mt Owen and BNP at the Chain of Ponds, Former Hebden School, John Winter Memorial, St Clements Church and the Integra monitoring locations will commence within 2 weeks of the approval of this BMP. Monitoring of Blasts at the Ravensworth Homestead for the Mt Owen Mine will also commence within 2 weeks of the approval of this plan.

e) The Blast Monitoring system is designed and built in accordance with the Australian Standard AS 2187.2 – 2006 (Appendix J). The blast monitors are calibrated every 3 months in accordance with the standard and have direct traceability to National Standards.

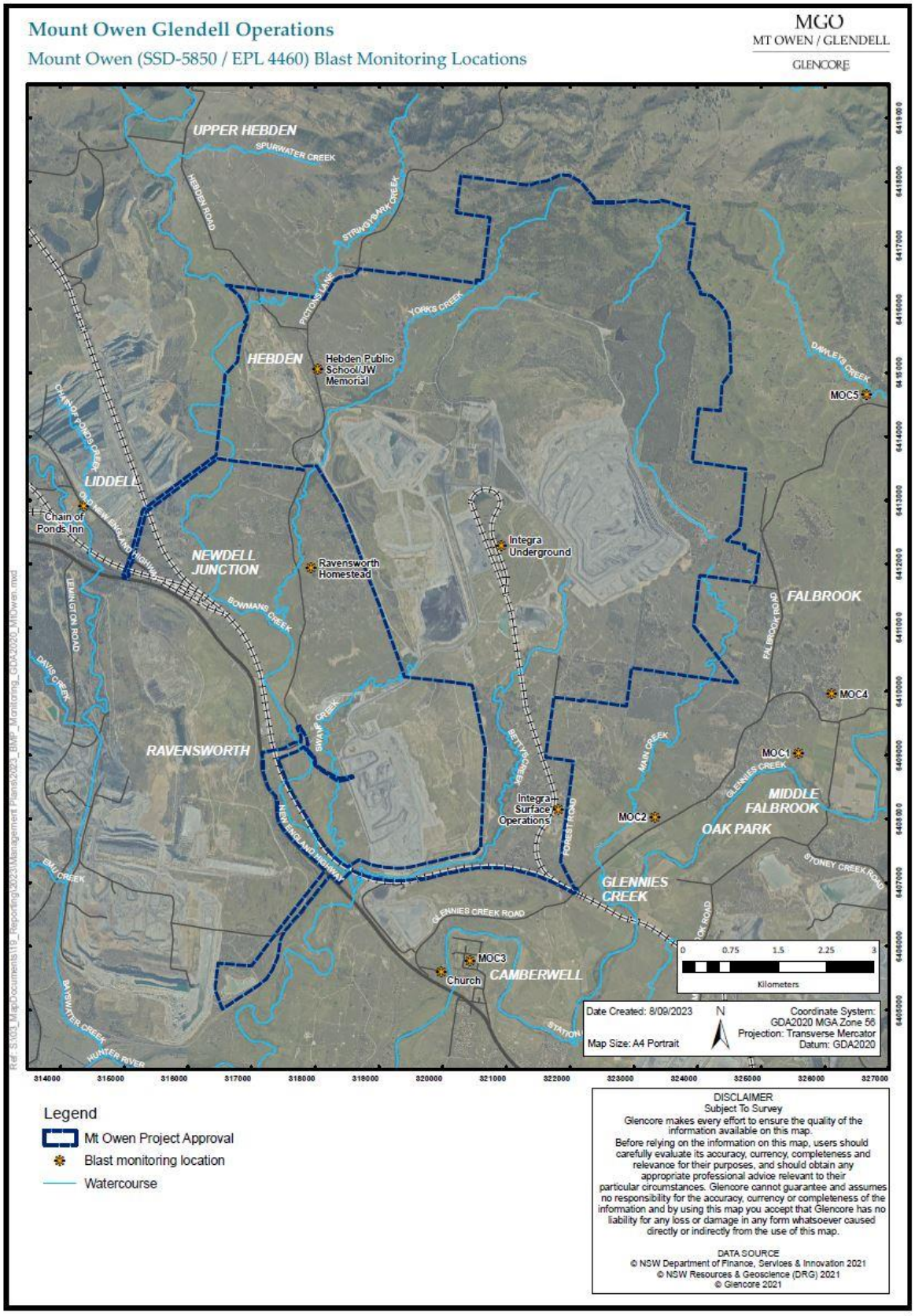


*Figure 4-1 Mt Owen Blast Monitoring Locations*

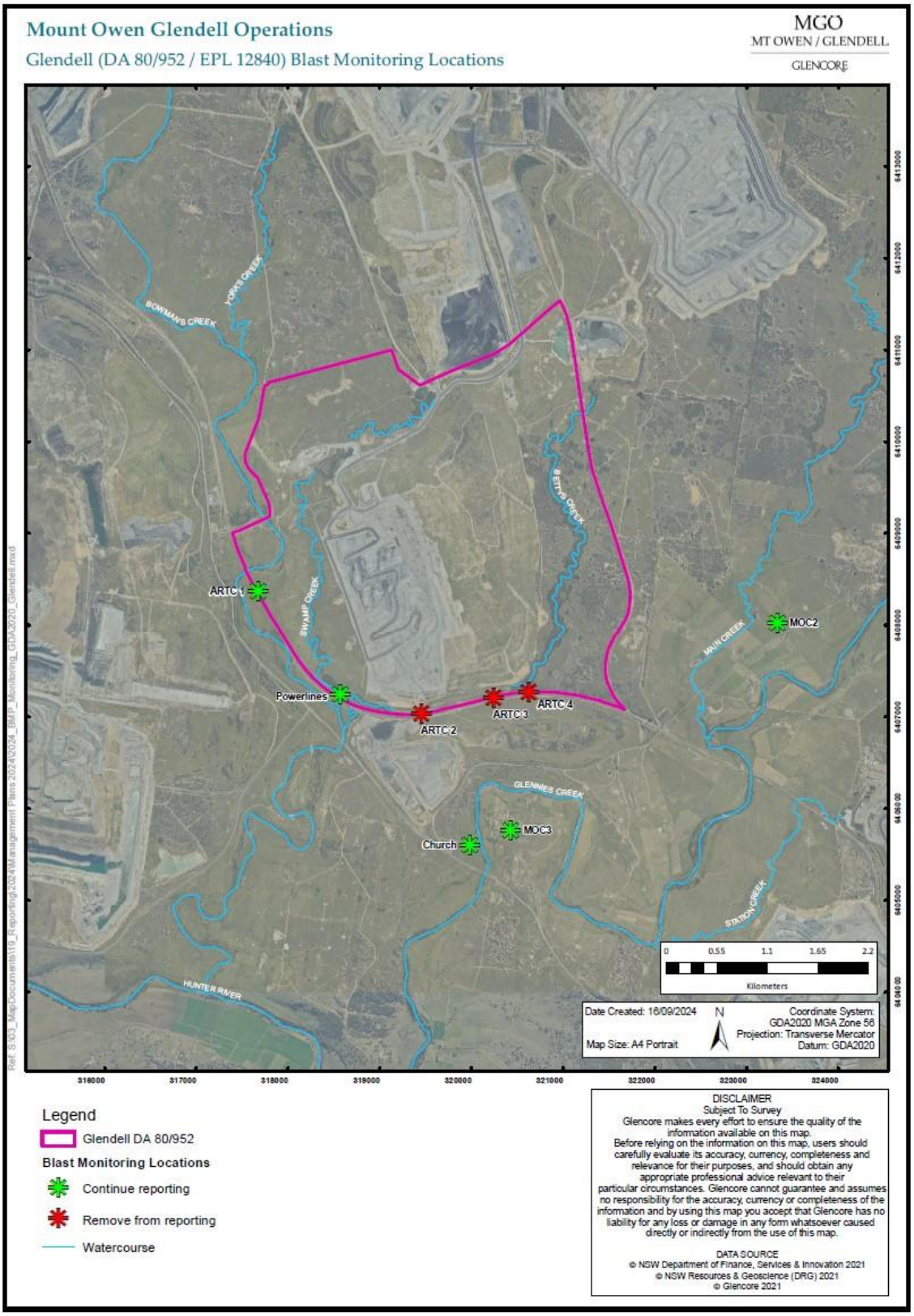


*Figure 4-2 Glendell Mine Blast Monitoring Locations*

The following table provides a summary of the blast monitoring locations depicted in ***Figure 4-1*** and ***Figure 4-2***.

*Table 4-1 Summary of Blast Monitoring Locations*

| Receiver | Operation | Monitoring Location | Comments |
|---|---|---|---|
| Residence on privately-owned land | Glendell Mine | MOC 2 | Monitoring on Glennies Creek Road (private residence) |
| | | MOC 3 | Monitoring in Camberwell Village |
| | Mt Owen Mine and BNP | MOC 1 | Monitoring in the Middle Falbrook Area |
| | | MOC 2 | Monitoring on Glennies Creek Road (private residence) |
| | | MOC 3 | Monitor located in Camberwell Village |
| | | MOC 4 | Monitor located in the Middle Falbrook Area |
| | | MOC 5 | Monitoring in the Goorangoola Area |
| **Historic Buildings and Structures** | | | |
| St Clements Church | Glendell Mine<br>Mt Owen Mine and BNP | Church | Monitor located at the St Clements Church |
| Ravensworth Homestead | Mt Owen Mine and BNP | Homestead | Monitor located at the Ravensworth Homestead |
| Chain of Ponds Inn | Mt Owen Mine and BNP | Chain of Ponds Inn | Monitor located at Chain of Ponds Inn |
| Kangory (Dulwich) Homestead | Mt Owen Mine and BNP | MOC 2 | Monitor located along Glennies Creek Road between Mt Owen and Kangory |
| Former Hebden Public School | Mt Owen Mine and BNP | Hebden School and JW Memorial | Monitor located at the Former Hebden School |
| John Winter Memorial | Mt Owen Mine and BNP | Hebden School and JW Memorial | Monitor located at the Former Hebden School (close proximity to the memorial) |
| **Infrastructure** | | | |
| Electricity transmission poles (132kV) | Glendell Mine | Powerlines | Monitor located along the 132kV powerlines |
| Prescribed Dams | Mt Owen Mine and BNP | N/A | Monitoring of the prescribed dam (TP1) will be undertaken when blasting is conducted within the DSC notification area. |
| Main Northern Rail Line | Glendell | ARTC 1 | Removal of redundant ARTC 2, ARTC 3, and ARTC 4 blast monitors and relocation of ARTC 1 to a more representative location for monitoring conducted within the path of maximum blasting impact along the Main Northern Railway, following consultation |

| Receiver | Operation | Monitoring Location | Comments |
|---|---|---|---|
| | | | with ARTC and in accordance with their requirements |
| Public Roads | Mt Owen Mine and BNP | N/A | In the event blasting is conducted within 500 metres of a public road, a road closure management plan will be developed that will include monitoring of the road so that the vibration limit of 100 mm/s limit is not exceeded. |
| Integra Underground Mine's Surface Facilities | Mt Owen Mine | Integra Monitor (surface) | A blast monitor will be positioned at the surface facilities near the Integra underground Mine Shaft to assess the vibration from the Mt Owen and BNP blasts. |
| Integra Underground Mine's Underground Workings | Mt Owen Mine | Integra Monitor (underground) | A blast Monitor will be positioned on the surface near the Integra underground workings to assess the vibration from the Mt Owen and BNP blasts. |
| All Other Public Infrastructure | Mt Owen Mine and BNP | N/A | No other public Infrastructure to be monitored. |

## 4.2 Record Keeping

All blast monitoring data is maintained in accordance with the EMF and is maintained on the premise for a period of 4 years.

## 4.3 Reporting

Environmental monitoring result summaries, compliance with Consent and Licence conditions and any required modifications to the blast monitoring will be reported in the Annual Review. Summaries will also be made available to the public via MGO's website in accordance with the EPA requirements for publishing monitoring data.

Blast monitoring results will also be presented at Community Consultative Committee (CCC) meetings.

### 4.3.1 Incident Reporting

All incidents will be reported in accordance with the ***MGO Hazard and Incident Management Procedure*** and the ***GCAA HSEC STD 6.0 Incident*** (or its latest revision).

If monitoring results identify an exceedance of the performance criteria outlined in ***Table 2-1***; except where a negotiated agreement has entered into in relation to the impact, MGO will notify regulators (DPHI and EPA) immediately after becoming aware of the event. Affected Landowners will also be notified as soon as practicable. A report will be provided to DPHI and other relevant agencies within 7 days of the exceedance, in accordance with Schedule 5, Condition 9 of MGO's development consents. The report will:

- Describe the date, time, and nature of the exceedance / incident;
- Identify the cause (or likely cause) of the exceedance / incident;

- Describe what action has been taken to date; and
- Describe the proposed measures to address the exceedance / incident.

### 4.3.2 Corrective Action

***Table 4-2*** summarises the potential blasting related issues that may arise and the appropriate corrective action(s) that will be taken.

*Table 4-2 Corrective Actions*

| Issue | Action(s) |
|---|---|
| Single exceedance of EPL/DA maximum conditions for airblast or ground vibration criteria (eg 120dBL and 10mm/s) | Investigation of exceedance, undertaking mitigating measures for future blasting where applicable.<br>Report exceedance to EPA and DPIE immediately.<br>Report in Annual Review and EPL Annual Return.<br>Report to senior management. |
| Single measured maximum ground vibration or airblast reading greater than the 5% per annum criteria (ie blast greater than 115dBL and less than 120dBL) | Investigate exceedance to determine contributing factors to mitigate potential recurrences. |
| Exceedance of 5% per annum criteria for overpressure or ground vibration (e.g. 115 dBL and 5mm/sec respectively) | Investigation of exceedances leading to exceedance of criteria, including the identification and implementation of measures for future blasting where applicable.<br>Report exceedance to EPA and DPHI immediately.<br>Report in Annual Review and EPL Annual Return.<br>Report to senior management. |
| Community complaint | Investigations of complaint, undertaking mitigating measures where applicable and provide feedback to complainant.<br>Provide feedback to mine planning and production personnel, where relevant.<br>Report complaint to senior management.<br>Report in the Annual Review. |
| Private property damage as a result of blasting operations | Investigation of issue, initiation of measures where appropriate.<br>Report issue to senior management. |

## 4.4 Complaint Resolution

All complaints received by MGO are managed in accordance with the **GCAA Community Complaint Management (GCAA-625378177-10296)** standard and the EMF that details the process so that complaints are properly documented and handled in accordance with licence requirements and company policy.

In response to blast-related complaints, an investigation into the complaint will be completed by a member of the MGO E&C team. The subsequent complaint notification report shall include details of the complaint along with details on the following:

- Confirmation that the blast was undertaken at MGO;
- Relevant blast details including location, time, design parameters etc;

- A review of relevant monitoring results for the blast including vibration and overpressure and meteorological conditions;
- An assessment of compliance against consent and EPL conditions; and
- Follow up response to the complainant.

If requested, following the complaint investigation, the complainant will be provided with the details of the investigation report including what actions were taken to mitigate any further blast impacts. This is not possible for complaints of an anonymous nature where contact details are not provided.

MGO maintains a dedicated free-call community response line (1800 730 883) that is advertised at least quarterly in the local newspapers, provided in each edition of the Greater Ravensworth Community Newsletter and displayed on the MGO website.

As a minimum, complaints received via the community response line are relayed immediately by SMS to the MGO E&C Manager, and the Mt Owen and Glendell Production Supervisor on-shift as required.

Complaints and enquiries do not have to be received on the Hotline and may be received in any other form. Any complaint or enquiry relating to environmental management or performance is to be relayed to the MGO E&C Manager as soon as practical. All employees are responsible for ensuring the prompt relaying of complaints.

The MGO E&C Manager or their delegate is responsible for ensuring that all complaints are appropriately investigated, actioned and that information is fed back to the complainant, unless requested to the contrary.

A summary of complaints received and actions taken is presented in the Annual Review and to the MGO CCC as part of the operational performance review. A complaints register is updated monthly on the MGO website located at:

*https://www.glencore.com.au/operations-and-projects/coal/current-operations/mt-owen-glendell-open-cut/community-documents*.If a complaint of structural damage is received from any private landholder, an investigation will be conducted to resolve the complaint, with the approval of the complainant.

## 4.5 Independent Review

If a landowner considers the operation to be in exceedance of the impact assessment criteria, they may request an independent review of the effects of the operation on their land. Such a request must be made in writing to the Secretary of DPHI. If the Secretary determines that an independent review is to be undertaken, MGO must follow the procedures outlined in the relevant development consent.

## 4.6 Training

Training for MGO employees and contractors is undertaken in accordance with the MGO EMS. Generic blast management training is provided to all employees and contractors through the **GCAA Generic Surface Induction and the Site Familiarisation (Glencore).**

From time to time, workforce communication days and toolbox talks allow for discussion of the objectives and requirements of this and any other relevant Management Plans.

To facilitate the effective implementation of blast management controls, all Mt Owen Glendell Operations personnel involved in the Drill and Blast process will undertake general blast awareness training annually, as well as more specific training on environmental obligations relating to blasting, such as the operation of blast and weather monitoring systems. Additionally, blast awareness training will be undertaken if there is a change in personnel.

# 5. Review and Improvement

## 5.1 Plan Review

This BMP and associated documents will be reviewed every three years in accordance with the MGO EMS, and as per Schedule 5, Condition 6 of the consents (SSD-5850 and DA 80/952)**,** that is within 3 months of:

a) The submission of an Annual Review;

b) The submission of an incident report;

c) The submission of an audit; or

d) Any modification to the conditions of this consent (unless the conditions require otherwise).

The Plan will also be reviewed following relevant outcomes from a risk assessment or change management process.

If any significant modifications to the BMP are required as an outcome of the review, relevant government agencies will be consulted regarding the changes and the revised Plan will be submitted to DPIE for approval. Minor changes such as formatting edits will be discussed verbally with DPHI prior to completion and will be made following DPIE confirmation. These edits will be tracked with version control (refer to ***Section 9.4***) on the MGO website.

This BMP may also be revised due to:

- Deficiencies being identified;
- Introduction of additional mitigation measures or controls;
- Results from the monitoring and review programme, including exceedances of criteria;
- Recommendations resulting from the monitoring and review programme;
- Changing environmental requirements;
- Improvements in knowledge or technology becoming available;
- Changes in legislation;
- Identification of a requirement to alter this BMP following a risk assessment; or
- Updating of the Mining Operations Plan.

## 5.2 Audit

In accordance with the Development Consents of Mt Owen and Glendell, initially within 12 months of approval, and every three years thereafter, MGO will commission an Independent Environmental Audit to the satisfaction of DPHI. The Audit will include an assessment of the adequacy of the BMP and blast monitoring program. Where necessary following the audit, the Plan will be updated to include action taken to improve blasting performance and blasting management practices.

# 6. Commitments

All commitments outlined within this management plan are detailed in ***Table 6-1*** below. Management commitments requiring actioning will be entered into the Mt Owen / Glendell Operations Compliance Management system (CMO) and actioned. Records of documentation associated with the management commitments will also be maintained within CMO.

*Table 6-1 Management Plan Commitments*

| No. | Commitment | Where addressed in Management Plan | Completion Status |
|---|---|---|---|
| 1 | MGO will notify neighbouring mines, relevant authorities, neighbouring properties and internal contacts prior to blasting. The public will be provided with up to date information regarding the blasting schedule.<br>Notification of blasting activities will be undertaken in accordance with the following:<br>• Residents requesting blasting notification will be notified accordingly.<br>• A free call blasting hotline will be updated each morning to advise of the blasting planned for that day.<br>• The blasting hotline will be advertised in the local newspapers at least quarterly, via the Community Newsletter and on the MGO Website.<br>• A Blasting schedule will be displayed on the Website notifying the community of potential blasting activities for the week.<br>• All blasts will be communicated to the various adjoining mine sites to minimise the risk of simultaneous blasting. In the event the blast is delayed or postponed, this will also be communicated with the nearby sites. | ***Section 3.1.2***<br>***Section 3.2.1*** | *Ongoing* |
| 2 | MGO will conduct a periodic review of blast management procedures to evaluate performance and identify corrective actions, if required. | ***Section 3.1.2*** | *Ongoing* |
| 3 | A blast protocol will be updated and agreed for blasting interactions with the Integra Underground prior to Integra Underground recommencing operations | ***Section 3.2.3*** | *Complete* |
| 4 | Integra Underground Operations will be notified of any blast at MGO that is predicted to exceed either:<br>• 10mm/s at occupied underground workings, or<br>• 250mm/s (structural limit) at unoccupied workings. | ***Section 3.2.3*** | *Ongoing* |
| 5 | When blasting within 300 m of the Main Creek highbank, predictive vibration modelling will be utilised targeting vibration levels below 100 mm/s criteria. As part of existing operational procedures, Mt Owen will continue to undertake inspections along the eastern highwall of the North Pit on a monthly basis, in conjunction with high wall stability inspections required for operational safety purposes in order to identify and monitor blast induced surface impacts such as surface cracking. | ***Section 3.7*** | *Ongoing* |
| 6 | In the event Blasting is undertaken within the Notifications Areas of TP1 and Stage 2 Tailings Dams (refer to *XMO SD PLN 0012 – Tailings Management Plan*), notification will be made by the Technical Services Manager and blast monitoring locations will be defined for the prescribed dam. | ***Section 4.1*** | *Not yet triggered* |

| No. | Commitment | Where addressed in Management Plan | Completion Status |
|---|---|---|---|
| 7 | The blast monitoring system is designed and built in accordance with the Australian Standard AS2187.-2006 (Appendix J). The blast monitors are calibrated in accordance with the standard and have direct traceability to National Standards. | ***Section 4.1*** | *Ongoing* |
| 8 | Environmental monitoring result summaries, compliance with Consent and Licence conditions and any required modifications to the blast monitoring will be reported in the Annual Review. Summaries will also be made available to the public via the Mt Owen / Glendell Operations website in accordance with the EPA requirements for publishing monitoring data. | ***Section 4.3*** | *Ongoing* |
| 9 | Blast monitoring results will be presented at Community Consultative Committee (CCC) meetings and will also be made available to the public via the MGO Website. These results are to be updated monthly. | ***Section 4.3*** | *Ongoing* |
| 10 | Generic blast management training is provided to all employees and contractors through the GCAA *Generic Surface Induction* and the *Site Familiarisation*. | ***Section 4.6*** | *Ongoing* |
| 11 | To facilitate the effective implementation of blast management controls, all Mt Owen / Glendell Operations personnel involved in the Drill and Blast process will undertake general blast awareness training annually or if there is a change in personnel. | ***Section 4.6*** | *Ongoing* |
| 12 | In the event a blast produces a post blast fume rating of 3 at its highest extent and leaves the site, and any blast that rates 4 or 5, must be reported to DPIE. All notification to the DPIE will be made via the Environment and Community Manager or their delegate. | ***Appendix D*** | *Ongoing* |

# 7. Accountabilities

Section 3.1 of the MGO ***Environmental Management Framework*** identifies the roles and responsibilities of all employees and contractors for the environmental management of the complex. In addition to this, the key accountabilities associated with this AQMP are presented in ***Table 7-1***.

*Table 7-1 Accountabilities*

| Role | Accountabilities for this document |
|---|---|
| Operations Manager | • Approve the BMP<br>• Confirm that the Plan is relevant to current operations.<br>• Provide adequate resources for the implementation of this Plan. |
| Environment & Community Manager | • Oversee the implementation of the BMP.<br>• Coordinate blast monitoring in accordance with this Plan.<br>• Notify regulatory authorities and affected landholders of any blasting related exceedance and undertake associated reporting.<br>• Coordinate periodic reviews of this Plan.<br>• Facilitate reporting of blasting activities and confirm they are undertaken in accordance with the requirements of this plan.<br>• Facilitate training of personnel in accordance with this Management Plan. |
| Environment and Community Coordinator / Officer | • Assist the Environment and Community Manager as required in the implementation of this Plan.<br>• Assist the Drill and Blast Engineer with investigations of blasting exceedances, incidents or complaints.<br>• Liaise with the Drill and Blast Engineer to maintain the blasting hotline and the Blast schedule on the website.<br>• Coordinate the implementation of the MGO blast monitoring program in accordance with this Plan.<br>• Coordinate the management of records and reporting of blast monitoring results.<br>• Manage blasting related complaints in accordance with the complaints management procedure.<br>• Provide training to all relevant personnel.<br>• Develop and maintain a protocol to minimise the potential for simultaneous blasting with other nearby mines.<br>• Where relevant, notify private residents of blasting times and any subsequent modifications to blasting times.<br>• Confirm blast monitoring is inspected and calibrated in accordance with Supplier requirements. |
| Drill and Blast Engineer/Technician | • Regularly review blast design parameters on the basis of blast monitoring records.<br>• Design and carry out blasts to comply with the requirements of this Plan, including the identification of meteorological blasting exclusion windows<br>• Establish and maintain blast exclusion zones and buffer zones for each blast<br>• Review all blast designs so that risk of wavefront reinforcement is minimised or prevented from occurring<br>• Develop blasting practises that manage blast fume through;<br>a) Minimising sleep times for shots. |

| Role | Accountabilities for this document |
|---|---|
| | b) Choosing the correct explosive product for the conditions.<br>• Assess meteorological conditions prior to blasting to determine whether conditions are appropriate for blasting, in consultation with the Environment and Community Coordinator and in accordance with the relevant procedures.<br>• Confirm that the blast monitoring network is active prior to blasting.<br>• Advise the E&C Coordinator of the current blasting schedule, including changes to the schedule.<br>• Maintain records for blasts initiated, including date, location of blast holes and quantity of explosive used each day<br>• Assist the Environment and Community Coordinator with investigations into blasting exceedances, incidents or complaints. |
| Technical Services Manager | • To advise the DSC when blasting is undertaken in the notification area of a Prescribed Dam. |
| Drill and Blast Superintendent/Supervisor | • Confirm the drill pattern is drilled in accordance with the blast design; and<br>• Confirm that the blast is loaded with the correct quantity and quality of explosive and stemmed in accordance with the blast design<br>• Confirm all legal requirements are complied with during blasting operations |
| Shotfirers | • Notify the Drill and Blast Engineer and Supervisor of any factors that may lead to non-compliance with this Plan.<br>• Comply with the pre-blast checklist.<br>• Load and fire blasts in accordance with the design supplied by the Drill and Blast Engineer. |
| Drillers | • Record drill status, including hole depths, pattern and relevant information, including any environmental issues. |
| All personnel | • Comply with the requirements of this Plan. |

# 8. Definitions

| Term | Definition |
|---|---|
| **Airblast/ Overpressure** | An airborne shock wave resulting from detonation of explosives. An airblast may be caused by blasted material movement or the release of expanding gas into the air. |
| **ARTC** | Australian Rail and Track Corporation |
| **Blast Exclusion Window** | The arc of prevailing wind direction calculated on an individual blast basis and designed to minimise the risk of adverse dust or fume impacts at private residences. |
| **Blasting** | Any activity involving the use of explosives for the purpose of producing an explosion to fragment rock for mining. |
| **BNP** | Bayswater North Pit |
| **CCC** | Community Consultative Committee |
| **CHPP** | Coal Handling Preparation Plant |
| **CMO** | Mt Owen's compliance management system |
| **dBL** | Airblast recording of the blast measured in Decibels (linear) |
| **DPIE** | Department of Planning, Industry and Environment |
| **DSC** | Dam Safety Committee |
| **DST** | Daylight Savings Time |
| **EMS** | Environmental Management System |
| **EPA** | Environment Protection Authority |
| **EPL** | Environmental Protection Licence |
| **EST** | Eastern Standard Time |
| **Flyrock** | Rock that is propelled outside of the blasting area through the air or along the ground as a result of the detonation of explosives. |
| **GCAA** | Glencore Coal Assets Australia Pty Ltd |
| **Ground vibration** | The movement of the ground caused by the blast wave emanating from the blast. |
| **Maximum instantaneous charge** | Is the amount of explosives detonated (or "fired") at the same moment in time |
| **MGO** | Mt Owen Glendell Operations |
| **MTO** | Mt Owen Pty Ltd |
| **NOx** | Multiple combinations of oxides of nitrogen ($N_2O$, NO, $NO_2$, $N_2O_4$, $N_2O_3$, $N_2O_5$) with nitrogen dioxide ($NO_2$) being the principle hazardous nitrous fume. |
| **Particle Velocity** | A measure of ground vibration. Particle velocity describes the velocity at which a particle of ground vibrates when excited by a seismic wave. |
| **Post-blast fume** | Gases generated by the detonation of explosives during blasting. |
| **TSR** | Travelling Stock Reserve |

# 9. Document Information

## 9.1 Relevant Legislation

- *Dams Safety Act 2015;*
- *Environmental Planning and Assessment Act 1979;*
- *Explosives Act 2003;*
- *Heritage Act 1977;*
- *Protection of the Environment Operations Act 1997;* and
- *Work Health and Safety (Mines and Petroleum Sites) Act 2013.*

## 9.2 Related Documents

Related documents, listed in ***Table 9-1*** below, are internal documents directly related to or referenced from this document. These documents have not been reviewed or endorsed by DPIE as part of this BMP.

*Table 9-1 Related Documents*

| Number | Title |
|---|---|
| **GCAA** | |
| GCAA-625378177-9992 | 6.0 Incident Standard |
| CAA HSEC PCL 0002 | GCAA Blast Protocol |
| GCAA-625379177-10330 | GCAA Internal Communication Standard |
| GCAA-625378177-10296 | 10.05 Community Complaint Management |
| **Mount Owen Glendell Operations** | |
| MGOOC-1779562647-4860 | Blast Signoff (Blast Pack) |
| MGOOC-1779562647-11191 | MGO Environmental Management Framework |
| MGOOC-899305957-18 | Hazard and Incident Management Procedure |
| MGOOC-1779562647-587 | Tailings Management Plan |
| MGOOC-1779562647-275 | Explosives Control Plan |
| MGOOC-1779562647-10971 | Creek Diversions Management Plan |

***Note***

*Due to the sensitivity of content of these internal instructions and procedural documents, these are not made publicly available and are strictly for internal use by MGO personnel only.*

## 9.3 Reference Information

Reference information, listed in ***Table 9-2*** below, is information that is directly related to the development of this document or referenced from within this document.

*Table 9-2 – Reference Information*

| Reference | Title |
|---|---|
| ANZECC 1990 | Technical Basis for Guidelines to Minimise Annoyance Due to Blasting Overpressure and Ground Vibration |
| AS2187:1998 | Explosives – Storage, Transport and Use |
| AS 2187.2 | Explosives – Storages and use – Use of explosives |
| Enviro Strata Consulting 2014 | Blast Impact Assessment for the Mt Owen Continued Operations Assessment |
| Enviro Strata Consulting 2018 | Review of the Impact of Blasting on Rock Strata Fracturing on Main Creek |
| Hansen Bailey 2017 | *Integra to Mount Owen Complex. Water Pipeline Modification Environmental Assessment* |
| ISO9001:2015 | Quality Management System |
| Umwelt 2007 | Environmental Assessment for Modification of Glendell Mine Operations |
| Umwelt 2015 | Mount Owen Continued Operations Project Environmental Impact Statement |
| Umwelt 2018a | Mount Owen Continued Operations Project - Modification 2: Statement of Environmental Effects |
| Umwelt 2018b | Glendell Mine Modification 4 Statement of Environmental Effects |
| Umwelt 2020a | *Mount Owen Continued Operations Project Modification Report Modification 5* |
| Umwelt 2020b | *Mount Owen Continued Operations Project Modification 6 Modification Report* |
| Enviro Strata Consulting 2021 | ARTC Vibration Monitor Location |
| ARTC 2021 | Ravensworth – Mt Owen Glendell Operations – Blast Monitor Removal |
| James Bailey and Associates 2022 | Mount Owen Continued Operations Project Modification 7, Modification Report |
| James Bailey and Associates 2023 | Glendell Mine Modification 5, Modification Report |

## 9.4 Change Information

Full details of the document history are recorded in the document control register, by version. A summary of the current change is provided in ***Table 9-3*** below.

*Table 9-3 Change Information*

| Version | Date | Review team (consultation) | Change Summary |
|---|---|---|---|
| 1.0 | 2005 | HSEC Manager | Creation of management plan |
| 2.0 | Nov 2008 | E&C Coordinator, HSEC Manager | Updated as result of development consent conditions |
| 3.0 | Nov 2011 | MGO E&C Manager, E&C Coordinator | Updated with current practices and applicable standards |
| 4.0 | November 2012 | MGO E&C Manager, Operations Manager | Updated with current practices and applicable standards |
| 5.0 | September 2013 | MGO E&C Manager, E&C Coordinator | Updated to reflect MGO ownership change, inclusion of a reference to the Fume Management Plan and general update |
| 6.0 | May 2014 | MGO E&C Manager, E&C Coordinator, Thiess Senior Environmental Officer. | Updated plan to include comments from DPIE and current practices. |

| Version | Date | Review team (consultation) | Change Summary |
|---|---|---|---|
| 7.0 | September 2014 | MGO E&C Manager | Added mining manager signoff on blasts outside of the exclusion arc |
| 8.0 | December 2015 | MGO E&C Manager | Transferred document into the Glencore Template and updated the training and review sections and added GCAA requirements. |
| 9.0 | November 2016 | Mount Owen Complex EMS Committee | Updated to be generally in accordance with GCAA requirements, SSD 5850 and DA 80/952 MOD 3. |
| 9.1 | February 2017 | E&C Manager, Thiess Senior Environmental Advisor, Glendell E&C Coordinator | Updates to document following feedback from DPIE, which includes:<br>Inclusion of Pre blasting assessment processes;<br>Blast fume management processes;<br>Inclusion of additional blast monitoring locations for Mt Owen and BNP; and<br>Managing blast impacts on heritage items. |
| **New SharePoint Version History** | | | |
| 1.0 | October 2017 | E&C Manager, Thiess Senior Environmental Advisor, Glendell E&C Officer. | Updates to Integra blasting interactions and referenced onsite procedures. |
| 2.0 | September 2018 | MGO E&C Manager, Glendell E&C Officer | Updates to document in accordance with comments received from DPIE. Moved Statutory Requirements from Section 1.5 to Appendix A.<br>Included Completion Status column in Commitments Table.<br>Included more detail on complaints and incidents, as requested by DPIE. |
| 3.0 | October 2018 | Document Controller | Added Planned Review Date to Cover. |
| 4.0 | March 2020 | E & C Department. | Update document as per approved MOCO Mod 2 SSD-5850. |
| 5.0 | March 2020 | E & C Department | Minor administrative revision to incorporate Glendell MOD 4 DA 80/952 and MOCO MOD 3 SSD-5850. |
| 6.0 | June 2021 | E & C Department | Minor administrative revision to incorporate MOCO MOD 5 and MOCO MOD 6 for SSD-5850. |
| 7.0 | October 2023 | E & C Department | Update document to incorporate MOCO MOD 7 SSD-5850, minor administrative revision to Appendix D – Blast Fume Management, MGO Blast Signoff (Blast Pack) Procedures and Mt Owen Blast Monitoring Locations indicating new location of integra underground blast monitor. |
| 8.0 | March 2024 | E & C Department | Revised to include reference ***GCAA HSEC STD 6.0 Incident.*** Plan updated following consultation with ARTC, to remove ARTC 2, ARTC 3, ARTC 4 blast monitors and include relocation of ARTC 1 blast monitor to a more representative location along the path of the Main Northern Rail Line to capture current and future maximum blasting impacts from Glendell site. Minor administrative changes to incorporate MOCO MOD 9 and Glendell MOD 5. |

# Appendix A - Statutory Requirements

*Table A-1 Relevant Development Consent Conditions*

<table>
<tr><th>Mount Owen Mine (SSD 5850)</th><th>Glendell Mine (DA 80/952)</th><th>Condition</th><th>Relevant Section of Plan</th></tr>
<tr><td>Schedule 3 Condition 8</td><td></td><td>Blasting Criteria<br>The Applicant must ensure that blasting on site does not cause exceedances of criteria in Table 4:<br><br>Table 4: Blasting criteria
<table>
<tr><th>Location</th><th>Airblast overpressure (dB(Lin Peak))</th><th>Ground vibration (mm/s)</th><th>Allowable exceedance</th></tr>
<tr><td rowspan="2">Residence on privately-owned land [a]</td><td>120</td><td>10</td><td>0%</td></tr>
<tr><td>115</td><td>5</td><td>5% of the total number of blasts over a calendar year</td></tr>
<tr><td colspan="4">Historic buildings and structures</td></tr>
<tr><td rowspan="2">St Clements Church</td><td>120</td><td>5</td><td>0%</td></tr>
<tr><td>115</td><td>2</td><td>5% of the total number of blasts over a calendar year</td></tr>
<tr><td>Ravensworth Homestead</td><td>126</td><td>5</td><td>0%</td></tr>
<tr><td>Chain of Ponds Inn</td><td>133</td><td>10</td><td>0%</td></tr>
<tr><td>Kangory (Dulwich) Homestead</td><td>126</td><td>5</td><td>0%</td></tr>
<tr><td>Former Hebden Public School</td><td>-</td><td>16</td><td>0%</td></tr>
<tr><td>John Winter Memorial</td><td>-</td><td>250</td><td>0%</td></tr>
<tr><td colspan="4">Infrastructure</td></tr>
<tr><td>Electricity transmission lines [b]</td><td>-</td><td>50</td><td>0%</td></tr>
<tr><td>Prescribed dams [c]</td><td>-</td><td>50</td><td>0%</td></tr>
<tr><td>Main Northern Rail Line [b]</td><td>-</td><td>25</td><td>0%</td></tr>
<tr><td>Public roads [b]</td><td>-</td><td>100</td><td>0%</td></tr>
<tr><td>Integra Underground Mine's surface facilities [d]</td><td>-</td><td>25 or 100 [e]</td><td>0%</td></tr>
<tr><td>Integra Underground Mine's underground workings [d]</td><td>-</td><td>10 or 250 [f]</td><td>0%</td></tr>
<tr><td>All other public infrastructure [b]</td><td>-</td><td>50</td><td>0%</td></tr>
</table>
a Unless otherwise agreed with the relevant owner/s of the residence, and the Applicant has advised the Department in writing of the terms of this agreement.<br>b Unless otherwise agreed with the relevant infrastructure provider or owner, and the Applicant has advised the Department in writing of the terms of this agreement.<br>c Unless otherwise agreed to by the Dam Safety Committee, and the Applicant has advised the Department in writing of the terms of this agreement.<br>d Unless otherwise agreed to by the relevant infrastructure owner and the Secretary (in writing).<br>e 25 mm/s for occupied non-sensitive sites (e.g. factories or commercial premises) or 100 mm/s for unoccupied structures of reinforced concrete or steel construction.<br>f 10 mm/s safety and personnel withdrawal limit for occupied underground workings and 250 mm/s structural limit for unoccupied workings.</td><td>Section 2.1 and Section 4.1</td></tr>
<tr><td>Schedule 3 Condition 9</td><td></td><td>Blasting Hours<br>The Applicant must only carry out blasting on site between 9 am and 5 pm (Monday to Saturday inclusive), with the exception of an allowable maximum of 12 blasts in a calendar year which may be undertaken between 7 am and 9 am (Monday to Saturday inclusive). No blasting is allowed on Sundays, public holidays or any other time without the agreement of the Secretary.</td><td>Section 3.1.1</td></tr>
</table>

| Mount Owen Mine (SSD 5850) | Glendell Mine (DA 80/952) | Condition | Relevant Section of Plan |
|---|---|---|---|
| Schedule 3 Condition 10 | | **Blasting Frequency**<br>The Applicant may carry out a maximum of:<br>a) 2 blasts a day at the Ravensworth East Mine;<br>b) 2 blasts a day at the Mount Owen Mine;<br>c) 5 blasts a week at the Ravensworth East Mine, averaged over a calendar year; and<br>d) 8 blasts a week at the Mount Owen Mine, averaged over a calendar year.<br>This condition does not apply to blasts that generate ground vibration of 0.5 mm/s or less at any residence on privately-owned land, or to blast misfires or blasts required to ensure the safety of the mine, its workers or the general public.<br>Notes:<br>• For the purposes of this condition, a blast refers to a single event, which may involve a number of individual blasts fired in quick succession in a discrete area of the mine.<br>• For the avoidance of doubt, should an additional blast be required after a blast misfire, this additional blast and the blast misfire are counted as a single blast, for the purpose of calculating the maximum number of daily and weekly blasts under this condition. | *Section 3.1.1* |
| Schedule 3 Condition 11 | | **Property Inspections**<br>If the Applicant receives a written request from the owner of any privately-owned land within 3 kilometres of any approved open cut mining pit on site for a property inspection to establish the baseline condition of any buildings and/or structures on his/her land, or to have a previous property inspection updated, then within 2 months of receiving this request the Applicant must:<br>a) commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties to:<br>o establish the baseline condition of any buildings and other structures on the land, or update the previous property inspection report; and<br>o identify measures that should be implemented to minimise the potential blasting impacts of the development on these buildings and/or structures; and<br>b) give the landowner a copy of the new or updated property inspection report.<br>If there is a dispute over the selection of the suitably qualified, experienced and independent person, or the Applicant or the landowner disagrees with the findings of the property inspection report, either party may refer the matter to the Secretary for resolution. | *Section 3.4* |

| Mount Owen Mine (SSD 5850) | Glendell Mine (DA 80/952) | Condition | Relevant Section of Plan |
|---|---|---|---|
| Schedule 3 Condition 12 | | **Property Investigations**<br>If the owner of any privately-owned land within 3 kilometres of any approved open cut mining pit on site claims that buildings and/or structures on his/her land have been damaged as a result of blasting on the site, then within 2 months of receiving this claim the Applicant must:<br>a) commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties to investigate the claim; and<br>b) give the landowner a copy of the property investigation report.<br>If this independent property investigation confirms the landowner's claim, and both parties agree with these findings, then the Applicant must repair the damage to the satisfaction of the Secretary.<br>If there is a dispute over the selection of the suitably qualified, experienced and independent person, or the Applicant or the landowner disagrees with the findings of the independent property investigation, then either party may refer the matter to the Secretary for resolution. | *Section 3.4* |
| Schedule 3 Condition 13 | | **Blast Operating Conditions**<br>The Applicant must:<br>a) implement all reasonable and feasible measures to:<br>o protect the safety of people and livestock from blasting impacts in the areas surrounding blasting operations;<br>o protect public or private infrastructure/property in the surrounding area from damage from blasting operations<br>o minimise blasting Impacts on the Main Creek alluvial aquifer;<br>o minimise the dust and fume emissions of any blasting; | *Section 3* |
| | | b) ensure that blasting on the site does not damage heritage items, and develop specific measures to protect the Ravensworth Homestead, Chain of Ponds Inn, Kangory (Dulwich) Homestead, Former Hebden Public School and John Winter Memorial from any blasting damage associated with the development; | *Section 3.3 and Section 4.1* |
| | | c) minimise the frequency and duration of any road closures, and use all reasonable efforts to avoid road closures for blasting during peak traffic periods; | *Section 3.5* |
| | | d) operate a suitable system to enable members of the public to get up-to-date information on the proposed blasting schedule on site and associated road closures, including, on request, notification via SMS message of the blasting schedule and associated public road closures for that day and any variations to that schedule and closures; | *Section 3.2.1* |

| Mount Owen Mine (SSD 5850) | Glendell Mine (DA 80/952) | Condition | Relevant Section of Plan |
|---|---|---|---|
| | | e) use all reasonable endeavours to co-ordinate the timing of blasting at the site with any nearby mines (including the Glendell and Rix's Creek North Mines) to minimise cumulative blasting impacts; and | *Section 3.2.2* |
| | | f) carry out regular monitoring to determine whether the development is complying with the relevant conditions of this consent. | *Section 4.1* |
| Schedule 3 Condition 14 | | The Applicant must not undertake blasting on site within 500 metres of any public road or any land outside the site not owned by the Applicant, unless the Applicant has:<br>a) a written agreement with the relevant infrastructure owner or landowner to allow blasting to be carried out closer to the infrastructure or land, and the Applicant has advised the Department in writing of the terms of this agreement; or | *Section 3.1.2* |
| | | b) demonstrated to the satisfaction of the Secretary that the blasting can be carried out closer to the infrastructure or land without compromising the safety of people or livestock or damaging the infrastructure and / or other buildings and structures, and the Secretary has approved an updated Blast Management Plan that includes specific mitigation measures to be implemented while blasting is being carried out within 500 metres of the infrastructure or land. | |
| Schedule 3 Condition 15 | | The Applicant must prepare a Blast Management Plan for the development to the satisfaction of the Secretary. This plan must: | |
| | | a) be prepared in consultation with the EPA, and submitted to the Secretary for approval prior to the commencement of development under this consent, unless the Secretary agrees otherwise; | *Section 1.6.2* |
| | | b) describe the measures that will be implemented to ensure compliance with the blast criteria and operating conditions of this consent; | *Section 3* |
| | | c) include a road closure management plan for blasting within 500 metres of a public road, that has been prepared in consultation with applicable roads authorities and includes provisions for:<br>o notifying relevant roads authorities of any planned public road closures;<br>o minimising the duration of closures, both on a per event basis and weekly basis;<br>o avoiding peak traffic periods as far as practicable; and<br>o coordinating with neighbouring mines to minimise the cumulative effect of road closures; | *Section 3.5* |
| | | d) propose and justify any agreed alternative ground vibration limits for public infrastructure in the vicinity of the site (if relevant); | *Section 2.2* |

<table>
<tr><th>Mount Owen Mine (SSD 5850)</th><th>Glendell Mine (DA 80/952)</th><th>Condition</th><th>Relevant Section of Plan</th></tr>
<tr><td></td><td></td><td>e) include an agreed strategy for the management of potential blast interactions within 500 metres of any approved and/or developed underground workings for the Integra Underground Mine, and includes details of:<br>○ systems for the prior and timely notification of scheduled blasting and subsidence activities;<br>○ personnel evacuation and safety protocols for specific blast events; and<br>○ procedures and protocols for managing the interaction of the two mines; and</td><td>Section 3.2.3</td></tr>
<tr><td></td><td></td><td>f) include a monitoring program for evaluating and reporting on compliance with the blasting criteria and operating conditions of this consent.</td><td>Section 4.1</td></tr>
<tr><td></td><td></td><td>The Applicant must implement the approved Blast Management Plan as approved from time to time by the Secretary.</td><td>Section 5</td></tr>
<tr><td></td><td>Schedule 3 Condition 9</td><td>BLASTING AND VIBRATION<br>Airblast Overpressure Impact Assessment Criteria<br>The Applicant must ensure that the airblast overpressure level from blasting at the development does not exceed the criteria in Table 6 at any residence on privately-owned land.<br><br>Table 6: Airblast overpressure impact assessment criteria<br><table><tr><th>Airblast overpressure level (dB(Lin Peak))</th><th>Allowable exceedance</th></tr><tr><td>115</td><td>5% of the total number of blasts over a period of 12 months</td></tr><tr><td>120</td><td>0%</td></tr></table></td><td>Section 2.1 and Section 4.1</td></tr>
</table>

<table>
<tr><th>Mount Owen Mine (SSD 5850)</th><th>Glendell Mine (DA 80/952)</th><th>Condition</th><th>Relevant Section of Plan</th></tr>
<tr><td></td><td>Schedule 3 Condition 10</td><td>Ground Vibration Impact Assessment Criteria<br>The Applicant must ensure that the ground vibration[a] level from blasting at the development does not exceed the criteria at the receivers[b] in Table 7.<br><br>Table 7: Ground vibration impact assessment criteria<br><table><tr><th>Receiver</th><th>Peak particle velocity (mm/s)</th><th>Allowable exceedance</th></tr><tr><td rowspan="2">Residence on privately-owned land</td><td>5</td><td>5% of the total number of blasts over a period of 12 months</td></tr><tr><td>10</td><td>0%</td></tr><tr><td rowspan="2">St Clements Church</td><td>2</td><td>5% of the total number of blasts over a period of 12 months</td></tr><tr><td>5</td><td>0%</td></tr><tr><td>Main Northern Railway culverts and bridges</td><td>25</td><td>0%</td></tr><tr><td>Electricity transmission poles</td><td>50</td><td>0%</td></tr></table><br>[a]Vibration must be measured in accordance with applicable guidelines, including EPA's Assessing Vibration: A Technical Guideline (2006).<br>[b]The receivers referred to in Table 7 are shown in Appendix 4.<br><br>However, if the Applicant has a written negotiated agreement with the relevant service provider, and a copy of this agreement has been forwarded to the Department and EPA, then the Applicant may exceed the criteria for the Main Northern Railway culverts and bridges and electricity transmission poles in accordance with the negotiated agreement.</td><td>Section 2.1 and Section 4.1</td></tr>
<tr><td></td><td>Schedule 3 Condition 11</td><td>Blasting Hours<br>The Applicant must only carry out blasting on site between 9am and 5pm Monday to Saturday (EST) inclusive, and 9am to 6pm Monday to Saturday (DST) inclusive. No blasting is allowed on Sundays, public holidays, or at any other time without the written approval of the Secretary.</td><td>Section 3.1.1</td></tr>
</table>

| Mount Owen Mine (SSD 5850) | Glendell Mine (DA 80/952) | Condition | Relevant Section of Plan |
|---|---|---|---|
| | Schedule 3 Condition 12 | **Blasting Frequency**<br>The Applicant may carry out a maximum of:<br>a) 2 single blast events[a] a day; and<br>b) 5 single blast events[a] a week, averaged over a 12 month period.<br><br>This condition does not apply to blasts that generate ground vibration of 0.5 mm/s or less at any residence on privately-owned land, or to blast misfires or blasts required to ensure the safety of the mine, its workers or the general public.<br><br>*Notes:*<br>• *[a]A 'single blast event' means a blast which involves either a single detonation or a number of individual blasts fired in quick succession in a discrete area of the development. Should an additional blast be required after a blast misfire, this additional blast and the blast misfire are counted as a single blast event.* | *Section 3.1.1* |
| | Schedule 3 Condition 13 | **Operating Conditions**<br>During mining operations on site, the Applicant must implement best blasting practice to:<br>a) protect the safety of people, property, public infrastructure, and livestock from blasting impacts in the areas surrounding blasting operations;<br>b) minimise the dust and fume emissions from blasting at the development, to the satisfaction of the Secretary. | *Section 3* |
| | Schedule 3 Condition 14 | The Applicant must not undertake blasting within 500 metres of any privately-owned land or any land not owned by the Applicant, unless suitable arrangements have been made with the landowner and any tenants to minimise the risk of flyrock-related impact to the property to the satisfaction of the Secretary. | *Section 3.1.2* |
| | Schedule 3 Condition 15 | **Road Closure**<br>Prior to blasting within 500 metres of any public road, the Applicant must prepare a Road Closure Management Plan for the development in consultation with Council and to the satisfaction of the Secretary.<br>The Applicant must implement the approved plan as approved from time to time by the Secretary. | *Section 3.5* |

| Mount Owen Mine (SSD 5850) | Glendell Mine (DA 80/952) | Condition | Relevant Section of Plan |
|---|---|---|---|
| | Schedule 3 Condition 16 | **Public Notice**<br>During mining operations on site, the Applicant must:<br>a) notify the landowner/occupier of any residence within 2 kilometres of the mining area who registers an interest in being notified about the blasting schedule at the mine;<br>b) operate a Blasting Hotline, or alternate system agreed to by the Secretary, to enable the public to get up-to-date information on the blasting schedule at the development;<br>c) advertise the blasting hotline number in a local newspaper at least 4 times each year, and<br>d) publish an up-to-date blasting schedule on its website,<br>to the satisfaction of the Secretary. | *Section 3.2.1* |
| | Schedule 3 Condition 17 | **Property Inspections**<br>At least 6 months prior to blasting within 2 kilometres of any privately-owned land, the Applicant must advise applicable landowners that they are entitled to a structural property inspection.<br>If the Applicant receives a written request for a structural property inspection from the landowner, the Applicant must within 3 months of receiving this request and prior to blasting within 2 kilometres of the property:<br>a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Secretary, to inspect the condition of any building or structure on the land, and recommend measures to mitigate any potential blasting impacts; and<br>b) give the landowner a copy of the property inspection report. | *Section 3.4* |
| | Schedule 3 Condition 18 | **Property Investigations**<br>If any landowner of privately-owned land within 2 kilometres of the mining area claims that buildings and/or structures on his/her land have been damaged as a result of blasting at the development, the Applicant must within 3 months of receiving this claim:<br>a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Secretary, to investigate the claim; and<br>b) give the landowner a copy of the property investigation report. If this independent property investigation confirms the landowner's claim, and both parties agree with these findings, then the Applicant must repair the damages to the satisfaction of the Secretary.<br>If the Applicant or landowner disagrees with the findings of the independent property investigation, then either party may refer the matter to the Secretary for resolution. | *Section 3.4* |

| Mount Owen Mine (SSD 5850) | Glendell Mine (DA 80/952) | Condition | Relevant Section of Plan |
|---|---|---|---|
| | Schedule 3 Condition 19 | **Blast Monitoring Program**<br>The Applicant must prepare a Blast Monitoring Program for the development to the satisfaction of the Secretary. This program must:<br>a) be prepared in consultation with the EPA;<br>b) be submitted to the Secretary for approval by the end of April 2008; and<br>c) include a protocol for evaluating blasting impacts on, and demonstrating compliance with the blasting criteria in this consent for:<br>o privately-owned residences and structures;<br>o St Clements Church;<br>o Main Northern Railway; and<br>o electricity transmission lines.<br>The Applicant must implement the approved program as approved from time to time by the Secretary. | *Section 4.1* |
| | SoC 1.4.3 | The Applicant will continue monitoring of meteorological conditions and consideration of weather data in the timing of blasts to minimise the impacts of blast generated dust, particularly on residents to the south and south-east of the project. | *Section 3.1.2* |
| | SoC 1.4.8 | Use of adequate stemming in blast holes. | *Section 3.1.2* |
| | SoC 1.8.1 | **Blast and Vibration**<br>**Blasting in Proximity to Infrastructure**<br>The Applicant will undertake further consultation with ARTC, including entering into an agreement to cover blasting practices in proximity to the Main Northern Railway, prior to mining being undertaken within 500 metres of the Main Northern Railway. | *Section 3.2.4* |
| | SoC 1.8.2 | The Applicant will undertake further consultation with Ausgrid prior to undertaking detailed design of blasts in proximity to the 132kV transmission line within the Glendell Mine site. | *Section 3.2.5* |
| | SoC 1.8.3 | The Applicant will undertake further consultation with surrounding mining companies to seek to establish blasting protocols which minimise potential cumulative impacts of blasting practices. | *Section 3.2.2* |
| | SoC 1.9.1 | **Blast Controls**<br>Other blast controls will include:<br>Designing and undertaking blasts to ensure that vibration and airblast limits are met, including consideration of wind speed and direction prior to blasting to minimise impacts on neighbours; | *Section 3.1.2* |
| | SoC 1.9.2 | Design blasts so that predicted vibration levels at the St Clements Church are less than 2 mm/s; | *Section 3.3* |
| | SoC 1.9.3 | Detailed monitoring of blasts over the life of the mine to inform the detailed design of blasts and modification of blast designs as necessary; | *Section 3.1.2 and Section 4.1* |
| | SoC 1.9.4 | Training all relevant personnel on environmental obligations in relation to blasting controls; | *Section 4.6* |

| Mount Owen Mine (SSD 5850) | Glendell Mine (DA 80/952) | Condition | Relevant Section of Plan |
|---|---|---|---|
| | SoC 1.9.5 | Monitoring blasts at the nearest non-mined owned residence and St Clements Church to verify vibration and airblast limits are met; | *Section 4.1* |
| | SoC 1.9.6 | Documentation of the date, location of blast holes and quantity of explosives used each day; and | *Section 3.1.2* |
| | SoC 1.9.7 | Periodic review of blast management procedures to evaluate performance and identify corrective action, if required. | *Section 5* |

*Table A-2 Relevant EPL Conditions*

| Mount Owen Mine (EPL 4460) | Glendell Mine (EPL 12840) | Condition | Relevant Section of Plan |
|---|---|---|---|
| L4.1 | L3.1 | The airblast overpressure level from blasting operations in or on the premises must not exceed 115 dB (Lin Peak) for more than 5% of the total number of blasts during each reporting period at either monitoring point in Condition P1.3 | ***Section 2.1*** |
| L4.2 | L3.2 | The airblast overpressure level from blasting operations in or on the premises must not exceed 120dB (Lin Peak) at any time at either monitoring point in Condition P1.3 | ***Section 2.1*** |
| L4.3 | L3.3 | The ground vibration peak particle velocity from blasting operations in or on the premises must not exceed 5mm/second for more than 5% of the total number of blasts during each reporting period at either monitoring point in Condition P1.3 | ***Section 2.1*** |
| L4.4 | L3.4 | The ground vibration peak particle velocity from blasting operations in or on the premises must not exceed 10mm/second at any time at either monitoring point in Condition P1.3 | ***Section 2.1*** |
| | L3.5 | The licensee shall only carry out blasting on site between 9am and 5pm, Monday to Saturday (EST) inclusive, and 9am to 6pm Monday to Saturday (DST) inclusive. No blasting is allowed on Sundays, public holidays or any other time without written approval of the EPA. | ***Section 3.1.1*** |
| L4.5 | L3.6 | Offensive blast fume must not be emitted from the premises. | ***Section 3.6*** |

# Appendix B - Blast Management Plan Approval

# Appendix C - External Consultation Records

Planning, Industry & Environment

Jason Desmond
Environment and Community Manager
Mt Owen Pty Ltd
158 Hebden Road
Ravensworth NSW 2330

17/06/2021

Dear Mr Desmond

**Mount Owen Continued Operations Project (SSD 5850)**
**Road Closure Management Plan**

I refer to your letter dated 3 June 2021 regarding the requirement to prepare a Road Closure Management Plan as a component of the Blast Management Plan required under condition 15(c) of Schedule 3 of the development consent for the Mount Owen Continued Operations Project (SSD 5850).

The Department has carefully reviewed the conditions of consent, and the approved Blast Management Plan, and considers that a Road Closure Management Plan is only required to be prepared when blasting is proposed to be conducted within 500 m of a public road.

If you wish to discuss the matter further, please contact Joe Fittell on 02 4908 6896 or via email at joe.fittell@planning.nsw.gov.au.

Yours sincerely

Matthew Sprott
Director
Resource Assessments (Coal & Quarries)

As the Planning Secretary's nominee

6 Kings Road,
Broadmeadow NSW 2292
Locked Bag 1,
Broadmeadow, 2292

**P** 02 4952 0209
**E** info@artc.com.au
**W** artc.com.au

21 September 2021

Mr Anthony Billings
Environment and Community Officer
Mt Owen Glendell Operations
Glencore
Email: Anthony.billings@glencore.com.au

Dear Anthony

**Ravensworth – Mt Owen Glendell Operations – Blast monitor removal**

I refer to your request regarding the removal of blast monitoring equipment due to Glencore's blasting operation being greater than 500 metres from Australian Rail Track Corporation (ARTC) infrastructure.

ARTC have considered this request and support Mt Owen Glendell Operations ceasing the monitoring at the current ARTC infrastructure monitoring sites ARTC 1, ARTC 2 ARTC 3 and ARTC 4 subject to the following;

- Application to be submitted to ARTC Third Party Works Team to remove any equipment within the rail corridor.
- Provide the latest conditions report for ARTC infrastructure at sites 1-4.
- Introduction of a new rail monitoring station at the "closest" location to the rail corridor (km's TBC) in order to measure the maximum vibration levels coming into the rail corridor.
- Continued monitoring results forwarded to ARTC.
- Update the Blasting Management Plan to reflect the changes with acceptable PPV upper limits for ARTC assets below;

| ARTC Infrastructure | Rail Km's | PPV Limit |
|---|---|---|
| Main Northern Railway | | 100 |
| Bowmans Creek Underbridge | 259.076 | 50 |
| Newdell Junction Underbridge | 259.680 | 50 |
| Newdell Junction Underbridge | 260.140 | 50 |
| Signal NJ1 | 258.975 | 25 |
| Signals NJ3 and NJ5 | 259.516 | 25 |
| Signal Hut | 259.620 | 25 |
| Signal Hut | 259.811 | 25 |

I trust this information is satisfactory. If you have any questions, please feel free to contact the property team on HVPropertyServices@ARTC.com.au.

Yours sincerely

Monica Cox
**Property Manager – Hunter Valley**

ARTC Reference # 65/285/2808

Page 1 of 1

# Appendix D - Blast Fume Management

## POST BLAST FUME MANAGEMENT

Fume is a combination of post blast gases which are predominantly caused by a non-ideal detonation reaction i.e.

AN + Fuel = Carbon Dioxide + Water + Nitrogen + (Nitrogen Dioxide (Fume) in a non-ideal reaction)

Nitrogen dioxide is the only post blast gas that is visible with a yellow, orange or brown colour. A fume Category Rating has been developed and is used across Mt Owen / Glendell Operations in classifying a fume event (refer to ***Table D-1*** below).

*Table D-1: Fume Category – NOx Rating Scale*

| Level | Appearance | Colour |
|---|---|---|
| 0 – No fume (No NOx gas) |  | |
| 1 – Fume (slight NOx gas)<br>1A Localised<br>1B Medium<br>1C Extensive |  | |
| 2 – Minor yellow/orange fume<br>2A Localised<br>2B Medium<br>2C Extensive |  | |
| 3 – Moderate orange fume<br>3A Localised<br>3B Medium<br>3C Extensive |  | |
| 4 – Significant orange fume<br>4A Localised<br>4B Medium<br>4C Extensive |  | |
| 5 – Major red/purple fume<br>5A Localised<br>5B Medium<br>5C Extensive |  | |

The above table is used to assess the intensity of the NOx gases produced from a blast, while the extent of the NOx gases also needs to be assessed and this is done on a simple scale from A to C where:

A = Localised (i.e. NOx gases localised across only a few blast holes).

B = Medium (i.e. NOx gases from up to 50% of blast holes in the shot).

C = Extensive (i.e. Extensive generation of NOx Gases across the whole blast).

**FUME MINIMISATION AND PREVENTION**

MGO manage blasting activities using all reasonable and feasible measures to minimise and prevent fume generation. Factors identified as being influential in the generation of fume and MGOs associated controls are listed below.

- Explosive formulation and quality assurance;
  - Test explosive densities regularly on bench (cup density)
  - Allow adequate gassing time when loading emulsion product prior to stemming
  - Visual checks when loading explosive product
  - Quality control with hole and explosive deck lengths, dip and record depths, holes loaded and backfilled.
  - Quality checks by explosive supplier
- Explosive product selection;
  - Selection of wet hole product where holes are affected by water
  - Selection of suitable product considered for loading in specific geology types
- On bench practices;
  - Assessment of blast hole conditions
  - Use of hole savers to limit fall back of material into the hole
  - Bench preparation prior to loading i.e. consider drainage
  - Loading plan/sequencing
  - Any loading changes or changes to design are reported and must be discussed with the Drill and Blast Engineer or Drill and Blast Supervisor.
- Rainfall;
  - Cap off dry product with drill cuttings in light rain predicted
  - Use wet product if substantial rainfall predicted
- Blast design;
  - Consider blast hole diameter in blasts
  - Consider hole depth in blasts
  - Consider rock strength and properties in blasts
  - Consider Powder Factor in blast
  - Confirm sufficient face/hole burdens
- Geological conditions;
  - Where possible, consider jointing and faulting when designing blasts

- Contamination of explosive in the blast-hole;
  - Use recommended loading practices to limit explosive contamination
  - Bottom loading wet holes
  - Gas bag off water in holes if less than 0.5m deep
  - Monitor loaded holes for slumping
- Sleep time.
  - Confirm sleep times are in line with manufacturers recommendations

These factors are in line with the Australian Explosives Industry and Safety Group (AEISG) Code of Practice: Prevention and Management of Blast Generated NOx Gases in Surface Blasting (Edition 2 August 2011).

**FUME MANAGEMENT**

Additional practices that occur across the MGO to manage fume are as follows:

- Mt Owen / Glendell Operations risk assess each blast using a "fume probability predictor" and plume modelling. This process takes into account numerous factors that can influence the generation of fume and provides an expected probability that a blast will create fume.
- Monitoring of meteorological conditions at the time of firing the blast so that if fume does occur, the trajectory of plume is known and anyone who will potentially be impacted can be contacted as soon as possible.
- All Blasts at Mt Owen / Glendell Operations will be video recorded. Any blast that produces a fume event shall be recorded for a minimum of one (1) minute post blast or until the fume event has dispersed. Videos shall be kept for a period of not less than one (1) calendar year, from the time of the blast.
- Fume events will be rated using the Fume rating scale (***Table D-1***). This will be recorded in the blast pack.

**REPORTING OF FUME EVENTS**

In the event a blast produces a post blast fume rating of 3 at its highest extent and leaves the site, and any blast that rates 4 or 5, must be reported to DPHI.All notification to the DPIE will be made via the Environment and Community Manager or their delegate.