

Dendrobium Mine

Environmental Management System

Management Plan



Lighting

Review History

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1.0		Nov 04	Bryan Quinn
2.0	Three yearly review as required by Development Consent	Oct 06	David Oliver
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1 INTRODUCTION

1.1 Background

Dendrobium Mine is an underground mine which commenced construction in January 2002 following approval from the Minister of the then Department of Urban Affairs and Planning on 20 November 2001. Longwall mining commenced at Dendrobium in April 2005. The mine is owned and operated by Dendrobium Coal Pty Ltd, a wholly owned subsidiary of BHP Billiton and is operated on a continuous basis, 24 hours a day and 7 days a week.

The Mining operations are located immediately adjacent to Mt Kembla, approximately 8km west of Wollongong, NSW, on the Illawarra escarpment. Mt Kembla village, located within 500m of the Pit Top site, has close historical links with coal mining.

The Pit Top facilities have been developed on the site previously known as Nebo Colliery, which was combined with Wongawilli Colliery in 1993 to form Elouera Colliery. The Nebo Portal site was relinquished from the ownership and responsibility of Elouera Colliery in December 2001 to enable Dendrobium Mine to acquire formal responsibility, ownership and identity of the site.

Dendrobium Mine accesses coal from the No. 3 Seam (Wongawilli Seam) of the Illawarra Coal Fields. Three mining areas make up the approved mine plan for Dendrobium and are named Areas 1, 2, and 3 respectively.

Dendrobium produces coking coal and is approved to produce up to 5.2 million tonnes per annum with an expected life of mine in excess of 20 years. The Bluescope Port Kembla Steel Works and Whyalla Steel Works are the major customers. In addition to these Australian based customers, coal may be exported via the Port Kembla Coal Terminal to international customers.

1.2 Scope

The scope of this Lighting Management Plan (LMP) includes the following Dendrobium sites and facilities:

Dendrobium Pit Top - consists of administration building, workshop, machinery and equipment storage areas, people and materials access to the underground workings via the Dendrobium Tunnel, a sedimentation pond and grey water treatment and Oil Water Separation facility.

Kemira Valley Coal Loading Facility – the KVCLF receives coal from underground via the Kemira Valley Tunnel. Coal is transported from underground to KVCLF via a conveyor network. The coal is then fed into a rill tower and deposited onto a 150,000 tonne capacity stockpile from which it is loaded into trains via an enclosed rail-loading chute.

Kemira Valley Rail Line - used to transport the coal from KVCLF to the Dendrobium Coal Preparation Plant.

2 OBJECTIVES

The objectives of the LMP are to:

- Ensure sustained compliance with the Conditions of Consent, Australian Standards and Legislation with regards to lighting,
- Ensure BHP Billiton Environmental and other relevant strategies and policies are met and upheld.
- Minimise the spread of light and total night time glow from the mine and associated sites, through the use of technical measures, work/operating practices and vegetation/visual screens.
- Minimise the impact of stationary and non-stationary lighting on surrounding residents and users of Cordeaux Road and Stones Road and from the drift access and conveyors in Kemira Valley, through the use of technical measures, work/operating practices and vegetation/visual screens.
- Prevent on-site lighting and vehicle headlights from directing light into the line of sight of nearby dwellings.
- Create a monitoring, auditing and reporting system to measure performance against the lighting management objectives during the operational phases of the Dendrobium Mine.

3 RESPONSIBILITIES

It is the responsibility of all employees and contractors to undertake practices to manage and minimise light impacts according to this Management Plan.

The Environment and Community Manager is responsible for coordinating the implementation of this management plan and for the periodic review of the Plan.

Issues with the loading of coal at Kemira Valley and the train line are managed by the Logistics Group, with some aspects, such as the EPA licence requirements, managed in conjunction with Dendrobium's Environment and Community Manager.

4 LEGISLATIVE AND OTHER REQUIREMENTS

4.1 Legislative Requirements

Lighting which materially affects the reasonable comfort and convenience of a section of the public is classed as public nuisance under section 125 of the *Local Government Act 1993*. Under this Act, a council may abate a public nuisance or order a person responsible for a public nuisance to abate it.

4.2 Environment Protection Licence Requirements

Licence 3241 applies to the Dendrobium Mine premises and associated activities, and contains conditions pertaining to lighting. A copy of the licence can be accessed at the DECC website.

http://www.environment.nsw.gov.au/poeo/details.asp?licence_no=3241

4.3 Development Consent Conditions

Schedule 4 of the Development Consent specifies the operational requirements with which Dendrobium must comply. The following conditions apply to this Management Plan:

Schedule 4

Visual – Visual Amenity

28. The Applicant shall minimise the visual impacts of the surface facilities to the satisfaction of the Director-General.

Visual – Lighting Emissions

29. The Applicant shall:

- a. ensure that all external lighting associated with the surface facilities complies with *Australian Standard AS4282 (INT) 1995 – Control of Obtrusive Effects of Outdoor Lighting*;
- b. take all practicable measures to mitigate off-site lighting impacts from the surface facilities;
- c. ensure that light emitted from headlights of locomotives operating on the Kemira Valley rail line are screened from residences; and
- d. report on the effectiveness of lighting emission controls in the AEMR to the satisfaction of the Director-General.

4.4 BHP Billiton and Other Policies and Strategies

4.4.1 HSEC Management System Standards

BHP Billiton operates in accordance with the Health, Safety, Environment and Community (HSEC) Management Standard (STA.009) which covers all operational aspects and activities of its business and the Environment Standard (STA.020) which prescribes the mandatory environmental performance requirements that support the aspiration of zero harm across BHP Billiton.

The HSEC Management System framework is consistent with internationally recognised standards. It aims to set benchmarks for the Company's diverse range of businesses to develop and implement their own HSEC Management Systems, to provide auditable criteria for these systems and to provide a basis from which to drive continuous improvement.

The Lighting Management Plan has been developed consistent with the principles of the HSEC Management Standard and Environment Standard.

Dendrobium Mine maintains an environmental management system which is certified to ISO14001 standard.

4.4.2 Australian Standards

The Australian Standards pertinent to the management of light spread during the operational phases of the Dendrobium Mine are *AS/NZS 1158.0:2005 Lighting for Roads and Public Spaces* and other Standards in the 1158 series and *AS 4282-1997 Control of Obtrusive Effects of Outdoor Lighting*.

AS/NZS 1158.0:2005 sets out definitions and lighting categories applicable to roads and outdoor public areas, and for the movement of vehicles and pedestrians. It also serves as a general introduction to other Standards in the AS/NZS 1158 series, which refer to the performance and installation design requirements for roads and thoroughfares.

AS 4282-1997 Control of Obtrusive Effects of Outdoor Lighting sets out guidelines for the control of the obtrusive affects of outdoor lighting and gives recommended limits for the relevant lighting parameters to contain these effects within tolerable levels. This standard also refers to the potential effects of lighting systems on nearby residents, and users of adjacent roads and transport signaling systems, and on astronomical observations. It does not apply to road lighting; internally illuminated advertising signs; brightly-lit surfaces (e.g. floodlit buildings and advertising signs); lighting systems installed for the purposes of television broadcasting; or lighting systems that are of a cyclic or flashing nature.

5 MANAGEMENT STRATEGIES

5.1 Operational Activities and Potential Lighting Impacts

The Dendrobium operations utilise mostly fixed lighting. Lighting is provided around main buildings, structures and amenities. Lighting is kept to the minimum necessary for operational and safety needs, while minimising night glow.

5.1.1 Dendrobium Surface Activities

The Dendrobium Pit Top utilises lighting at strategic locations on the surface, along the portal road and at the entrance to the site to provide safe working conditions and for site security purposes. Some lights at the Pit Top remain on during the night for operational and safety reasons.

5.1.2 Kemira Valley Coal Loading Facility

Lighting in Kemira Valley includes perimeter and top lighting of the stockpile (pointed down) and covers the train line approaching the stockpile. The conveyor has fixed lighting. These lights remain off at night unless required for safety and security purposes.

5.1.3 Potential Lighting Impacts

The visual impacts of lighting used at Dendrobium vary across sites due to a number of factors that include;

- The type of lighting used,
- Placement of lighting, natural and man made barriers both on-site and off-site,
- Whether the light is stationary or moving.

There are three distinct types of lighting impacts, which are addressed by this LMP. These are:

- i. Direct light impact: where light is directly experienced by the viewer, as with a vehicle or train moving towards a viewer,
- ii. Indirect light impact: where the light source is not directed at the viewer but the spread of light has an impact, and
- iii. Night Glow: where results from light of sufficient strength from a single or multiple sources is being reflected in the atmosphere. Such effects will also be influenced by atmospheric conditions such as fog, low cloud and/or dust particles, which will reflect the light. Conversely on a clear night this effect would be lessened.

5.2 Light Management and Mitigation Strategies

There is an extensive array of lighting management and mitigation strategies which have been employed at Dendrobium Pit Top and Kemira Valley sites as detailed in the table below. They can be broken into three categories:

- i. Physical barriers and lighting direction
- ii. Technical Measures
- iii. Worker Behaviour and Job Planning

Physical Barriers and Lighting Direction

There are a number of physical barriers and lighting direction techniques that are currently being utilised at both the Dendrobium Pit Top site and the Kemira Valley Coal Loading Facility. These techniques are detailed in the table below.

Area / Road	Potential Lighting Impacts	Minimisation / Mitigation Details
Cordeaux Rd at Dendrobium Surface Entry	Direct light impact from entry lighting, impacting on vehicle movement.	Lighting directed down, height of poles kept to a minimum, shrouding, screening along Cordeaux Road with vegetation (including screening of existing substation)
Lighting along road access to Dendrobium Portal, lighting of Portal	Indirect light impact from fixed lighting	Lighting directed down, height of poles kept to a minimum, shrouding, topographic screening to the west
Lighting of eastern carpark	Indirect light impact from fixed lighting	Lighting directed down, height of poles kept to a minimum, shrouding
Surface lighting inc. Sewage Treatment Plant	Indirect light impact, night glow	Lighting directed down, topographic and vegetation screening.
Lighting of Stockpile (KV)	Indirect light impact, night glow from reflected light	Lighting directed down, shrouding.
Stockpile perimeter lighting (KV)	Direct and indirect light impacts	Lighting directed down, shrouding, topographic and vegetation screening.
Conveyor lighting (KV)	Indirect light impact, night glow from reflected light	Lighting directed away from residences and roads, shrouding
Lighting of train line near stockpile (KV)	Indirect light impact	Lighting directed down, shrouding
Lighting of Kemira Portal and Road (KV)	Indirect light impact, Direct light impact (from vehicles)	Lighting directed down, height of lighting kept to a minimum, shrouding, vegetation screening

Area / Road	Potential Lighting Impacts	Minimisation / Mitigation Details
Train Movement	Indirect and direct light impact	Topographic vegetation screening, operational management (by drivers) if required
Lighting of other infrastructure (e.g. amenities, sediment ponds)	Indirect light impact, night glow from reflected light	Lighting directed down, height of lighting kept to a minimum, shrouding (where appropriate),

Technical Measures

There are a number of technical measures also utilised to ensure that lighting is kept to a minimum necessary for operational and safety needs. Lights have been and will continue to be installed in such a way that they:

- are placed at the lowest practical level;
- are directed to the ground and/or work areas to avoid being cast skyward or over long distances;
- are directed away from incoming traffic, from dwellings and public roads; and
- incorporate shields and/or louvres where possible.

Worker Behaviour and Job Planning

Minimisation of lighting impacts on residents due to operational activities will be maintained through:

- Avoiding work in areas that are in the direct view of residents at night and/or directing light away from these viewing positions.
- Consideration of the colour/wavelength of lighting (i.e. mercury vapour lighting which emits a white light compared with high pressure sodium lighting which emits a yellow-orange light), whilst ensuring compliance with Australian Standards.
- Consideration of lighting impacts on surrounding residences and road users for both long and short term planning of mining operations; and
- Ensuring that feedback regarding lighting complaints is provided to production and mine planning personnel to assist with improvements to lighting management on site.

5.3 Management Strategy Effectiveness

The management strategies discussed above are used to minimise the potential lighting impacts from the Dendrobium operations. Dendrobium Mine will continue to research and where its is relevant to do so, develop and implement, lighting management and mitigation measures to ensure that lighting related issues are maintained at community acceptable levels.

6 MONITORING

6.1 Existing Lighting Monitoring Program

Lighting related issues associated with the Dendrobium operations will continue to be closely monitored to ensure that they are maintained to an acceptable level. The ways in which lighting related issues are monitored at Dendrobium include:

- i. Inspection by Dendrobium personnel
- ii. Community Call line
- iii. Lighting Surveys and Assessments

Inspections by Dendrobium personnel

Dendrobium personnel carry out regular inspections at the facilities that make up the Dendrobium Operations. If these inspections were to identify any lighting related issues, the issue would be investigated and measures put in place to control the issue.

Community Call Line

Lighting issues related to the Dendrobium operations can also be identified by members of the local community. The 24hr community call line allows the local community to relay these issues onto Dendrobium personnel. Enquiries/complaints received via the community call line will be followed up by the appropriate Dendrobium personnel via the process outlined in '*ICHP0112 Handling Community Complaints*'. For more information regarding the community call line, please refer to Section 8 of this management plan.

An archive spreadsheet is maintained detailing when lighting related complaints are received. This spreadsheet is reviewed on a regular basis to identify any trends.

Lighting Surveys and Assessments

Lighting Surveys and/or Assessments will be undertaken on a periodic basis dependent on complaints received and observations from site personnel. They will be undertaken by an external consultant.

6.2 Lighting Monitoring Program Review

The Lighting Monitoring Program will be reviewed on a triennial basis or when required.

7 REPORTING

7.1 Monitoring Data and Non-Conformances

All non-conformances to this LMP (i.e. issues identified by site personnel) and community complaints are recorded in First Priority, a computer based incident recording and reporting system. This system keeps track of non-compliances, corrective actions, responsibilities, planned and actual completion dates and details of reporting to Regulatory Agencies and the community where appropriate.

Reporting of lighting related issues occurs in a range of formats including:

- Internal Reporting (e.g. Monthly and Annual reports);
- Reports to Regulatory Agencies (e.g. annual Environmental Management Report); and
- Community Reports (e.g. BHP Billiton/Illawarra Coal annual Sustainability Reports and presentations to the Dendrobium Community Consultative Committee (DCCC)).

The Environmental Management Strategy contains further details of these reporting systems.

7.2 Auditing

A system of HSEC auditing is undertaken on the Dendrobium Mine sites and includes the use of trained internal and external auditors. In addition auditing is undertaken to ensure compliance with the ISO14001 standard.

Dendrobium Mine has an independently certified Environmental Management System (EMS). The Illawarra Coal EMS Team meets on a regular basis to develop, implement and improve the EMS. An ongoing audit program is implemented in accordance with the following schedule:

Audit Type	Frequency
Internal – from other IC site	Every 6 months
External - independent	Every 12 months
ISO14001 Certification - independent	Every 3 years

All internal auditors are trained and certified as competent auditors by an independent and external provider.

The results of monitoring and auditing are regularly reported through the senior management team to ensure that action items are addressed.

8 COMPLAINTS RECORDING AND REPORTING

Dendrobium has a 24 hour, 7 day free call community hotline number (1800 000 510), advertised to the public via the DCCC and public notices such as Dendrobium News, which provides a mechanism by which complaints and general enquiries regarding environmental or community issues associated with operational activities can be directed. All complaints (whether received via the hotline or directly to Dendrobium personnel) are documented and entered into First Priority (a data and document management program). After hours community complaints are immediately forwarded to the relevant Environment and Community representative for investigation and action.

Complaints will be handled via the procedures required by Section M4 of the EPL and explained in the Environmental Management Strategy. These involve the keeping of a legible record of all complaints showing:

- i. The date and time of the complaint
- ii. The method by which the complaint was received
- iii. The personal detail of the complainant which were provided by the complainant and if no details were provided a note to that effect
- iv. The nature of the complaint
- v. The action taken including any follow up contact
- vi. If no action is taken the reason why no action was taken.

The number and category (noise, traffic, dust, etc) of complaints are reported monthly to senior Mine Management and also during DCCC meetings on a bi-monthly basis. A summary of complaints for the year is reported in the annual Environmental Management Report.

All aspects of the operation will be reviewed if light standards/goals are exceeded to identify further improvements that can practically be implemented, with the goal being to achieve zero lighting related complaints received as a result of operational activities.

9 REFERENCES

Australian Standards (available through Standards Australia) <http://www.standards.com.au>

BHP Billiton (2008) Health, Safety, Environment and Community (HSEC) Management Standard – STA.009

BHP Billiton (2008) Environment Standard – STA.020

Cardno Lawson Treloar (2008). Dendrobium Mine – Lighting Impact Assessment.

Illawarra Coal (2008). ICHP0112 Handling Community Complaints.

Local Government Act 1993 http://www.austlii.edu.au/au/legis/nsw/consol_act/lga1993182/