



# **AIR QUALITY AND GREENHOUSE GAS MANAGEMENT PLAN**



**Mt Owen Complex Environmental Management System**

**November, 2011**

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# AIR QUALITY AND GREENHOUSE GAS MANAGEMENT PLAN

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## 1. COMMITMENT AND POLICY

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### 1.1 Introduction

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The Mt Owen Complex (MOC) is located in the Hunter Coal fields of New South Wales, approximately 25 kilometres northwest of Singleton. The Complex is owned and managed by Xstrata Mt Owen Pty Limited (XMO) which is a wholly owned subsidiary business unit of Xstrata Coal Australia Pty Ltd (Xstrata).

First granted on 8 December 2004, Mt Owen's Development Consent (DA 14-1-2004) was last modified on 26<sup>th</sup> November 2010 to include a rail refuelling facility at Mt Owen Mine. The consent conditions were reviewed with minor amendments including the requirement to have an Air Quality and Greenhouse Gas Management Plan (previously managed under the Air Quality Monitoring Program and Energy Savings Action Plans). The Ravensworth East Mine Development Consent (DA 52-03-99) was last modified in August 2005 to align with the Mt Owen consent. A modification to the Glendell Mine development consent (DA80/952) was granted on 25 February 2008, enabling revisions of the mine plan and integration of the Glendell Mine into the Mt Owen Complex. These Consents set out a number of specific requirements for the Air Quality Monitoring Program/Air Quality and Greenhouse Gas Management Plan. Relevant Consent Conditions are contained in **Appendix 1**.

This Plan considers how to manage the contribution of the Mt Owen Complex to regional air quality and greenhouse gas emissions. It outlines the controls that are implemented to minimise adverse impacts. The controls outlined in this management plan have been developed with consideration of industry leading practice. The Plan also outlines commitments to measuring and reporting on the effectiveness of these controls.

### 1.2 Purpose

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The purpose of this Air Quality and Greenhouse Gas Management Plan (the Plan) is to:

- outline and comply with the relevant conditions of the Project Approvals for the Mt Owen, Ravensworth East and Glendell mines (collectively the Mt Owen Complex - MOC) in **Appendix 1**;
- provide a description of the measures to be implemented by MOC and its contractors to mitigate air quality and greenhouse gas impacts and to detail air quality and greenhouse gas monitoring requirements associated with the MOC;
- provide a mechanism for assessing air quality monitoring results against the relevant air quality impact assessment criteria and land acquisition criteria;
- provide employees and contractors with a clear and concise description of their responsibilities in relation to air quality and greenhouse gas management during the operation of the mine; and

- 
- address all relevant commitments made in the Environmental Protection Licence and EIS's/EA's (refer to **Appendix 1**) for the MOC mining operations.

The Plan outlines the control measures to be implemented as a part of the continued operations at the Mt Owen Complex to minimise the potential for air quality and greenhouse gas impacts on the local community and the environment.

### 1.3 Scope

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This Plan applies to all operational activities within the Mt Owen Complex which includes the following mining operations and infrastructure:

- Mt Owen mine comprising an open cut coal mine with an extraction limit of 10 million tonnes per annum (mtpa) run of mine (ROM) coal, a coal handling and preparation plant with a processing limit of 15 mtpa ROM and associated infrastructure including a rail loop/train loading area, rail and truck refuelling facilities, tailings dams and water storages, workshops and administration areas.
- Ravensworth East mine comprising an open cut coal mine with an extraction limit of 4mtpa ROM and associated infrastructure including roads, dams, workshop and offices.
- Glendell Mine comprising an open cut coal mine with an extraction limit of 4.5mtpa ROM and associated infrastructure including roads, dams, workshop and offices.

The Plan forms part of the Mt Owen Complex Environmental Management System (EMS) and should be read in conjunction with the Mt Owen Complex Environmental Management Strategy.

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## 2. PLANNING

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### 2.1 Project Approval & EPL Requirements

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The Mt Owen, Ravensworth East and Glendell development consents require compliance with the OEH air quality criteria. The Consents set out a number of additional specific conditions to protect the health and amenity of nearby residents and a process to be followed in the event that there is an exceedence of relevant air quality criteria. Further details of Consent conditions relevant to air quality are provided in **Appendix 1**.

Environmental Protection Licences (EPL) are administered by the OEH. Licences set out criteria for dust deposition and dust concentration levels and conditions for air quality monitoring and reporting. Licence conditions relating to air quality are provided in **Appendix 1** and are incorporated into this Plan.

A Pollution Reduction Program relating to dust reduction is also contained in the EPL. This will be implemented and progress reported in accordance with EPL conditions.

## 2.2 Air Quality Criteria

The OEH specify two classes of air quality goals relevant to coal mining operations. These classes relate to dust deposition and dust concentration levels. Dust deposition levels refer to the quantity of dust particles that settle out from the air as measured in grams per square metre per month ( $\text{g}/\text{m}^2/\text{month}$ ) at a particular location. Dust concentration refers to airborne dust and is measured in micrograms per cubic metre ( $\mu\text{g}/\text{m}^3$ ).

### 2.21 Dust Deposition

The OEH expresses dust deposition criteria in terms of both an acceptable increase in dust deposition over the existing background levels and an absolute maximum value. These goals are summarised in **Table 1**.

**Table 1 – Dust Deposition Criteria**

Pollutant	Maximum Increase in Deposited Dust Level	Maximum Total Deposited Dust Level
Deposited Dust	2 $\text{g}/\text{m}^2/\text{month}$ (Annual Average)	4 $\text{g}/\text{m}^2/\text{month}$ (Annual Average)

### 2.22 Dust Concentration

The OEH criteria for dust concentration are defined in terms of two measures of dust concentration, total suspended particulate matter (TSP) and  $\text{PM}_{10}$ . TSP relates to all suspended particles, which are usually in the size range of zero to 50 micrometres ( $\mu\text{m}$ ). Particle sizes larger than  $50\mu\text{m}$  are measured in dust deposition levels.  $\text{PM}_{10}$  refers to particulate matter with a diameter less than  $10\mu\text{m}$ . TSP measurements include  $\text{PM}_{10}$  particles.

The OEH goals for dust concentration are referred to as long-term (annual averages) and short-term (24 hour maximum) goals. These goals are summarised in **Table 2**.

**Table 2– Dust Concentration Criteria**

Pollutant	Criteria
Total Suspended Particulate Matter (TSP)	90 $\mu\text{g}/\text{m}^3$ (annual average)
Particulate Matter <10 $\mu\text{g}$ ( $\text{PM}_{10}$ )	Long Term Goal (annual average) 30 $\mu\text{g}/\text{m}^3$ Short Term Goal (24 hour maximum) – 150 $\mu\text{g}/\text{m}^3$ Total <sup>1</sup> Short Term Goal (24 hour maximum) - 50 $\mu\text{g}/\text{m}^3$ Incremental <sup>2</sup> (should not be exceeded more than 5 times a year)

<sup>1</sup>Background  $\text{PM}_{10}$  concentrations due to all other sources plus the incremental increase in  $\text{PM}_{10}$  concentrations due to the mine alone.

<sup>2</sup>Incremental increase in  $\text{PM}_{10}$  concentrations due to the mine alone.

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## 2.23 EIS/EA Predictions

Where air quality predictions in the Mt Owen Operations EIS suggest that dust emissions generated by Mt Owen Mine are likely to exceed air quality criteria in tables 6, 7 & 8 of the Mt Owen Development Consent (refer to **Appendix 1**) at any residence or more than 25% of privately owned land, Mt Owen is required to comply with predictions in the EIS for that residence.

For the scenarios modelled in the EIS, one private residence in year 10 (residence 70) and two private residences in year 17 (residences 69 & 70) are predicted to experience 24 hour average PM<sub>10</sub> levels in excess of the short-term impact assessment criteria of 50 µg/m<sup>3</sup>. The PM<sub>10</sub> 24 hour criteria for years 10-17 and years 17+ at these residences is outlined in **Table 3**.

**Table 3- PM10 Average 24 Hour Criteria for Residences 69 & 70**

Year	Residence 69	Residence 70
10-17	N/A	55
17+	54	59

NB: N/A indicates that predictions do not exceed air quality criteria. Limits outlined in Tables 3.1 and 3.2 apply.

Glendell mine is required to comply with the relevant air quality criteria listed in Tables 8, 9 and 10 of the Glendell development consent (refer to **Appendix 1**) for any residence or on more than 25% of privately owned land.

The Modification to Glendell Mine Operations Environmental Assessment (EA) (Umwelt 2007) predicted, due to Glendell operations alone, the relevant OEH air quality criteria would not be exceeded at any private residence surrounding the Glendell mine site.

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## 2.3 Other Legislative Requirements

### 2.31 Air Quality

MOC will undertake air quality management in accordance with the relevant policies, principles, regulations and guidelines contained in:

- The *Protection of the Environment Operations Act 1997 (PoEO Act)* administered by the NSW Office of Environment and Heritage (OEH, formerly the NSW Department of Environment, Climate Change and Water);
- *Environmental Planning and Assessment Act 1979 (EP&A Act)* administered by the DoPI;
- Australian Standard AS2923 -1987 (Guide for measurement of horizontal wind for air quality applications);
- The Protection of the Environment Operations (Clean Air) Regulation 2002;
- OEH publication Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales (2005); and

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- AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air – Determination of Particulate Matter – Deposited Matter – Gravimetric Method.

### **2.32 Greenhouse Gas**

MOC will undertake greenhouse gas management in accordance with the policies, principles, regulations and guidelines contained within:

- the *National Greenhouse and Energy Reporting Act 2007* (NGER Act) (and subsequent amendments), administered by the Department of Climate Change and Energy Efficiency;
- the *National Greenhouse and Energy Reporting Regulations 2008*, administered by the Department of Climate Change and Energy Efficiency;
- the *National Greenhouse and Energy Reporting (measurement) Determination*, administered by the Department of Climate Change and Energy Efficiency;
- the *Energy Efficiency Opportunities Act 2006 Cth.*, administered by the Department of Resources, Energy and Tourism;
- the *Energy Efficiency Opportunities Regulations Cth.*, administered by the Department of Resources, Energy and Tourism; and
- the *Energy and Utilities Administration Act 1987 Part 6A*, administered by the OEH

## **2.4 Relevant Xstrata Guidelines and Standards**

This Plan also takes into consideration the Guidelines from Xstrata Coal NSW (XCN). These guidelines, policies and standards incorporate legal requirements, the Xstrata PLC Sustainable Development Standards, stakeholder feedback and learnings from industry best practise into reference documents for all XCN sites.

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## **3. IMPLEMENTATION**

### **3.1 Air Quality Management**

#### **3.1.1 Air Quality Sources**

There are a number of essential activities at the Mt Owen Complex that have the potential to impact on air quality, these include:

- exploration;
- prestrip operations, including removal of vegetation and topsoil ahead of active mining;
- drill and blasting operations;
- tailings emplacement;
- rehabilitation activities;
- overburden removal and emplacement; and
- run of mine (ROM) and product coal stockpiling and transportation.

In order to effectively manage impacts from these activities the Mt Owen Complex will implement a range of onsite controls and this comprehensive air quality monitoring program.

### 3.12 Key Air Quality Controls

A number of air quality controls are implemented at the Mt Owen Complex. The MOC also incorporates air quality management into site management plans, operational procedures and training. A summary of key controls is included in **Table 4** below.

**Table 4: Summary of Key Air Quality Controls at MOC**

Source	Control
Exploration	<ul style="list-style-type: none"> <li>• Minimise disturbance area</li> <li>• Drive to conditions</li> <li>• Small water cart</li> <li>• Rehabilitation as soon as possible.</li> </ul>
Pre-strip operations, including removal of vegetation and topsoil ahead of active mining	<ul style="list-style-type: none"> <li>• Minimise disturbance ahead of mining</li> <li>• Monitor topsoil stripping/handling activities and amend operation or cease if conditions are unsuitable.</li> <li>• Strip to clay until the area can be drilled.</li> </ul>
Drill and blasting operations	<ul style="list-style-type: none"> <li>• Dust suppression system on drills.</li> <li>• Wet the drill cuttings on surface</li> <li>• Pre-blast meteorological assessment</li> <li>• Adequate stemming of holes</li> </ul>
Tailings emplacement	<ul style="list-style-type: none"> <li>• Where possible, keep tailings dams covered with water if dust is likely to be an issue.</li> <li>• Cap and rehabilitate as soon as practicable</li> </ul>
Overburden removal and emplacement	<ul style="list-style-type: none"> <li>• Truck capacity and shortest haul distance possible</li> <li>• Close off unnecessary haul roads and use of water carts (with chemical dust suppressant) on haul roads/excavator work area</li> <li>• Keep distance between truck and excavator bucket to a minimum.</li> <li>• Inspections of work area by Mining Supervisors to assess air quality/implement additional controls where necessary. Early warning alarms are on dust monitors which Mining Supervisor will investigate and take action where necessary.</li> <li>• Mine planning to make provision for sheltered dumping areas where possible (which can be utilised in adverse conditions).</li> <li>• Dumps at final RL are progressively rehabilitated to minimise disturbance area. Temporary rehabilitation completed where appropriate.</li> </ul>
Run of mine (ROM) and product coal stockpiling and transportation	<ul style="list-style-type: none"> <li>• Truck capacity and shortest haul distance possible</li> <li>• Close off unnecessary haul roads and use of water carts (with chemical dust suppressant) on haul roads and ROM stockpile pad.</li> <li>• Sprays on hoppers and transfer points where required.</li> <li>• Covered conveyors</li> <li>• Stockpile spray at product coal stockpile</li> </ul>
Rehabilitation activities	<ul style="list-style-type: none"> <li>• Topsoil spreading/activities on spread topsoil are managed and ceased if weather conditions are unfavourable</li> <li>• Small water carts are used on topsoil haulage routes.</li> </ul>

	<ul style="list-style-type: none"> <li>• Cover crops are used where possible to establish quick groundcover until desirable species have established.</li> <li>• Progressive rehabilitation to minimise disturbance area.</li> <li>• Revegetate longer term topsoil stockpiles.</li> <li>• Rehabilitate obsolete roads.</li> </ul>
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### 3.13 Cumulative Air Quality

The MOC has several mining operations surrounding it to the north, west, south and south east. A quarry and agricultural land is also in close proximity to the MOC. The cumulative impact of mining operations on the surrounding community is a concern for the community. The MOC Complex has an air quality monitoring network and data is shared between the three sites. Data sharing with other mine sites is currently at the discretion of management on a case by case basis. An extensive amount of monitoring data from the MOC was also provided to the Camberwell Cumulative Impact Study.

The MOC also refers to the data collected by the OEH’s Regional Air Quality Monitoring Network to compare against its own monitoring and assist in assessing regional air quality.

In order to assess the MOC contribution to cumulative air quality, continuous dust monitors are placed upstream and downstream of the mine sites to estimate the project specific contribution. The monitors representative of the community also have warning alarms which are activated if a high dust peak is evident (based on 15 minute averages) and the wind direction is from the mine site to the monitor. This allows immediate investigation by the Mining Supervisor and action to be taken where necessary.

Air quality results are provided to the community in terms of the cumulative result and performance of the mine against the project specific criteria.

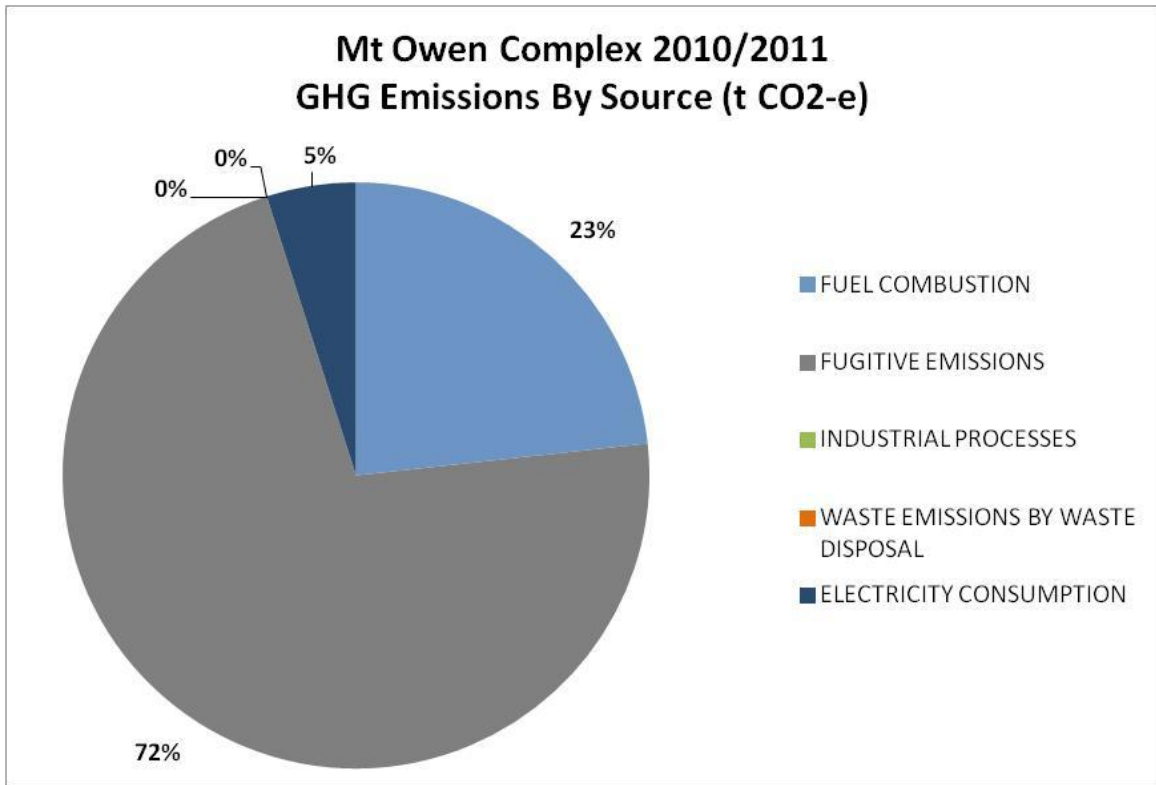
## 3.2 Greenhouse Gas Management

### 3.21 Greenhouse Gas Sources

The primary sources of greenhouse gas (GHG) emissions at the Mt Owen Complex are as described below and in **Figure 1**:

- Fugitive emissions of CO<sub>2</sub> and CH<sub>4</sub> from coal seam exposure
- GHG from combustion of diesel fuel (used in mine fleet, ancillary equipment, transport and blasting).
- Indirect release due to electrical power consumption required to power the CHPP and other infrastructure areas.

The below pie chart shows the 2010/2011 Financial Year breakdown of GHG by emission source:



**Figure 1: MOC Greenhouse Gas Emissions by Source.**

### 3.22 Greenhouse Gas Controls

The MOC has an Energy Savings Action Plan which is reviewed annually. The aim of this Plan is to identify improvement opportunities related to improving energy efficiency, reducing greenhouse gas emissions, communicating our performance and improving monitoring of our resource utilisation and emissions. This plan is attached as **Appendix 3**.

Greenhouse gas emissions at the MOC will be minimised through the efficient use of diesel by the mining fleet. Diesel use will be minimised by:

- optimising the design of haul roads to minimise the distance travelled between the pit and the ROM stockpiles and overburden dumping locations;
- minimising the re-handling of material (i.e. coal, overburden and topsoil);
- managing truck payloads to utilise the tray space without overloading; and
- maintaining the mine fleet in good operating order.

Coal seam gas is not currently pre-drained for the Mt Owen Complex and this is not in the MOC's immediate plans. Should this change, a summary will be incorporated into the next review of this Plan.

Although not as high a GHG emitter as diesel and fugitive emissions, electricity consumption also contributes to the sites' overall GHG emissions and is monitored and reviewed quarterly. Most of the electricity is consumed by the CHPP. Annual reviews of the Energy Savings Action Plan are conducted to determine the savings in actions implemented to date and investigate further improvement opportunities.

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### 3.3 Odour Sources

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The Mt Owen Complex also has a requirement to ensure reasonable and practicable measures are taken to minimise fume and odours from spontaneous combustion. Spontaneous combustion at the MOC is considered a low risk. Relevant mine personnel are aware of the hazards and Development Consent requirements in relation to spontaneous combustion and the controls to manage spontaneous combustion.

Fume from blasting can also produce an offensive odour hence it is important to take reasonable and practicable measures to reduce fume and ensure meteorological conditions are assessed prior to blasting. Fume management is further covered in the Mt Owen Complex Blast Management Plan.

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## 4. GHG MEASUREMENT AND EVALUATION

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### 4.1 National Greenhouse and Energy Reporting

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The MOC reports GHG emissions and Energy consumption and production under the National Greenhouse and Energy Reporting framework. Xstrata has developed a reporting tool that all the Xstrata Coal NSW sites, including MOC, use to track diesel usage on site, electricity consumption, waste generation and recycling, coal production (and associated fugitive emissions) and other aspects required by Xstrata for NGER.

Xstrata maintain NGER Protocols to assist sites with reporting. This outlines how to measure the GHG/Energy sources, records to be retained and other aspects of NGER.

An annual review is conducted of the site's Energy Savings Action Plan which evaluates the savings of controls implemented to date and identifies additional improvement opportunities. These are then prioritised according to feasibility of implementation and anticipated energy savings.

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## 5. AIR QUALITY MONITORING AND INTERPRETATION

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### 5.1 Monitoring

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#### 5.1.1 Monitoring Locations

To assess compliance against dust deposition and dust concentration criteria for Mt Owen, Ravensworth East and Glendell mines, depositional dust, TSP and PM<sub>10</sub> are routinely monitored at the locations shown on **Figure 2**.

Air quality monitoring locations will be reviewed and where necessary, modified over the life of operations according to progressive monitoring results, physical changes in mining operations, or following the acquisition of private property by XMO.

#### 5.1.2 Monitoring Program

Monitoring is undertaken in accordance with EPL and Development Consent Conditions, which specify required methods of sampling, analysis and frequency of monitoring (refer to **Appendix 1**).

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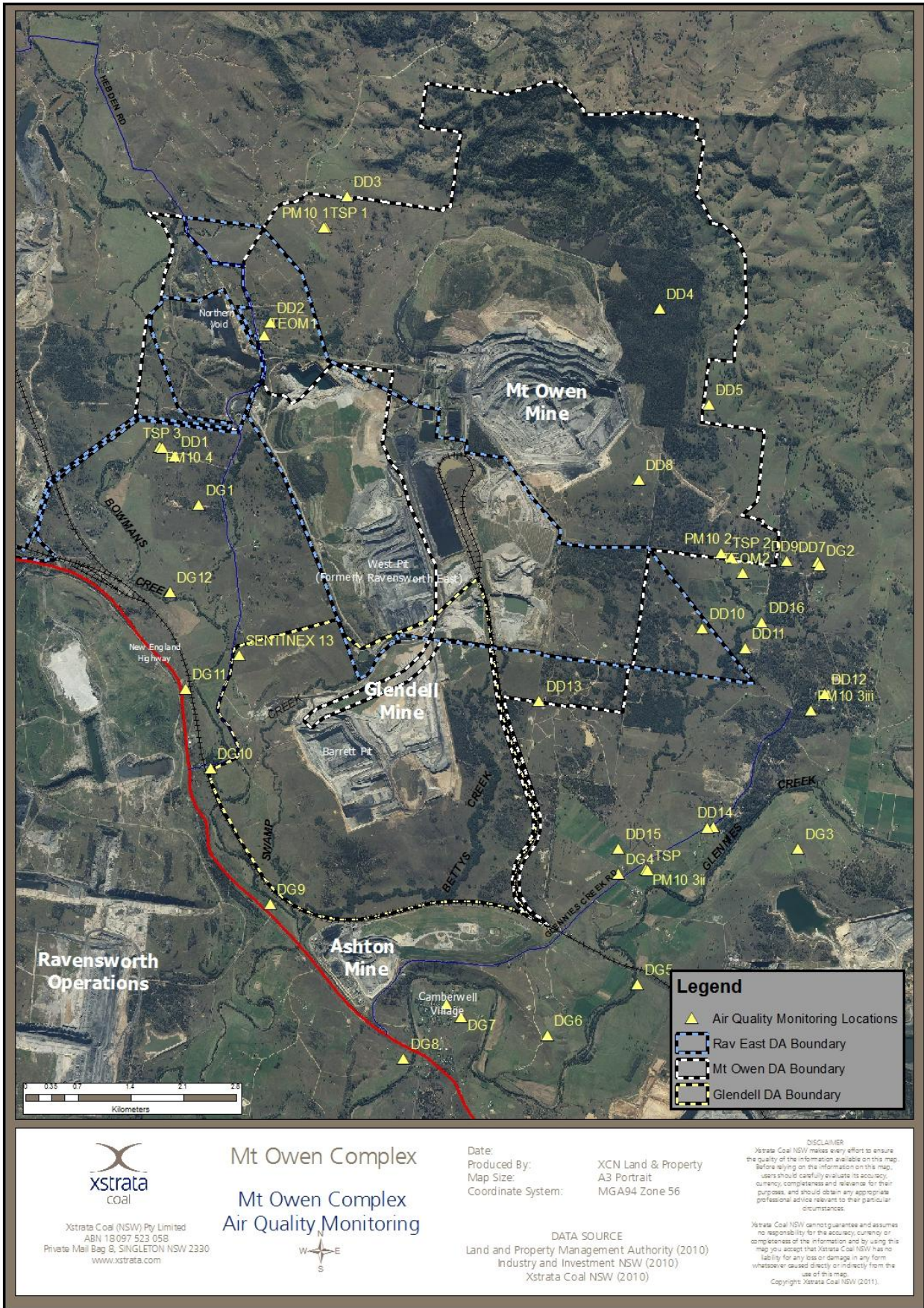
## 5.2 Interpretation of Air Quality Data

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The Mt Owen Complex air quality monitoring program includes a combination of Dust Deposition Gauges, TSP & PM<sub>10</sub> High Volume Air Samplers (HVAS) and Continuous PM<sub>10</sub> monitoring units (TEOMS) (refer to **Figure 2**). Assessment and response to data obtained from this monitoring program is outlined below. This process will be managed through a work procedure, which will be subject to regular review and refinement based on feedback from the monitoring program.

### 5.21 Dust Deposition

Dust deposition gauges are collected and analysed monthly by an independent consultant in accordance with a monitoring schedule approved by the OEH. Results are obtained monthly and progressively assessed against annual average criteria (4g/m<sup>2</sup>/month) and criteria for incremental increase (2g/m<sup>2</sup>/month). Any anomalous results from the monitoring program will be assessed as soon as possible with reference to operational, meteorological and sampling information. Findings of the assessment will be reported to the mine management as necessary. A potential or demonstrated exceedance of dust deposition criteria will trigger corrective action, as outlined in **Section 6.2**.



**Figure 2: MOC Air Quality Monitoring Network**

## 5.22 Dust Concentration

The dust concentration monitoring network consists of TSP & PM<sub>10</sub> HVAS & Continuous PM<sub>10</sub> units (TEOMS).

### High Volume Air Samplers

High Volume Air Sampling Units operate over a 24 hour period every six days in accordance with a schedule set by the OEH. Results are obtained for both TSP and PM<sub>10</sub> monthly and progressively assessed against annual average and 24 hour criteria as shown in **Table 5**.

**Table 5 – Assessment Protocol for HVAS Data**

Measurement	Criteria	Action
TSP	<b>Annual Average</b>	<ul style="list-style-type: none"> <li>- Assess results monthly against annual average criteria (90µg/m<sup>3</sup>) to identify trends in data.</li> <li>- Compliance with annual average criteria to be assessed on an annual basis.</li> </ul>
	<b>24 hour</b>	N/A
PM <sub>10</sub>	<b>Annual Average</b>	<ul style="list-style-type: none"> <li>- Assess results monthly against annual average criteria (30 µg/m<sup>3</sup>) to identify trends in data.</li> <li>- Compliance with annual average criteria to be assessed on an annual basis.</li> </ul>
	<b>24 hour</b>	<ul style="list-style-type: none"> <li>- Assess results monthly against 24 hour average incremental (50 µg/m<sup>3</sup>) and cumulative criteria (150 µg/m<sup>3</sup>) to identify trends in data.</li> <li>- Compliance with 24 hour average incremental criteria (no more than five exceedances per year of 50 µg/m<sup>3</sup>) to be assessed on an annual basis.</li> </ul>

Any anomalous results from the HVAS monitoring program will be investigated as soon as possible, with reference to operational and meteorological data and information on regional dust levels to help determine the contribution from the Mt Owen Complex. Findings of the investigation will be reported to the mine management as necessary. A potential or demonstrated exceedance of dust concentration criteria will trigger corrective action, as outlined in **Section 6.2**.

Where air quality predictions in the Mt Owen Operations EIS suggest that dust emissions generated by the Mt Owen mine are likely to exceed the criteria listed in **Table 2** at any private residence on the land, TSP and PM<sub>10</sub> HVAS measurements will be assessed against the criteria shown in **Table 3**. However, this will not be required until after year 10 of the development.

### **Continuous PM<sub>10</sub> Monitors**

Schedule 4 of the Mt Owen and Ravensworth East Development Consents and Schedule 3 of the Glendell Development Consent requires the regular assessment of continuous air quality monitoring data for 24-hour average PM<sub>10</sub> and meteorological monitoring data. As required, mining operations are to be relocated, modified and/or ceased to ensure compliance with 24 hour average PM<sub>10</sub> criteria. In order to meet this requirement, the results from the PM<sub>10</sub> continuous monitoring network will be assessed according to the protocol detailed in **Table 6**.

**Table 6 – Assessment Protocol for Continuous PM10 Data**

<b>Step</b>	<b>Action</b>
1	Retrieve data on a daily basis or in response to a trigger.
2	Assess results - cross reference to weather and operational data.
3	Are results within 24 hour criteria? 3a. Yes – no further action required. 3b. No – proceed to step 4.
4	Can the exceedance potentially be attributed to the Mt Owen Complex? 4a. No – no further action required. 4b. Yes – proceed to step 5.
5	Were there any likely short-term operational causes? 5a. No - proceed to step 7 5b. Yes – proceed to step 6.
6	Can the offending activity be modified during prevailing conditions? 6a. No – proceed to step 7 6b. Yes – modify activity and check subsequent results.
7	Confirm trend for subsequent results under similar conditions. 7a. Yes – proceed to step 8. 7b. No – closely monitor similar conditions.
8	Assess medium to long-term site management options.
9	Reductions achievable? 9a. Yes – modify operations and monitor results. 9b. No – trigger relevant conditions of Consent – Further details of this process are provided in <b>Section 6.2</b> .

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Data from the continuous PM<sub>10</sub> monitors will be downloaded on a daily basis, or in response to a trigger, which will notify site personnel of any potential exceedance of 24 hour average PM<sub>10</sub> criteria. The data will be assessed against the 24 hour average (midnight to midnight) and annual average criteria for PM<sub>10</sub>. Due to the close proximity of neighbouring mining operations, assessment of compliance with 24 hour average PM<sub>10</sub> criteria will require careful consideration of upwind and downwind results and regional dust data, in order to determine the contribution from the Mt Owen Complex.

Where air quality predictions in the Mt Owen Operations EIS suggest that dust emissions generated by the development are likely to exceed the criteria listed in **Table 2** at any private residence on the land, continuous PM<sub>10</sub> measurements will be assessed against the criteria shown in **Table 3**. However, this will not be required until after year 10 of the development.

## 5.3 Reporting

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### 5.31 Reporting

Air quality monitoring results and compliance with Consent and Licence conditions will be reported in the Annual Return to the OEHL and the Annual Review (formerly the AEMR).

A summary of air quality monitoring results will be presented at CCC meetings and will also be made available to the public via the Mt Owen Complex Website. These results will be updated at least every two months.

If monitoring results identify an exceedance of the performance criteria outlined in Schedule 4 of DA 14-1-2004, or Schedule 4 of DA 52-03-99; except where predicted in the relevant EIS, and except where a negotiated agreement has entered into in relation to the impact, XMO will notify DoPI and any affected landowners or tenants of the exceedance/incident. If monitoring results identify an exceedance of the performance criteria outlined in Schedule 3 of DA 80/952, except where predicted in the relevant EA, and except where a negotiated agreement has entered into in relation to the impact, XMO will notify DoPI, other relevant agencies and any affected landowners or tenants of the exceedance/incident. Notified parties will be provided with quarterly monitoring results until it can be demonstrated that the operation is compliant with the relevant development consent.

### 5.32 Incident Reporting

Within 24 hours of detecting an exceedance of the limits/performance criteria outlined in the Glendell Mine development consent (DA80/952), XMO will notify DoPI and other relevant agencies of the exceedance/incident

Within 6 days of notifying the DoPI and other relevant agencies of an exceedance of the limits/performance criteria outlined in the Glendell Mine development consent (DA80/952), XMO will provide the DoPI and other relevant agencies with a written report that:

- (a) describes the date, time, and nature of the exceedance/incident;
- (b) identifies the cause (or likely cause) of the exceedance/incident;
- (c) describes what action has been taken to date; and
- (d) describes the proposed measures to address the exceedance/incident.

### 5.33 Air Quality Brochure

XMO will develop a brochure to advise local residents of the possible health and amenity impacts associated with exposure to particulate matter. The brochure must be prepared in consultation with NSW Health and be submitted to the Director-General of DoP for approval by 25 August 2008.

The brochure will be provided to all landowners and tenants, including the tenants of mine owned properties, where predicted or monitored dust emissions exceed air quality land acquisition criteria.

XMO update this brochure based on a review of human health studies, every three years, and submit the updated plan to the Director-General of DoP for approval.

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## 6. REVIEW AND IMPROVEMENT

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### 6.1 Corrective Action

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**Table 7** summarises the potential air quality issues that may arise and the appropriate corrective action to be taken.

**Table 7 – Corrective Actions**

Problem	Corrective Action
Potential to exceed air quality criteria based on a trigger (alarm) and interpretation of trends in monitoring data	Investigation of trends, undertaking mitigating measures where applicable. Report potential exceedance to Senior Management.
Exceedance of air quality criteria	Investigation of exceedance, undertaking mitigating measures where applicable. Report exceedance to regulatory agencies, senior management and notify impacted residents as required (refer to <b>Appendix 2</b> ). Where relevant initiate the Independent Review process.
Community complaints	Investigation of complaint, taking mitigating measures where applicable and provide feedback to complainant. Report complaint to senior management. Provide feedback to mine planning and production personnel, where relevant.

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## 6.2 Complaints Management

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The Mt Owen Complex operates a dedicated complaints hotline. The details of this are advertised in local newspapers at least quarterly, via the Mt Owen Complex Community Newsletter and on the Mt Owen Complex website.

A procedure for handling complaints has been implemented as part of the Mt Owen Complex EMS which is in line with EPL requirements. The procedure provides a consistent approach to managing any complaints. All complaints will be thoroughly investigated, including use of environmental and meteorological monitoring data, in conjunction with operating records to determine any likely cause. Feedback to the complainant will be provided as quickly as possible.

A community complaint report will be included in the Annual Review. In addition all complaints will be reported to senior management via an established reporting system.

Details of complaints relating will be provided to relevant mine planning and production personnel, to assist in the improvement of management practices.

## 6.3 Independent Review

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If a landowner considers the Mt Owen Complex operation to be in exceedance of the relevant impact assessment criteria specified under a development consent, 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 Director-General of DoPI. If the Director-General determines that an independent review is to be undertaken, XMO must follow the procedures outlined in the relevant development consent (refer to **Appendix 2**).

### 6.31 Dispute Resolution and Land Acquisition

#### ***Response to Exceedance of Air Quality Criteria***

If air quality monitoring results confirm that dust generated by the Mt Owen, Ravensworth East or Glendell mine exceeds relevant air quality criteria (except where this is predicted in the EIS or an alternative agreement with the landowner exists) then the Director-General of DoPI and any affected residents shall be notified and provided with quarterly monitoring results until results show compliance with air quality criteria.

If compliance with air quality criteria cannot be achieved, XMO will acquire the land following a written request from the affected landholder, in accordance with the process set out in Schedule 5 of the Mt Owen and Ravensworth East Development Consents and Schedule 4 of the Glendell Development Consent. Details of this process are set out in **Appendix 2**.

#### ***Response to a Residents Claim of an Exceedance of Air Quality Criteria***

If a landowner believes that the Mt Owen, Ravensworth East or Glendell mine is exceeding air quality criteria or predictions in the EIS the landowner may ask, in writing, for an independent review of the air pollution impacts on his/her land. If the Director-General of DoP is satisfied that an independent review is warranted, then within three months of the Director-General advising for Mt Owen and Ravensworth

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East and within two months of the Director-General advising for Glendell Mine, a review will be undertaken in accordance with conditions outlined in Schedule 5 of the Mt Owen and Ravensworth East Development Consents and Schedule 4 of the Glendell Development Consent. Further information regarding this process is provided in **Appendix 2**.

### **Land Acquisition**

If the independent review process outlined above or monitoring results show that there is an exceedance of the land acquisition criteria due to the operation of Mt Owen, Ravensworth East or Glendell Mine, the affected landholder will be entitled to request acquisition. XMO will follow the Land Acquisition process outlined in Schedule 5 of the Mt Owen and Ravensworth East Development Consents and Schedule 4 of the Glendell Development Consent. Further information regarding this process is provided in **Appendix 2**.

## **6.4 Auditing and Review**

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The Air Quality and Greenhouse Gas Management Plan is to be reviewed at least every three years or as otherwise directed by the Director-General of DoPI. The review process is to reflect changes in environmental legislation and guidelines and changes in technology or operational procedures. The review process also takes into consideration feedback from internal stakeholders, CCC and other community members and relevant consultants. The final version takes into consideration feedback from OEH and DoPI and is approved by the DG of DoPI.

In accordance with Development Consent Conditions for Mt Owen, Ravensworth East and Glendell mines, every three years XMO will commission an Independent Environmental Audit to the satisfaction of DoPI. The Audit will include an assessment of the adequacy of the Air Quality and Greenhouse Gas Management Plan. Where necessary and following the audit, the Plan will be updated and action taken to improve performance and management practices.

The original Air Quality Monitoring Program required under the Mt Owen and Ravensworth East development consents was submitted for the approval of DoPI in June 2005. The first review of the Air Quality Management Plan was in 2008 and coincided with the modification of the plan to include the requirements of the Glendell development consent and following the independent audit conducted in December 2007. This Plan forms the latest review to incorporate cumulative impact considerations and greenhouse gas management as required by Mt Owen's Development Consent modification issued 26<sup>th</sup> November 2010.

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## 7. DEFINITIONS

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<b>Term</b>	<b>Definition</b>
<b>DoPI</b>	Department of Primary Industries
<b>Dust Deposition</b>	Dust particles that settle out from the air - measured in grams per square metre per unit time (g/m <sup>2</sup> /time)
<b>HVAS</b>	High Volume Air Sampler
<b>MOC</b>	Mt Owen Complex
<b>NGER</b>	National Greenhouse and Energy Reporting
<b>OEH</b>	Office of Environment and Heritage
<b>PM<sub>10</sub></b>	Particulate matter less than 10 micrometers (µm) in size
<b>TEOM</b>	Tapered Element Oscillating Microbalance
<b>TSP</b>	Total Suspended Particulates (µg/m <sup>3</sup> ). The nominal size of this fraction has particles with a diameter of up to 50 micrometers (µm)
<b>µg/m<sup>3</sup></b>	Micrograms per cubic metre
<b>XMO</b>	Xstrata Mt Owen P/L

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## 8. ACCOUNTABILITIES

Role	Accountabilities for this document
<b>Operations Manager</b>	<ul style="list-style-type: none"> <li>• Ensure that adequate resources are available to implement the requirements of this Plan.</li> <li>• Ensure that the plan is relevant to current operations.</li> </ul>
<b>Environment and Community Manager</b>	<ul style="list-style-type: none"> <li>• Oversee the implementation of the Air Quality and Greenhouse Gas Management Plan.</li> <li>• Coordinate air quality and greenhouse gas monitoring in accordance with this Plan.</li> <li>• Notify regulatory authorities and affected landowners of any air quality related exceedance and undertake associated reporting.</li> <li>• Coordinate periodic reviews of this Plan.</li> </ul>
<b>Environment and Community Coordinator</b>	<ul style="list-style-type: none"> <li>• Coordinate air quality and greenhouse gas monitoring in accordance with this Plan.</li> <li>• Develop and maintain a protocol for evaluating compliance with air quality and greenhouse gas criteria contained in this Plan.</li> <li>• Maintain a protocol for assessment and response to continuous PM<sub>10</sub> data.</li> <li>• Coordinate investigations of dust exceedances, significant increases in GHG emissions or complaints and implementation of any relevant mitigation and controls.</li> <li>• Assist and jointly coordinate periodic reviews of this Plan.</li> </ul>
<b>Mining Supervisor/Open-cut Examiner</b>	<ul style="list-style-type: none"> <li>• Respond to potential exceedances of air quality criteria as identified by the continuous PM<sub>10</sub> monitoring system.</li> <li>• Review operations in response to alerts and modify operations as appropriate.</li> <li>• Report to Environment and Community Coordinator on response to alerts.</li> <li>• Conduct regular inspections and reviews of open cut operations for potential and actual dust generation.</li> <li>• Continually assess the need for dust control measures according to operational and climate conditions.</li> <li>• Assist the Environment and Community Coordinator with investigations into dust exceedances, incidents or complaints.</li> <li>• Report fuel spills and assist in the implementation of GHG reduction measures as required.</li> </ul>
<b>Other Employees and Contractors</b>	<ul style="list-style-type: none"> <li>• All employees and contractors are required to comply with the requirements of this Program.</li> </ul>

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## 9. REFERENCES

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### 9.1 Legislation

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- Protection of the Environment Operations Act 1997
- Environmental Planning and Assessment Act 1979
- National Greenhouse and Energy Reporting Act 2007
- National Greenhouse and Energy Reporting (measurement) Determination, June 2010
- National Greenhouse and Energy Reporting Regulations 2008
- Energy Efficiency Opportunities Act 2006 Cth
- Energy Efficiency Opportunities Regulations Cth
- Energy and Utilities Administration Act 1987 Part 6A

### 9.2 Australian Standards/Miscellaneous Standards

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- Australian Standard AS2923 -1987 (Guide for measurement of horizontal wind for air quality applications)
- AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air – Determination of Particulate Matter – Deposited Matter – Gravimetric Method.
- OEH publication Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales (2005)

### 9.3 Xstrata plc

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- Sustainable Development: 17 Standards
- XC SD STD 0006 XC NGERS Standard – Facility Requirements

### 9.4 Xstrata Coal NSW

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- XCN SD Guidelines

### 9.5 Mt Owen Complex

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- ERM Mitchell McCotter Pty Ltd, 1999. *The Ravensworth East Mine Environmental Impact Statement.*
- Umwelt (Australia) Pty Limited, 2003. *The Mt Owen Operations Environmental Impact Statement.*
- Umwelt (Australia) Pty Limited, 2007. *Environmental Assessment for Modification of Glendell Mine Operations.*

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## 10. CONTROL AND REVISION HISTORY

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### 10.1 Document information

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Property	Management Plan
Approved by	Pam Simpson
Document Owner	Environment and Community Manager
Effective Date	30/11/2011 (Pending Approval)
Keywords	Air Quality, Greenhouse Gas, Management Plan, Dust

For a complete list of document properties, select **View Properties** from the document's context menu on the intranet.

### 10.2 Revisions

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Version	Date reviewed	Review team (consultation)	Nature of the amendment
1			
2			
3			

## 11. APPENDICES

### 11.1 Appendix 1— Consent and Licence Conditions

#### APPENDIX 1a - Mt Owen Development Consent (DA 14-1-2004) – Air Quality Conditions

Condition Number	Condition Title	Condition Detail	Section of Plan																							
Schedule 4, Condition 21	Impact Assessment Criteria	<p>The Applicant shall ensure that the dust emissions generated by the development do not cause additional exceedances of the air quality impact assessment criteria listed in Tables 6, 7, and 8 at any residence on, or on more than 25 percent of, any privately owned land, excluding the land listed in Table 1.</p> <p>Table 6: Long term impact assessment criteria for particulate matter</p> <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Averaging period</th> <th>Criterion</th> </tr> </thead> <tbody> <tr> <td>Total suspended particulate (TSP) matter</td> <td>Annual</td> <td>90 µg/m<sup>3</sup></td> </tr> <tr> <td>Particulate matter &lt; 10 µm (PM<sub>10</sub>)</td> <td>Annual</td> <td>30 µg/m<sup>3</sup></td> </tr> </tbody> </table> <p>Table 7: Short term impact assessment criterion for particulate matter</p> <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Averaging period</th> <th>Criterion</th> </tr> </thead> <tbody> <tr> <td>Particulate matter &lt; 10 µm (PM<sub>10</sub>)</td> <td>24 hour</td> <td>50 µg/m<sup>3</sup></td> </tr> </tbody> </table> <p>Table 8: Long term impact assessment criteria for deposited dust</p> <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Averaging period</th> <th>Maximum increase in deposited dust level</th> <th>Maximum total deposited dust level</th> </tr> </thead> <tbody> <tr> <td>Deposited dust</td> <td>Annual</td> <td>2 g/m<sup>2</sup>/month</td> <td>4 g/m<sup>2</sup>/month</td> </tr> </tbody> </table> <p><i>Note: Deposited dust is assessed as insoluble solids as defined by Standards Australia, 1991, AS 3580.10.1-1991: Methods for Sampling and Analysis of Ambient Air - Determination of Particulates - Deposited Matter - Gravimetric Method.</i></p>	Pollutant	Averaging period	Criterion	Total suspended particulate (TSP) matter	Annual	90 µg/m <sup>3</sup>	Particulate matter < 10 µm (PM <sub>10</sub> )	Annual	30 µg/m <sup>3</sup>	Pollutant	Averaging period	Criterion	Particulate matter < 10 µm (PM <sub>10</sub> )	24 hour	50 µg/m <sup>3</sup>	Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level	Deposited dust	Annual	2 g/m <sup>2</sup> /month	4 g/m <sup>2</sup> /month	Section 3 & Section 6
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Condition Number	Condition Title	Condition Detail	Section of Plan																		
Schedule 4, Condition 22	Impact Assessment Criteria	<p>While the land in Table 1 is privately owned, the Applicant shall ensure that the dust emissions generated by the development do not cause additional exceedances of the air quality criteria in Tables 6, 7, and 8 at any residence on this land. However, where the air quality predictions in the EIS suggest that the dust emissions generated by the development are likely to exceed these criteria at any residence on this land, the Applicant shall comply with the predictions in the EIS for this residence.</p> <p>Table 1: Land subject to acquisition upon request (project specific)</p> <table border="1" data-bbox="640 651 1753 1394"> <tbody> <tr> <td>64 - Richards</td> <td>84 - Lawlor</td> </tr> <tr> <td>66 - Cramp</td> <td>85 - Frost</td> </tr> <tr> <td>67 - Robinson and Brandl</td> <td>87 - Westcott</td> </tr> <tr> <td>68 - Deaves</td> <td>88 - Flynn</td> </tr> <tr> <td>69 - Fairfull</td> <td>89 - White</td> </tr> <tr> <td>70 - Johnson</td> <td>91 - Lancaster</td> </tr> <tr> <td>72 - Baker and Ellis</td> <td>108 - Gardener (north of Glennies Creek Road)</td> </tr> <tr> <td>73 - Cole</td> <td>109 - Noble</td> </tr> <tr> <td>83 - Rose</td> <td>110 - Donellan</td> </tr> </tbody> </table>	64 - Richards	84 - Lawlor	66 - Cramp	85 - Frost	67 - Robinson and Brandl	87 - Westcott	68 - Deaves	88 - Flynn	69 - Fairfull	89 - White	70 - Johnson	91 - Lancaster	72 - Baker and Ellis	108 - Gardener (north of Glennies Creek Road)	73 - Cole	109 - Noble	83 - Rose	110 - Donellan	Sections 3 & 6.4
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Schedule 4, Condition 23	Land Acquisition Criteria	<p>If the dust emissions generated by the development exceed the criteria in Tables 9, 10, and 11 at any residence on, or on more than 25 percent of, any privately owned land, the Applicant shall, upon receiving a written request for acquisition from the landowner, acquire the land in accordance with the procedures in conditions 10-12 of schedule 5.</p> <p>Table 9: Long term land acquisition criteria for particulate matter</p> <table border="1" data-bbox="638 475 1753 778"> <thead> <tr> <th>Pollutant</th> <th>Averaging period</th> <th>Criterion</th> </tr> </thead> <tbody> <tr> <td>Total suspended particulate (TSP) matter</td> <td>Annual</td> <td>90 µg/m<sup>3</sup></td> </tr> <tr> <td>Particulate matter &lt; 10 µm (PM<sub>10</sub>)</td> <td>Annual</td> <td>30 µg/m<sup>3</sup></td> </tr> </tbody> </table> <p>Table 10: Short term land acquisition criteria for particulate matter</p> <table border="1" data-bbox="638 839 1753 1070"> <thead> <tr> <th>Pollutant</th> <th>Averaging period</th> <th>Criterion</th> <th>Percentile<sup>1</sup></th> <th>Basis</th> </tr> </thead> <tbody> <tr> <td>Particulate matter &lt; 10 µm (PM<sub>10</sub>)</td> <td>24 hour</td> <td>150 µg/m<sup>3</sup></td> <td>99<sup>2</sup></td> <td>Total<sup>3</sup></td> </tr> <tr> <td>Particulate matter &lt; 10 µm (PM<sub>10</sub>)</td> <td>24 hour</td> <td>50 µg/m<sup>3</sup></td> <td>98.6</td> <td>Increment<sup>4</sup></td> </tr> </tbody> </table> <p><sup>1</sup>Based on the number of block 24 hour averages in an annual period.</p> <p><sup>2</sup>Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, illegal activities or any other activity agreed by the Director-General in consultation with the DEC.</p> <p><sup>3</sup>Background PM<sub>10</sub> concentrations due to all other sources plus the incremental increase in PM<sub>10</sub> concentrations due to the mine alone.</p> <p><sup>4</sup>Incremental increase in PM<sub>10</sub> concentrations due to the mine alone.</p>	Pollutant	Averaging period	Criterion	Total suspended particulate (TSP) matter	Annual	90 µg/m <sup>3</sup>	Particulate matter < 10 µm (PM <sub>10</sub> )	Annual	30 µg/m <sup>3</sup>	Pollutant	Averaging period	Criterion	Percentile <sup>1</sup>	Basis	Particulate matter < 10 µm (PM <sub>10</sub> )	24 hour	150 µg/m <sup>3</sup>	99 <sup>2</sup>	Total <sup>3</sup>	Particulate matter < 10 µm (PM <sub>10</sub> )	24 hour	50 µg/m <sup>3</sup>	98.6	Increment <sup>4</sup>	Sections 3 & 6.4
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Schedule 4, Condition 25	Operating Conditions	<p>The Applicant shall:</p> <p>(a) ensure any visible air pollution generated by the development is assessed regularly, and that mining operations are relocated, modified, and/or stopped as required to minimise air quality impacts on privately owned land;</p> <p>(b) ensure real-time air quality monitoring for 24-hour average PM<sub>10</sub> and the meteorological monitoring data are assessed regularly, and that mining operations are relocated, modified and/or stopped as required to ensure compliance with the relevant air quality criteria; and</p> <p>(c) implement all practicable measures to minimise the off-site odour and fume emissions generated by any spontaneous combustion at the development.</p> <p>to the satisfaction of the Director-General.</p>	Section 6								
Schedule 4, Condition 27	Monitoring	<p>Within 6 months of this consent, the Applicant shall prepare and implement a detailed Air Quality Monitoring Program to the satisfaction of the Director-General. The Air Quality Monitoring Program shall include a combination of real-time monitors, high volume samplers and dust deposition gauges to monitor the dust emissions of the development; and an air quality monitoring protocol for evaluating compliance with the air quality impact assessment and land acquisition criteria in this Consent.</p>	All								
Schedule 4, Condition 28	Metrologic al Monitoring	<p>Within 6 months of this consent, the Applicant shall ensure that there is a suitable meteorological station operating in the vicinity of the development in accordance with the requirements in <i>Approved Methods for Sampling of Air Pollutants in New South Wales</i>, and to the satisfaction of the DEC and the Director-General.</p>	Section 6 & Figure 6.1								

## APPENDIX 1b - Ravensworth East Development Consent (DA 52-03-99) – Air Quality Conditions

Condition Number	Condition Title	Condition Detail	Section of Plan																							
Schedule 4, Condition 18	Impact Assessment Criteria	<p>The Applicant shall ensure that the dust emissions generated by the development do not cause additional exceedances of the air quality impact assessment criteria listed in Tables 5, 6, and 7 at any residence on, or on more than 25 percent of, any privately owned land.</p> <p>Table 5: Long term impact assessment criteria for particulate matter</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th style="width: 40%;">Pollutant</th> <th style="width: 20%;">Averaging period</th> <th style="width: 40%;">Criterion</th> </tr> </thead> <tbody> <tr> <td>Total suspended particulate (TSP) matter</td> <td>Annual</td> <td>90 µg/m<sup>3</sup></td> </tr> <tr> <td>Particulate matter &lt; 10 µm (PM<sub>10</sub>)</td> <td>Annual</td> <td>30 µg/m<sup>3</sup></td> </tr> </tbody> </table> <p>Table 6: Short term impact assessment criterion for particulate matter</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th style="width: 40%;">Pollutant</th> <th style="width: 20%;">Averaging period</th> <th style="width: 40%;">Criterion</th> </tr> </thead> <tbody> <tr> <td>Particulate matter &lt; 10 µm (PM<sub>10</sub>)</td> <td>24 hour</td> <td>50 µg/m<sup>3</sup></td> </tr> </tbody> </table> <p>Table 7: Long term impact assessment criteria for deposited dust</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th style="width: 20%;">Pollutant</th> <th style="width: 15%;">Averaging period</th> <th style="width: 30%;">Maximum increase in deposited dust level</th> <th style="width: 35%;">Maximum total deposited dust level</th> </tr> </thead> <tbody> <tr> <td>Deposited dust</td> <td>Annual</td> <td>2 g/m<sup>2</sup>/month</td> <td>4 g/m<sup>2</sup>/month</td> </tr> </tbody> </table> <p><i>Note: Deposited dust is assessed as insoluble solids as defined by Standards Australia, 1991, AS 3580.10.1-1991: Methods for Sampling and Analysis of Ambient Air - Determination of Particulates - Deposited Matter - Gravimetric Method.</i></p>	Pollutant	Averaging period	Criterion	Total suspended particulate (TSP) matter	Annual	90 µg/m <sup>3</sup>	Particulate matter < 10 µm (PM <sub>10</sub> )	Annual	30 µg/m <sup>3</sup>	Pollutant	Averaging period	Criterion	Particulate matter < 10 µm (PM <sub>10</sub> )	24 hour	50 µg/m <sup>3</sup>	Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level	Deposited dust	Annual	2 g/m <sup>2</sup> /month	4 g/m <sup>2</sup> /month	Section 3 & Section 6
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Schedule 4, Condition 19	Land Acquisition Criteria	<p data-bbox="557 312 1830 440">If the dust emissions generated by the development exceed the criteria in Tables 8, 9, and 10 at any residence on, or on more than 25 percent of, any privately owned land, the Applicant shall, upon receiving a written request for acquisition from the landowner, acquire the land in accordance with the procedures in conditions 9-11 of schedule 5.</p> <p data-bbox="633 523 1512 552">Table 8: Long term land acquisition criteria for particulate matter</p> <table border="1" data-bbox="633 555 1753 804"> <thead> <tr> <th data-bbox="642 561 1167 635">Pollutant</th> <th data-bbox="1176 561 1429 635">Averaging period</th> <th data-bbox="1438 561 1744 635">Criterion</th> </tr> </thead> <tbody> <tr> <td data-bbox="642 641 1167 721">Total suspended particulate (TSP) matter</td> <td data-bbox="1176 641 1429 721">Annual</td> <td data-bbox="1438 641 1744 721">90 µg/m<sup>3</sup></td> </tr> <tr> <td data-bbox="642 727 1167 801">Particulate matter &lt; 10 µm (PM<sub>10</sub>)</td> <td data-bbox="1176 727 1429 801">Annual</td> <td data-bbox="1438 727 1744 801">30 µg/m<sup>3</sup></td> </tr> </tbody> </table> <p data-bbox="633 865 1520 893">Table 9: Short term land acquisition criteria for particulate matter</p> <table border="1" data-bbox="633 896 1753 1126"> <thead> <tr> <th data-bbox="642 903 1016 970">Pollutant</th> <th data-bbox="1025 903 1205 970">Averaging period</th> <th data-bbox="1214 903 1375 970">Criterion</th> <th data-bbox="1384 903 1563 970">Percentile<sup>1</sup></th> <th data-bbox="1572 903 1744 970">Basis</th> </tr> </thead> <tbody> <tr> <td data-bbox="642 976 1016 1050">Particulate matter &lt; 10 µm (PM<sub>10</sub>)</td> <td data-bbox="1025 976 1205 1050">24 hour</td> <td data-bbox="1214 976 1375 1050">150 µg/m<sup>3</sup></td> <td data-bbox="1384 976 1563 1050">99<sup>2</sup></td> <td data-bbox="1572 976 1744 1050">Total<sup>3</sup></td> </tr> <tr> <td data-bbox="642 1056 1016 1120">Particulate matter &lt; 10 µm (PM<sub>10</sub>)</td> <td data-bbox="1025 1056 1205 1120">24 hour</td> <td data-bbox="1214 1056 1375 1120">50 µg/m<sup>3</sup></td> <td data-bbox="1384 1056 1563 1120">98.6</td> <td data-bbox="1572 1056 1744 1120">Increment<sup>4</sup></td> </tr> </tbody> </table> <p data-bbox="633 1142 1382 1171"><sup>1</sup>Based on the number of block 24 hour averages in an annual period.</p> <p data-bbox="633 1184 1771 1238"><sup>2</sup>Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, illegal activities or any other activity agreed by the Director-General in consultation with the DEC.</p> <p data-bbox="633 1251 1816 1305"><sup>3</sup>Background PM<sub>10</sub> concentrations due to all other sources plus the incremental increase in PM<sub>10</sub> concentrations due to the mine alone.</p> <p data-bbox="633 1318 1364 1347"><sup>4</sup>Incremental increase in PM<sub>10</sub> concentrations due to the mine alone.</p>	Pollutant	Averaging period	Criterion	Total suspended particulate (TSP) matter	Annual	90 µg/m <sup>3</sup>	Particulate matter < 10 µm (PM <sub>10</sub> )	Annual	30 µg/m <sup>3</sup>	Pollutant	Averaging period	Criterion	Percentile <sup>1</sup>	Basis	Particulate matter < 10 µm (PM <sub>10</sub> )	24 hour	150 µg/m <sup>3</sup>	99 <sup>2</sup>	Total <sup>3</sup>	Particulate matter < 10 µm (PM <sub>10</sub> )	24 hour	50 µg/m <sup>3</sup>	98.6	Increment <sup>4</sup>	Section 3 & Section 6
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Condition Number	Condition Title	Condition Detail	Section of Plan								
		<p>Table 10: Long term land acquisition criteria for deposited dust</p> <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Averaging period</th> <th>Maximum increase in deposited dust level</th> <th>Maximum total deposited dust level</th> </tr> </thead> <tbody> <tr> <td>Deposited dust</td> <td>Annual</td> <td>2 g/m<sup>2</sup>/month</td> <td>4 g/m<sup>2</sup>/month</td> </tr> </tbody> </table> <p><i>Note: Deposited dust is assessed as insoluble solids as defined by Standards Australia, 1991, AS 3580.10.1-1991: Methods for Sampling and Analysis of Ambient Air - Determination of Particulates - Deposited Matter - Gravimetric Method.</i></p>	Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level	Deposited dust	Annual	2 g/m <sup>2</sup> /month	4 g/m <sup>2</sup> /month	
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Schedule 4, Condition 20	Operating Conditions	<p>The Applicant shall:</p> <p>(a) ensure any visible air pollution generated by the development is assessed regularly, and that mining operations are relocated, modified, and/or stopped as required to minimise air quality impacts on privately owned land;</p> <p>(b) ensure real-time air quality monitoring for 24-hour average PM<sub>10</sub> and the meteorological monitoring data are assessed regularly, and that mining operations are relocated, modified and/or stopped as required to ensure compliance with the relevant air quality criteria; and</p> <p>(c) implement all practicable measures to minimise the off-site odour and fume emissions generated by any spontaneous combustion at the development.</p> <p>to the satisfaction of the Director-General.</p>	Section 5 & 6								
Schedule 4, Condition 21	Monitoring	By the end of June 2005, the Applicant shall prepare and implement a detailed Air Quality Monitoring Program to the satisfaction of the Director-General. The Air Quality Monitoring Program shall include a combination of real-time monitors, high volume samplers and dust deposition gauges to monitor the dust emissions of the development; and an air quality monitoring protocol for evaluating compliance with the air quality impact assessment and land acquisition criteria in this consent.	All								
Schedule 4, Condition 22	Metrological Monitoring	The Applicant shall ensure that there is a suitable meteorological station operating in the vicinity of the development in accordance with the requirements in <i>Approved Methods for Sampling of Air Pollutants in New South Wales</i> , and to the satisfaction of DEC and the Director-General.	Section 6 & Figure 6.1								

## APPENDIX 1c - Glendell Development Consent (DA 80-952) – Air Quality Conditions

Condition Number	Condition Title	Condition Detail	Section of Plan																							
Schedule 3 Condition 20	Impact Assessment Criteria	<p>The Applicant shall ensure that the dust emissions generated by the development do not cause additional exceedances of the air quality impact assessment criteria listed in Tables 8, 9, and 10 at any residence on privately-owned land, or on more than 25 per cent of any privately-owned land.</p> <p>Table 8: Long term impact assessment criteria for particulate matter</p> <table border="1" data-bbox="904 624 1659 783"> <thead> <tr> <th>Pollutant</th> <th>Averaging Period</th> <th>Criterion</th> </tr> </thead> <tbody> <tr> <td>Total suspended particulate (TSP) matter</td> <td>Annual</td> <td>90 µg/m<sup>3</sup></td> </tr> <tr> <td>Particulate matter &lt; 10 µm (PM10)</td> <td>Annual</td> <td>30 µg/m<sup>3</sup></td> </tr> </tbody> </table> <p>Table 9: Short term impact assessment criterion for particulate matter</p> <table border="1" data-bbox="904 826 1659 951"> <thead> <tr> <th>Pollutant</th> <th>Averaging Period</th> <th>Criterion</th> </tr> </thead> <tbody> <tr> <td>Particulate matter &lt; 10 µm (PM10)</td> <td>24 hour</td> <td>50 µg/m<sup>3</sup></td> </tr> </tbody> </table> <p>Table 10: Long term impact assessment criteria for deposited dust</p> <table border="1" data-bbox="828 994 1738 1115"> <thead> <tr> <th>Pollutant</th> <th>Averaging period</th> <th>Maximum increase in deposited dust level</th> <th>Maximum total deposited dust level</th> </tr> </thead> <tbody> <tr> <td>Deposited dust</td> <td>Annual</td> <td>2 g/m<sup>2</sup>/month</td> <td>4 g/m<sup>2</sup>/month</td> </tr> </tbody> </table> <p><i>Note: Deposited dust is assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter -Deposited Matter - Gravimetric Method.</i></p>	Pollutant	Averaging Period	Criterion	Total suspended particulate (TSP) matter	Annual	90 µg/m <sup>3</sup>	Particulate matter < 10 µm (PM10)	Annual	30 µg/m <sup>3</sup>	Pollutant	Averaging Period	Criterion	Particulate matter < 10 µm (PM10)	24 hour	50 µg/m <sup>3</sup>	Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level	Deposited dust	Annual	2 g/m <sup>2</sup> /month	4 g/m <sup>2</sup> /month	Sections 3 & 6
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Deposited dust	Annual	2 g/m <sup>2</sup> /month	4 g/m <sup>2</sup> /month																							

Condition Number	Condition Title	Condition Detail	Section of Plan																								
Schedule 3 Condition 21	Land Acquisition Criteria	<p>If the dust emissions generated by the development exceed the criteria in Tables 11, 12, and 13 at any residence on privately-owned land, or on more than 25 percent of any privately-owned land, the Applicant shall, upon receiving a written request for acquisition from the landowner, acquire the land in accordance with the procedures in conditions 9-11 of schedule 4.</p> <p>Table 11: Long term land acquisition criteria for particulate matter</p> <table border="1" data-bbox="842 603 1722 807"> <thead> <tr> <th>Pollutant</th> <th>Averaging Period</th> <th>Criterion</th> </tr> </thead> <tbody> <tr> <td>Total suspended particulate (TSP) matter</td> <td>Annual</td> <td>90 µg/m<sup>3</sup></td> </tr> <tr> <td>Particulate matter &lt; 10 µm (PM<sub>10</sub>)</td> <td>Annual</td> <td>30 µg/m<sup>3</sup></td> </tr> </tbody> </table> <p>Table 12: Short term land acquisition criteria for particulate matter</p> <table border="1" data-bbox="790 900 1771 1182"> <thead> <tr> <th>Pollutant</th> <th>Averaging period</th> <th>Criterion</th> <th>Percentile</th> <th>Basis</th> </tr> </thead> <tbody> <tr> <td>Particulate matter &lt; 10 µm (PM<sub>10</sub>)</td> <td>24 hour</td> <td>150 µg/m<sup>3</sup></td> <td>99<sup>2</sup></td> <td>Total<sup>3</sup></td> </tr> <tr> <td>Particulate matter &lt; 10 µm (PM<sub>10</sub>)</td> <td>24 hour</td> <td>50 µg/m<sup>3</sup></td> <td>98.6</td> <td>Increment<sup>4</sup></td> </tr> </tbody> </table> <p><sup>1</sup>Based on the number of block 24 hour averages in an annual period.</p> <p><sup>2</sup>Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, illegal activities or any other activity agreed by the Director-General in consultation with DECC.</p>	Pollutant	Averaging Period	Criterion	Total suspended particulate (TSP) matter	Annual	90 µg/m <sup>3</sup>	Particulate matter < 10 µm (PM <sub>10</sub> )	Annual	30 µg/m <sup>3</sup>	Pollutant	Averaging period	Criterion	Percentile	Basis	Particulate matter < 10 µm (PM <sub>10</sub> )	24 hour	150 µg/m <sup>3</sup>	99 <sup>2</sup>	Total <sup>3</sup>	Particulate matter < 10 µm (PM <sub>10</sub> )	24 hour	50 µg/m <sup>3</sup>	98.6	Increment <sup>4</sup>	Sections 3 & 6
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Condition Number	Condition Title	Condition Detail	Section of Plan								
		<p><sup>3</sup>Background PM<sub>10</sub> concentrations due to all other sources plus the incremental increase in PM<sub>10</sub> concentrations due to the mine alone.</p> <p><sup>4</sup>Incremental increase in PM<sub>10</sub> concentrations due to the mine alone.</p> <p>Table 13: Long term land acquisition criteria for deposited dust</p> <table border="1" data-bbox="801 507 1760 673"> <thead> <tr> <th data-bbox="801 507 1003 603">Pollutant</th> <th data-bbox="1003 507 1227 603">Averaging period</th> <th data-bbox="1227 507 1518 603">Maximum increase in deposited dust level</th> <th data-bbox="1518 507 1760 603">Maximum total deposited dust level</th> </tr> </thead> <tbody> <tr> <td data-bbox="801 603 1003 673">Deposited dust</td> <td data-bbox="1003 603 1227 673">Annual</td> <td data-bbox="1227 603 1518 673">2 g/m<sup>2</sup>/month</td> <td data-bbox="1518 603 1760 673">4 g/m<sup>2</sup>/month</td> </tr> </tbody> </table> <p>Note: Deposited dust is assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter -Deposited Matter -Gravimetric Method.</p>	Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level	Deposited dust	Annual	2 g/m <sup>2</sup> /month	4 g/m <sup>2</sup> /month	
Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level								
Deposited dust	Annual	2 g/m <sup>2</sup> /month	4 g/m <sup>2</sup> /month								
Schedule 3 Condition 22	Operating Conditions	<p>22. The Applicant shall:</p> <p>(a) ensure any visible air pollution generated by the development is assessed regularly, and that mining operations are relocated, modified, and/or stopped as required to minimise air quality impacts on privately-owned land;</p> <p>(b) ensure that the real-time air quality monitoring and meteorological monitoring data are assessed regularly, and that mining operations are relocated, modified and/or stopped as required to ensure compliance with the relevant air quality criteria; and</p> <p>(c) implement all practicable measures to minimise the off-site odour and fume emissions generated by any spontaneous combustion on site, to the satisfaction of the Director-General.</p>	Sections 5 & 6								
Schedule 3 Condition 23	Monitoring	<p>The Applicant shall prepare and implement an Air Quality Monitoring Program for the development to the satisfaction of the Director-General. This program must:</p> <p>(a) be prepared in consultation with DECC;</p>	Whole Plan								

Condition Number	Condition Title	Condition Detail	Section of Plan
		(b) be submitted to the Director-General for approval by the end of April 2008; and (c) include: <ul style="list-style-type: none"> <li>• a combination of real-time monitors, high volume samplers and dust deposition gauges to monitor the dust emissions of the development; and</li> <li>• an air quality monitoring protocol for evaluating compliance with the air quality impact assessment and land acquisition criteria in this consent.</li> </ul>	
Schedule 3 Condition 24	Meteorological Monitoring	During the life of the development, the Applicant shall ensure that there is a suitable meteorological station in the vicinity of the site that complies with the requirements in the <i>Approved Methods for Sampling of Air Pollutants in New South Wales</i> guideline.	Section 6 & Figure 6.1

**APPENDIX 1d - Mt Owen Environmental Protection Licence (EPL No: 4460) – Air Quality Conditions**

Condition Number	Condition Title	Condition Detail	Section of Plan																				
Condition P1.1	Location of monitoring/discharge points and areas	<p>The following points referred to in the table below are identified in this licence for the purposes of monitoring and/or the setting of limits for the emission of pollutants to the air from the point.</p> <table border="1" data-bbox="616 518 1787 1289"> <thead> <tr> <th data-bbox="616 518 801 619">EPA Identification no.</th> <th data-bbox="801 518 1064 619">Type of Monitoring Point</th> <th data-bbox="1064 518 1294 619">Type of Discharge Point</th> <th data-bbox="1294 518 1787 619">Description of Location</th> </tr> </thead> <tbody> <tr> <td data-bbox="616 619 801 766">2</td> <td data-bbox="801 619 1064 766">Ambient air monitoring</td> <td data-bbox="1064 619 1294 766"></td> <td data-bbox="1294 619 1787 766">At location where dust deposition levels are representative of the levels experienced at residential properties, or other sensitive receivers, resulting from the operation of the mine.</td> </tr> <tr> <td data-bbox="616 766 801 941">3</td> <td data-bbox="801 766 1064 941">Ambient air monitoring.</td> <td data-bbox="1064 766 1294 941"></td> <td data-bbox="1294 766 1787 941">At locations where the level of particulate matter being sampled is representative of emissions from the operation of the mine taking into account prevailing wind direction and the location of residential properties or other sensitive receivers.</td> </tr> <tr> <td data-bbox="616 941 801 1117">4</td> <td data-bbox="801 941 1064 1117">Ambient air monitoring</td> <td data-bbox="1064 941 1294 1117"></td> <td data-bbox="1294 941 1787 1117">At locations where the level of particulate matter being sampled is representative of emissions from the operation of the mine taking into account prevailing wind direction and the location of residential properties or other sensitive receivers.</td> </tr> <tr> <td data-bbox="616 1117 801 1289">5</td> <td data-bbox="801 1117 1064 1289">Ambient Air Monitoring</td> <td data-bbox="1064 1117 1294 1289"></td> <td data-bbox="1294 1117 1787 1289">At locations where the level of particulate matter being sampled is representative of emissions from the operation of the mine taking into account prevailing wind direction and the location of residential properties or other sensitive receivers.</td> </tr> </tbody> </table>	EPA Identification no.	Type of Monitoring Point	Type of Discharge Point	Description of Location	2	Ambient air monitoring		At location where dust deposition levels are representative of the levels experienced at residential properties, or other sensitive receivers, resulting from the operation of the mine.	3	Ambient air monitoring.		At locations where the level of particulate matter being sampled is representative of emissions from the operation of the mine taking into account prevailing wind direction and the location of residential properties or other sensitive receivers.	4	Ambient air monitoring		At locations where the level of particulate matter being sampled is representative of emissions from the operation of the mine taking into account prevailing wind direction and the location of residential properties or other sensitive receivers.	5	Ambient Air Monitoring		At locations where the level of particulate matter being sampled is representative of emissions from the operation of the mine taking into account prevailing wind direction and the location of residential properties or other sensitive receivers.	Section 6.1
EPA Identification no.	Type of Monitoring Point	Type of Discharge Point	Description of Location																				
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5	Ambient Air Monitoring		At locations where the level of particulate matter being sampled is representative of emissions from the operation of the mine taking into account prevailing wind direction and the location of residential properties or other sensitive receivers.																				

Condition Number	Condition Title	Condition Detail	Section of Plan																																
Condition M2.1	Requirement to monitor concentration of pollutants discharged	<p>For each monitoring/discharge point or utilisation area specified below (by a point number), the licensee must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified in Column 1. The licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns:</p> <p><b>POINT 2</b></p> <table border="1" data-bbox="618 529 1783 711"> <thead> <tr> <th>Pollutant</th> <th>Units of measure</th> <th>Frequency</th> <th>Sampling Method</th> </tr> </thead> <tbody> <tr> <td>Particulates - Deposited Matter</td> <td>g/m<sup>2</sup>/month</td> <td>Monthly</td> <td>Clean Air (Plant &amp; Equipment) Regulation 1997 Method Number AM-19</td> </tr> </tbody> </table> <p><b>POINT 3</b></p> <table border="1" data-bbox="618 759 1783 941"> <thead> <tr> <th>Pollutant</th> <th>Units of measure</th> <th>Frequency</th> <th>Sampling Method</th> </tr> </thead> <tbody> <tr> <td>Total suspended particles</td> <td>ug/m<sup>3</sup></td> <td>Every 6 days</td> <td>Clean Air (Plant &amp; Equipment) Regulation 1997 Method Number AM-15</td> </tr> </tbody> </table> <p><b>POINT 4</b></p> <table border="1" data-bbox="618 989 1783 1171"> <thead> <tr> <th>Pollutant</th> <th>Units of measure</th> <th>Frequency</th> <th>Sampling Method</th> </tr> </thead> <tbody> <tr> <td>PM10</td> <td>ug/m<sup>3</sup></td> <td>Continuous</td> <td>Clean Air (Plant &amp; Equipment) Regulation 1997 Method Number AM-18</td> </tr> </tbody> </table> <p><b>POINT 5</b></p> <table border="1" data-bbox="618 1219 1783 1401"> <thead> <tr> <th>Pollutant</th> <th>Units of measure</th> <th>Frequency</th> <th>Sampling Method</th> </tr> </thead> <tbody> <tr> <td>PM10</td> <td>ug/m<sup>3</sup></td> <td>Every 6 days</td> <td>Clean Air (Plant &amp; Equipment) Regulation 1997 Method Number AM-18</td> </tr> </tbody> </table> <p>Air Quality and Greenhouse Gas Management Plan      Status: Draft      Effective: N/A      Page 38 of 52 Version: 0.1      Review: N/A</p> <p><b>THIS DOCUMENT IS UNCONTROLLED UNLESS VIEWED ON THE INTRANET</b></p>	Pollutant	Units of measure	Frequency	Sampling Method	Particulates - Deposited Matter	g/m <sup>2</sup> /month	Monthly	Clean Air (Plant & Equipment) Regulation 1997 Method Number AM-19	Pollutant	Units of measure	Frequency	Sampling Method	Total suspended particles	ug/m <sup>3</sup>	Every 6 days	Clean Air (Plant & Equipment) Regulation 1997 Method Number AM-15	Pollutant	Units of measure	Frequency	Sampling Method	PM10	ug/m <sup>3</sup>	Continuous	Clean Air (Plant & Equipment) Regulation 1997 Method Number AM-18	Pollutant	Units of measure	Frequency	Sampling Method	PM10	ug/m <sup>3</sup>	Every 6 days	Clean Air (Plant & Equipment) Regulation 1997 Method Number AM-18	Section 6
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PM10	ug/m <sup>3</sup>	Every 6 days	Clean Air (Plant & Equipment) Regulation 1997 Method Number AM-18																																

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Condition Number	Condition Title	Condition Detail	Section of Plan
Condition M3.1	Testing methods - concentration limits	<p>Monitoring for the concentration of a pollutant emitted to the air required to be conducted by this licence must be done in accordance with:</p> <p>(a) any methodology which is required by or under the Act to be used for the testing of the concentration of the pollutant; or</p> <p>(b) if no such requirement is imposed by or under the Act, any methodology which a condition of this licence requires to be used for that testing; or</p> <p>(c) if no such requirement is imposed by or under the Act or by a condition of this licence, any methodology approved in writing by the EPA for the purposes of that testing prior to the testing taking place.</p> <p>Note: The Clean Air (Plant &amp; Equipment) Regulation 1997 requires testing for certain purposes to be conducted in accordance with test methods contained in the publication "Approved Methods for the Sampling and Analysis of Air Pollutants in NSW".</p>	All

## APPENDIX 1e - Ravensworth East Environmental Protection Licence (EPL No: 10860) – Air Quality Conditions

Condition Number	Condition Title	Condition Detail	Section of Plan																				
Condition P1.1	Location of monitoring/discharge points and areas	<p>The following points referred to in the table below are identified in this licence for the purposes of monitoring and/or the setting of limits for the emission of pollutants to the air from the point.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th data-bbox="663 568 853 663">EPA Identification no.</th> <th data-bbox="864 568 1122 663">Type of Monitoring Point</th> <th data-bbox="1133 568 1357 663">Type of Discharge Point</th> <th data-bbox="1368 568 1827 663">Description of Location</th> </tr> </thead> <tbody> <tr> <td data-bbox="663 671 853 807" style="text-align: center;">2</td> <td data-bbox="864 671 1122 807" style="text-align: center;">Ambient air monitoring</td> <td data-bbox="1133 671 1357 807"></td> <td data-bbox="1368 671 1827 807">At location where dust deposition levels are representative of the levels experienced at residential properties, or other sensitive receivers, resulting from the operation of the mine.</td> </tr> <tr> <td data-bbox="663 815 853 983" style="text-align: center;">3</td> <td data-bbox="864 815 1122 983" style="text-align: center;">Ambient air monitoring.</td> <td data-bbox="1133 815 1357 983"></td> <td data-bbox="1368 815 1827 983">At locations where the level of particulate matter being sampled is representative of emissions from the operation of the mine taking into account prevailing wind direction and the location of residential properties or other sensitive receivers.</td> </tr> <tr> <td data-bbox="663 991 853 1158" style="text-align: center;">4</td> <td data-bbox="864 991 1122 1158" style="text-align: center;">Ambient air monitoring</td> <td data-bbox="1133 991 1357 1158"></td> <td data-bbox="1368 991 1827 1158">At locations where the level of particulate matter being sampled is representative of emissions from the operation of the mine taking into account prevailing wind direction and the location of residential properties or other sensitive receivers.</td> </tr> <tr> <td data-bbox="663 1166 853 1329" style="text-align: center;">5</td> <td data-bbox="864 1166 1122 1329" style="text-align: center;">Ambient Air Monitoring</td> <td data-bbox="1133 1166 1357 1329"></td> <td data-bbox="1368 1166 1827 1329">At locations where the level of particulate matter being sampled is representative of emissions from the operation of the mine taking into account prevailing wind direction and the location of residential properties or other sensitive receivers.</td> </tr> </tbody> </table>	EPA Identification no.	Type of Monitoring Point	Type of Discharge Point	Description of Location	2	Ambient air monitoring		At location where dust deposition levels are representative of the levels experienced at residential properties, or other sensitive receivers, resulting from the operation of the mine.	3	Ambient air monitoring.		At locations where the level of particulate matter being sampled is representative of emissions from the operation of the mine taking into account prevailing wind direction and the location of residential properties or other sensitive receivers.	4	Ambient air monitoring		At locations where the level of particulate matter being sampled is representative of emissions from the operation of the mine taking into account prevailing wind direction and the location of residential properties or other sensitive receivers.	5	Ambient Air Monitoring		At locations where the level of particulate matter being sampled is representative of emissions from the operation of the mine taking into account prevailing wind direction and the location of residential properties or other sensitive receivers.	Section 6.1
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Condition Number	Condition Title	Condition Detail	Section of Plan
Condition M3.1	Testing methods - concentration limits	<p>Monitoring for the concentration of a pollutant emitted to the air required to be conducted by this licence must be done in accordance with:</p> <p>(a) any methodology which is required by or under the Act to be used for the testing of the concentration of the pollutant; or</p> <p>(b) if no such requirement is imposed by or under the Act, any methodology which a condition of this licence requires to be used for that testing; or</p> <p>(c) if no such requirement is imposed by or under the Act or by a condition of this licence, any methodology approved in writing by the EPA for the purposes of that testing prior to the testing taking place.</p> <p>Note: The Clean Air (Plant &amp; Equipment) Regulation 1997 requires testing for certain purposes to be conducted in accordance with test methods contained in the publication "Approved Methods for the Sampling and Analysis of Air Pollutants in NSW".</p>	All

**APPENDIX 1f - Glendell Mine Environmental Protection Licence (EPL No: 12840) – Air Quality Conditions**

Condition Number	Condition Title	Condition Detail				Section of Plan
P1.1	Location of monitoring/discharge points and areas	<b>EPA Identification no.</b>	<b>Type of Monitoring Point</b>	<b>Type of Discharge Point</b>	<b>Description of Location</b>	Section 6.1
		1	Particulate monitoring (dust deposition network)		At location where dust deposition levels are representative of the levels experienced at residential properties, or other sensitive receivers, resulting from the operation of the mine.	
		2	Particulate monitoring (TSP High Volume Air Sampler network)		At location where dust deposition levels are representative of the levels experiences at residential properties, or other sensitive receivers, resulting from the operation of the mine.	
		3	Particulate monitoring (PM10 Continuous Monitoring Network)		At location where dust deposition levels are representative of the levels experiences at residential properties, or other sensitive receivers, resulting from the operation of the mine.	

Condition Number	Condition Title	Condition Detail	Section of Plan																								
M2.1	Requirement to monitor concentration of pollutants discharged	<p data-bbox="651 336 763 363">POINT 1</p> <table border="1" data-bbox="663 368 1827 549"> <thead> <tr> <th data-bbox="663 368 965 453">Pollutant</th> <th data-bbox="965 368 1133 453">Units of measure</th> <th data-bbox="1133 368 1420 453">Frequency</th> <th data-bbox="1420 368 1827 453">Sampling Method</th> </tr> </thead> <tbody> <tr> <td data-bbox="663 453 965 549">Particulates - Deposited Matter</td> <td data-bbox="965 453 1133 549">Grams per square metre per month</td> <td data-bbox="1133 453 1420 549">Continuous</td> <td data-bbox="1420 453 1827 549">AM-19</td> </tr> </tbody> </table> <p data-bbox="651 619 763 646">POINT 2</p> <table border="1" data-bbox="663 651 1827 831"> <thead> <tr> <th data-bbox="663 651 965 735">Pollutant</th> <th data-bbox="965 651 1133 735">Units of measure</th> <th data-bbox="1133 651 1420 735">Frequency</th> <th data-bbox="1420 651 1827 735">Sampling Method</th> </tr> </thead> <tbody> <tr> <td data-bbox="663 735 965 831">Total suspended solids</td> <td data-bbox="965 735 1133 831">Micrograms per cubic metre</td> <td data-bbox="1133 735 1420 831">Every 6 days</td> <td data-bbox="1420 735 1827 831">AM-15</td> </tr> </tbody> </table> <p data-bbox="651 901 763 928">POINT 3</p> <table border="1" data-bbox="663 933 1827 1114"> <thead> <tr> <th data-bbox="663 933 965 1018">Pollutant</th> <th data-bbox="965 933 1133 1018">Units of measure</th> <th data-bbox="1133 933 1420 1018">Frequency</th> <th data-bbox="1420 933 1827 1018">Sampling Method</th> </tr> </thead> <tbody> <tr> <td data-bbox="663 1018 965 1114">Particulate matter</td> <td data-bbox="965 1018 1133 1114">Micrograms per cubic metre</td> <td data-bbox="1133 1018 1420 1114">Continuous</td> <td data-bbox="1420 1018 1827 1114">Australian Standard 3580.9.8 - 2001</td> </tr> </tbody> </table>	Pollutant	Units of measure	Frequency	Sampling Method	Particulates - Deposited Matter	Grams per square metre per month	Continuous	AM-19	Pollutant	Units of measure	Frequency	Sampling Method	Total suspended solids	Micrograms per cubic metre	Every 6 days	AM-15	Pollutant	Units of measure	Frequency	Sampling Method	Particulate matter	Micrograms per cubic metre	Continuous	Australian Standard 3580.9.8 - 2001	Section 6.0
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Condition Number	Condition Title	Condition Detail	Section of Plan
M3.1	Testing methods – concentration limits	<p>Monitoring for the concentration of a pollutant emitted to the air required to be conducted by this licence must be done in accordance with:</p> <ul style="list-style-type: none"> <li>(a) any methodology which is required by or under the Act to be used for the testing of the concentration of the pollutant; or</li> <li>(b) if no such requirement is imposed by or under the Act, any methodology which is a condition of this licence requires to be used for that testing; or</li> <li>(c) if no such requirement is imposed by or under the Act or by a condition of this licence, any methodology approved in writing by the EPA for the purposes of that testing prior to the testing taking place.</li> </ul> <p>Note: The Protection of the Environment Operations (Clean Air) Regulation 2002 requires testing for certain purposes to be conducted in accordance with test methods contained in the publication “Approved Methods for the Sampling and Analysis of Air Pollutants in NSW”.</p>	All

## 11.2 Appendix 2 – Dispute Resolution and Land Acquisition

### APPENDIX 2a - Mt Owen Development Conditions (DA 14-1-2004) Regarding Dispute Resolution and Land Acquisition

Consent/ Licence	Condition Number	Condition Detail
DA 14-1-2004	Schedule 5	<p><b>Notification of Landowners</b></p> <p>2. If the results of the air quality and/or noise monitoring required in schedule 4 identify that the air pollution and/or noise generated by the development is greater than any of the air quality and/or noise criteria in schedule 4, except where this is predicted in the EIS, then the Applicant shall notify the Director-General and the affected landowners and/or existing or future tenants (including tenants of mine owned properties) accordingly, and provide quarterly monitoring results to each of these parties until the results show that the development is complying with the air quality and/or noise criteria in schedule 4.</p> <p><b>Independent Review</b></p> <p>4. If a landowner considers the development to be exceeding the air quality and/or noise criteria in schedule 4, except where this is predicted in the EIS, then he/she may ask the Applicant in writing for an independent review of the air pollution and/or noise impacts of the development on his/her land. If the Director-General is satisfied that an independent review is warranted, the Applicant shall within 3 months of the Director-General advising that an independent review is warranted:</p> <p>(a) consult with the landowner to determine his/her concerns;</p> <p>(b) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Director-General, to conduct air quality and/or noise monitoring on the land, to determine whether the development is complying with the relevant air quality and/or noise criteria in schedule 4, and identify the source(s) and scale of any air quality and/or noise impact on the land, and the development's</p>

Consent/ Licence	Condition Number	Condition Detail
		<p>contribution to this impact;</p> <p>(c) give the Director-General and landowner a copy of the independent review.</p> <p>5. If the independent review determines that the development is complying with the relevant air quality and/or noise criteria in schedule 4, then the Applicant may discontinue the independent review with the approval of the Director-General.</p> <p>6. If the independent review determines that the development is not complying with the relevant air quality and/or noise criteria in schedule 4, and that the development is primarily responsible for this non-compliance, then the Applicant shall:</p> <p>(a) take all practicable measures, in consultation with the landowner, to ensure that the development complies with the relevant air quality and/or noise criteria; and</p> <p>(b) conduct further air quality and/or noise monitoring to determine whether these measures ensure compliance; or</p> <p>(c) secure a written agreement with the landowner to allow exceedances of the air quality and/or noise criteria in schedule 4, to the satisfaction of the Director-General. If the additional monitoring referred to above subsequently determines that the development is complying with the relevant air quality and/or noise criteria in schedule 4, then the Applicant may discontinue the independent review with the approval of the Director-General.</p> <p>If the measures referred to in (a) do not achieve compliance with the air quality and/or noise land acquisition criteria in schedule 4, and the Applicant cannot secure a written agreement with the landowner to allow these exceedances within 3 months, then the Applicant shall, upon receiving a written request from the landowner,</p>

Consent/ Licence	Condition Number	Condition Detail
		<p>acquire the landowner's land in accordance with the procedures in conditions 10-12 below.</p> <p>7. If the independent review determines that the relevant air quality and/or noise criteria in schedule 4 are being exceeded, but that more than one mine is responsible for this non-compliance, then the Applicant shall:</p> <p>(a) take all practicable measures with the relevant mine/s, in consultation with the landowner, to ensure that the relevant air quality and/or noise criteria are complied with; and</p> <p>(b) conduct further air quality and/or noise monitoring to determine whether these measures ensure compliance; or</p> <p>(c) secure a written agreement with the landowner to allow exceedances of the air quality and/or noise criteria in schedule 4, to the satisfaction of the Director-General.</p> <p>8. If the independent review determines that the relevant air quality and/or noise land acquisition criteria in schedule 4 are being exceeded at the residence and/or on the landowner's land, and that more than one mine is responsible for this non-compliance, and the Applicant cannot secure a written agreement with the landowner to allow these exceedances within 3 months, then upon receiving a written request from the landowner, the Applicant shall acquire all or part of the landowner's land on as equitable a basis as possible with the relevant mine/s in accordance with the procedures in conditions 10-12 below.</p> <p>If the Applicant is unable to finalise an agreement with the landowner and/or other mine/s, then the Applicant or landowner may refer the matter to the Director-General for resolution. If the matter cannot be resolved within 21 days, the Director-General shall refer the matter to an Independent Dispute Resolution Process. If, following the Independent Dispute Resolution Process, the Director-General decides that the Applicant shall acquire all or part of the landowner's land, then the Applicant shall acquire this land in</p>

Consent/ Licence	Condition Number	Condition Detail
		<p>accordance with the procedures in conditions 10-12 below.</p> <p>9. If the landowner disputes the results of the independent review, either the Applicant or the landowner may refer the matter to the Director-General for resolution. If the matter cannot be resolved within 21 days, the Director-General shall refer the matter to an Independent Dispute Resolution Process.</p> <p><b>Land Acquisition</b></p> <p>10. Within 3 months of receiving a written request from a landowner with acquisition rights, the Applicant shall make a binding written offer to the landowner based on:</p> <p>(a) the current market value of the landowner’s interest in the property at the date of this written request, as if the property was unaffected by the development the subject of the DA, having regard to the:</p> <ul style="list-style-type: none"> <li>• existing and permissible use of the land, in accordance with the applicable planning instruments at the date of the written request; and</li> <li>• presence of improvements on the property and/or any approved building or structure which has been physically commenced at the date of the landowner’s written request, and is due to be completed subsequent to that date, but excluding any improvements that have resulted from the implementation of condition 4 of schedule 4;</li> </ul> <p>(b) the reasonable costs associated with:</p> <ul style="list-style-type: none"> <li>• relocating within the Singleton local government area, or to any other local government area determined by the Director-General;</li> </ul>

Consent/ Licence	Condition Number	Condition Detail
		<ul style="list-style-type: none"> <li>• obtaining legal advice and expert advice for determining the acquisition price of the land, and the terms upon which it is required; and</li> </ul> <p>(c) reasonable compensation for any disturbance caused by the land acquisition process.</p> <p>However, if at the end of this period, the Applicant and landowner cannot agree on the acquisition price of the land, and/or the terms upon which the land is to be acquired, then either party may refer the matter to the Director-General for resolution.</p> <p>Upon receiving such a request, the Director-General shall request the President of the Australian Property Institute to appoint a qualified independent valuer or Fellow of the Institute, to consider submissions from both parties, and determine a fair and reasonable acquisition price for the land, and/or terms upon which the land is to be acquired. If either party disputes the independent valuer's determination, then the independent valuer should refer the matter back to the Director-General.</p> <p>Upon receiving such a referral, the Director-General shall appoint a panel comprising the:</p> <ul style="list-style-type: none"> <li>(i) appointed independent valuer;</li> <li>(ii) Director-General and/or nominee/s; and</li> <li>(iii) President of the Law Society of NSW or nominee,</li> </ul> <p>to consider submissions from both parties, including meeting with the parties individually if requested, and to determine a fair and reasonable acquisition price for the land, and/or the terms upon which the land is to be acquired.</p> <p>Within 14 days of receiving the panel's determination, the Applicant shall make a written offer to purchase the land at a price not less than the panel's determination.</p> <p>If the landowner refuses to accept this offer within 6 months of the date of the Applicant's offer, the</p>

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Consent/ Licence	Condition Number	Condition Detail
		<p>Applicant's obligations to acquire the land shall cease, unless otherwise agreed by the Director-General.</p> <p>11. The Applicant shall bear the costs of any valuation or survey assessment requested by the independent valuer, panel, or the Director-General and the costs of determination referred above.</p> <p>12. If the Applicant and landowner agree that only part of the land shall be acquired, then the Applicant shall pay all reasonable costs associated with obtaining Council approval for any plan of subdivision, and registration of the plan at the Office of the Registrar-General.</p>

Consent/ Licence	Condition Number	Condition Detail
DA 14-1-2004	Appendix 2	<div style="text-align: center;"> <p><b>Independent Dispute Resolution Process (Indicative only)</b></p> <pre> graph TD     A[Matter referred to Independent Dispute Facilitator appointed by DIPNR in consultation with Council] --&gt; B[Independent Facilitator meets with parties concerned to discuss dispute]     B --&gt; C[Dispute resolved]     B --&gt; D[Dispute not resolved]     C --&gt; F[Agreed Outcome]     D --&gt; E[Facilitator consults relevant independent experts for advice on technical issues]     E --&gt; G[Facilitator meets with relevant parties and experts]     G --&gt; H[Dispute resolved]     G --&gt; I[Dispute not resolved]     H --&gt; F     I --&gt; J[Facilitator consults DIPNR and final decision made]     J --&gt; F           </pre> </div>
	Air Quality and	Greenhouse Gas Management Plan Status: Draft    Effective: N/A Version: 0.1    Review: N/A Page 49 of 92

**APPENDIX 2b – Ravensworth East Development Consent Conditions Regarding Dispute Resolution and Land Acquisition**

<b>Consent/ Licence</b>	<b>Condition Number</b>	<b>Condition Detail</b>
DA 52-03-99	Schedule 5	<p><b>Notification of Landowners</b></p> <p>1. If the results of the air quality and/or noise monitoring required in schedule 4 identify that the air pollution and/or noise generated by the development is greater than any of the air quality and/or noise criteria in schedule 4, except where this is predicted in the EIS, then the Applicant shall notify the Director-General and the affected landowners and/or existing or future tenants (including tenants of mine owned properties) accordingly, and provide quarterly monitoring results to each of these parties until the results show that the development is complying with the air quality and/or noise criteria in schedule 4.</p> <p><b>Independent Review</b></p> <p>3. If a landowner considers the development to be exceeding the air quality and/or noise criteria in schedule 4, except where this is predicted in the EIS, then he/she may ask the Applicant in writing for an independent review of the air pollution and/or noise impacts of the development on his/her land. If the Director-General is satisfied that an independent review is warranted, the Applicant shall within 3 months of the Director-General advising that an independent review is warranted:</p> <p>(a) consult with the landowner to determine his/her concerns;</p> <p>(b) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Director-General, to conduct air quality and/or noise monitoring on the land, to determine</p>

Consent/ Licence	Condition Number	Condition Detail
		<p>whether the development is complying with the relevant air quality and/or noise criteria in schedule 4, and identify the source(s) and scale of any air quality and/or noise impact on the land, and the development's contribution to this impact;</p> <p>(c) give the Director-General and landowner a copy of the independent review.</p> <p>4. If the independent review determines that the development is complying with the relevant air quality and/or noise criteria in schedule 4, then the Applicant may discontinue the independent review with the approval of the Director-General.</p> <p>5. If the independent review determines that the development is not complying with the relevant air quality and/or noise criteria in schedule 4, and that the development is primarily responsible for this non-compliance, then the Applicant shall:</p> <p>(a) take all practicable measures, in consultation with the landowner, to ensure that the development complies with the relevant air quality and/or noise criteria; and</p> <p>(b) conduct further air quality and/or noise monitoring to determine whether these measures ensure compliance; or</p> <p>(c) secure a written agreement with the landowner to allow exceedances of the air quality and/or noise criteria in schedule 4, to the satisfaction of the Director-General. If the additional monitoring referred to above subsequently determines that the development is complying with the relevant air quality and/or noise criteria in schedule 4, then the Applicant may discontinue the independent review with the approval of the Director-General.</p> <p>If the measures referred to in (a) do not achieve compliance with the air quality and/or noise land acquisition</p>

Consent/ Licence	Condition Number	Condition Detail
		<p>criteria in schedule 4, and the Applicant cannot secure a written agreement with the landowner to allow these exceedances within 3 months, then the Applicant shall, upon receiving a written request from the landowner, acquire the landowner's land in accordance with the procedures in conditions 10-12 below.</p> <p>6. If the independent review determines that the relevant air quality and/or noise criteria in schedule 4 are being exceeded, but that more than one mine is responsible for this non-compliance, then the Applicant shall:</p> <p>(a) take all practicable measures with the relevant mine/s, in consultation with the landowner, to ensure that the relevant air quality and/or noise criteria are complied with; and</p> <p>(b) conduct further air quality and/or noise monitoring to determine whether these measures ensure compliance; or</p> <p>(c) secure a written agreement with the landowner to allow exceedances of the air quality and/or noise criteria in schedule 4, to the satisfaction of the Director-General.</p> <p>7. If the independent review determines that the relevant air quality and/or noise land acquisition criteria in schedule 4 are being exceeded at the residence and/or on the landowner's land, and that more than one mine is responsible for this non-compliance, and the Applicant cannot secure a written agreement with the landowner to allow these exceedances within 3 months, then upon receiving a written request from the landowner, the Applicant shall acquire all or part of the landowner's land on as equitable a basis as possible with the relevant mine/s in accordance with the procedures in conditions 10-12 below.</p> <p>If the Applicant is unable to finalise an agreement with the landowner and/or other mine/s, then the Applicant or landowner may refer the matter to the Director-General for resolution. If the matter cannot be resolved within 21 days, the Director-General shall refer the matter to an Independent Dispute Resolution Process. If, following</p>

Consent/ Licence	Condition Number	Condition Detail
		<p>the Independent Dispute Resolution Process, the Director-General decides that the Applicant shall acquire all or part of the landowner's land, then the Applicant shall acquire this land in accordance with the procedures in conditions 10-12 below.</p> <p>8. If the landowner disputes the results of the independent review, either the Applicant or the landowner may refer the matter to the Director-General for resolution. If the matter cannot be resolved within 21 days, the Director-General shall refer the matter to an Independent Dispute Resolution Process.</p> <p><b>Land Acquisition</b></p> <p>9. Within 3 months of receiving a written request from a landowner with acquisition rights, the Applicant shall make a binding written offer to the landowner based on:</p> <p>(a) the current market value of the landowner's interest in the property at the date of this written request, as if the property was unaffected by the development the subject of the DA, having regard to the:</p> <ul style="list-style-type: none"> <li>• existing and permissible use of the land, in accordance with the applicable planning instruments at the date of the written request; and</li> <li>• presence of improvements on the property and/or any approved building or structure which has been physically commenced at the date of the landowner's written request, and is due to be completed subsequent to that date, but excluding any improvements that have resulted from the implementation of condition 4 of schedule 4;</li> </ul> <p>(b) the reasonable costs associated with:</p>

Consent/ Licence	Condition Number	Condition Detail
		<ul style="list-style-type: none"> <li>• relocating within the Singleton local government area, or to any other local government area determined by the Director-General;</li> <li>• obtaining legal advice and expert advice for determining the acquisition price of the land, and the terms upon which it is required; and</li> </ul> <p>(c) reasonable compensation for any disturbance caused by the land acquisition process.</p> <p>However, if at the end of this period, the Applicant and landowner cannot agree on the acquisition price of the land, and/or the terms upon which the land is to be acquired, then either party may refer the matter to the Director-General for resolution.</p> <p>Upon receiving such a request, the Director-General shall request the President of the Australian Property Institute to appoint a qualified independent valuer or Fellow of the Institute, to consider submissions from both parties, and determine a fair and reasonable acquisition price for the land, and/or terms upon which the land is to be acquired. If either party disputes the independent valuer's determination, then the independent valuer should refer the matter back to the Director-General.</p> <p>Upon receiving such a referral, the Director-General shall appoint a panel comprising the:</p> <ul style="list-style-type: none"> <li>(i) appointed independent valuer;</li> <li>(ii) Director-General and/or nominee/s; and</li> <li>(iii) President of the Law Society of NSW or nominee,</li> </ul> <p>to consider submissions from both parties, including meeting with the parties individually if requested, and to determine a fair and reasonable acquisition price for the land, and/or the terms upon which the land is to be acquired.</p> <p>Within 14 days of receiving the panel's determination, the Applicant shall make a written offer to purchase the</p>

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Consent/ Licence	Condition Number	Condition Detail
		<p>land at a price not less than the panel's determination.</p> <p>If the landowner refuses to accept this offer within 6 months of the date of the Applicant's offer, the Applicant's obligations to acquire the land shall cease, unless otherwise agreed by the Director-General.</p> <p>10. The Applicant shall bear the costs of any valuation or survey assessment requested by the independent valuer, panel, or the Director-General and the costs of determination referred above.</p> <p>11. If the Applicant and landowner agree that only part of the land shall be acquired, then the Applicant shall pay all reasonable costs associated with obtaining Council approval for any plan of subdivision, and registration of the plan at the Office of the Registrar-General.</p>

Consent/ Licence	Condition Number	Condition Detail
DA 52-02-99	Appendix 2	<div style="text-align: center;"> <p><b>Independent Dispute Resolution Process (Indicative only)</b></p> <pre> graph TD     A[Matter referred to Independent Dispute Facilitator appointed by DIPNR in consultation with Council] --&gt; B[Independent Facilitator meets with parties concerned to discuss dispute]     B --&gt; C[Dispute resolved]     B --&gt; D[Dispute not resolved]     D --&gt; E[Facilitator consults relevant independent experts for advice on technical issues]     E --&gt; F[Facilitator meets with relevant parties and experts]     F --&gt; G[Dispute resolved]     F --&gt; H[Dispute not resolved]     H --&gt; I[Facilitator consults DIPNR and final decision made]     C --&gt; J[Agreed Outcome]     G --&gt; J     I --&gt; J           </pre> </div>
Air Quality and Greenhouse Gas Management Plan		Status: Draft    Effective: N/A Version: 0.1    Review: N/A
<b>THIS DOCUMENT IS UNCONTROLLED UNLESS VIEWED ON THE INTRANET</b>		

**APPENDIX 2c – Glendell Development Consent Conditions Regarding Dispute Resolution and Land Acquisition**

<b>Consent</b>	<b>Condition Number</b>	<b>Condition Detail</b>
DA 80/952	Schedule 4	<p><b>Notification of Landowners</b></p> <p>1. By the end of April 2008, the Applicant shall notify the landowners of the land listed in Table 1 in writing that they have the right to require the Applicant to acquire their land at any stage during the development.</p> <p>2. If the results of monitoring required in schedule 3 identify that impacts generated by the development are greater than the impact assessment criteria in schedule 3, except where this is predicted in the EA, and except where a negotiated agreement has been entered into in relation to that impact, then the Applicant shall notify the Director-General and the affected landowners and/or existing or future tenants (including tenants of mine owned properties) accordingly, and provide quarterly monitoring results to each of these parties until the results show that the development is complying with the criteria in schedule 3.</p> <p>3. The Applicant shall develop a brochure to advise landowners and/or existing or future tenants (including tenants of mine owned properties) of the possible health and amenity impacts associated with exposure to particulate matter, to the satisfaction of the Director-General. The brochure shall be prepared in consultation with NSW Health, and be submitted to the Director-General within 6 months of the date of this consent.</p> <p>The Applicant shall review relevant human health studies and update this brochure every 3 years, to the satisfaction of the Director-General.</p> <p>The Applicant shall provide this brochure (and associated updates) to all landowners and/or existing or</p>

Consent	Condition Number	Condition Detail
		<p>future tenants (including tenants of mine owned properties) of properties where:</p> <p>(a) the predictions in the EA identify that the dust emissions generated by the development are likely to be greater than the air quality land acquisition criteria in condition 21 of schedule 3; and</p> <p>(b) monitoring results identify that the mine is exceeding the air quality land acquisition criteria in condition 21 of schedule 3.</p> <p><b>Independent Review</b></p> <p>4. If a landowner considers the development to be exceeding the impact assessment criteria in schedule 3, then he/she may ask the Director-General in writing for an independent review of the impacts of the development on his/her land.</p> <p>If the Director-General is satisfied that an independent review is warranted, the Applicant shall within 2 months of the Director-General's decision:</p> <p>(a) consult with the landowner to determine his/her concerns;</p> <p>(b) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Director-General, to conduct monitoring on the land, to:</p> <ul style="list-style-type: none"> <li>• determine whether the development is complying with the relevant impact assessment criteria in schedule 3; and</li> <li>• identify the source(s) and scale of any impact on the land, and the development's contribution to this impact; and</li> </ul> <p>(c) give the Director-General and landowner a copy of the independent review.</p>

Consent	Condition Number	Condition Detail
		<p>5. If the independent review determines that the development is complying with the relevant impact assessment criteria in schedule 3, then the Applicant may discontinue the independent review with the approval of the Director-General.</p> <p>6. If the independent review determines that the development is not complying with the relevant impact assessment criteria in schedule 3, and that the development is primarily responsible for this non-compliance, then the Applicant shall:</p> <p>(a) take all reasonable and feasible measures, in consultation with the landowner, to ensure that the development complies with the relevant criteria; and</p> <p>(b) conduct further monitoring to determine whether these measures ensure compliance.</p> <p>If the additional monitoring referred to above subsequently determines that the development is complying with the relevant criteria in schedule 3, or the Applicant and landowner enter into a negotiated agreement to allow these exceedances, then the Applicant may discontinue the independent review with the approval of the Director-General.</p> <p>7. If the independent review determines that the relevant criteria in schedule 3 are being exceeded, but that more than one mine is responsible for this non-compliance, then the Applicant shall, together with the relevant mine/s:</p> <p>(a) take all reasonable and feasible measures, in consultation with the landowner, to ensure that the relevant criteria are complied with; and</p>

Consent	Condition Number	Condition Detail
		<p>(b) conduct further monitoring to determine whether these measures ensure compliance; or</p> <p>(c) secure a written agreement with the landowner and other relevant mines to allow exceedances of the criteria in schedule 3, to the satisfaction of the Director-General.</p> <p>If the additional monitoring referred to above subsequently determines that the developments are complying with the relevant criteria in schedule 3, then the Applicant may discontinue the independent review with the approval of the Director-General.</p> <p>8. If the landowner disputes the results of the independent review, either the Applicant or the landowner may refer the matter to the Director-General for resolution.</p> <p>If the matter cannot be resolved within 21 days, the Director-General shall refer the matter to an Independent Dispute Resolution Process.</p> <p><b>Land Acquisition</b></p> <p>9. Within 3 months of receiving a written request from a landowner with acquisition rights, the Applicant shall make a binding written offer to the landowner based on:</p> <p>(a) the current market value of the landowner’s interest in the property at the date of this written request, as if the property was unaffected by the development the subject of the development application, having regard to the:</p> <ul style="list-style-type: none"> <li>• existing and permissible use of the land, in accordance with the applicable planning instruments at the date of the written request; and</li> </ul>

Consent	Condition Number	Condition Detail
		<ul style="list-style-type: none"> <li>• presence of improvements on the property and/or any approved building or structure which has been physically commenced at the date of the landowner’s written request, and is due to be completed subsequent to that date, but excluding any improvements that have resulted from the implementation of the ‘additional noise mitigation measures’ in condition 6 of schedule 3;</li> </ul> <p>(b) the reasonable costs associated with:</p> <ul style="list-style-type: none"> <li>• relocating within the Singleton local government area, or to any other local government area determined by the Director-General;</li> <li>• obtaining legal advice and expert advice for determining the acquisition price of the land, and the terms upon which it is required; and</li> </ul> <p>(c) reasonable compensation for any disturbance caused by the land acquisition process.</p> <p>However, if at the end of this period, the Applicant and landowner cannot agree on the acquisition price of the land, and/or the terms upon which the land is to be acquired, then either party may refer the matter to the Director-General for resolution.</p> <p>Upon receiving such a request, the Director-General shall request the President of the NSW Division of the Australian Property Institute to appoint a qualified independent valuer or Fellow of the Institute, to consider submissions from both parties, and determine a fair and reasonable acquisition price for the land, and/or terms upon which the land is to be acquired.</p> <p>Within 14 days of receiving the independent valuer’s determination, the Applicant shall make a written offer to purchase the land at a price not less than the independent valuer’s determination.</p> <p>If the landowner refuses to accept this offer within 6 months of the date of the Applicant’s offer, the Applicant's obligations to acquire the land shall cease, unless otherwise agreed by the Director- General.</p>

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Consent	Condition Number	Condition Detail
		<p>10. The Applicant shall bear the costs of any valuation or survey assessment requested by the independent valuer, or the Director-General, and the costs of determination referred above.</p> <p>11. If the Applicant and landowner agree that only part of the land shall be acquired, then the Applicant shall pay all reasonable costs associated with obtaining Council consent for any plan of subdivision (where permissible), and registration of the plan at the Office of the Registrar-General.</p>

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## **11.3 Appendix 3— Energy Savings Action Plan**

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### **Purpose**

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The purpose of this document is to detail approaches to improve energy efficiency from Mt Owen Complex mining operations. This will predominantly be achieved through the use of energy management systems and seeking continuous improvement in energy efficiency in the mining fleet, stationary equipment, mining processes and coal preparation. Mt Owen Complex will continue to assess and implement energy initiatives during the design; operation and decommissioning of mining operations.

This document will outline baseline energy use including a detailed breakdown. Using this data, opportunities will be identified across site in which Glendell can improve energy efficiency.

### **Baseline Energy use**

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The intention of this section of the report is to explain how the energy across the site is used. This section includes review of opportunities available at the site to improve energy efficiency.

Electrical power for the site facilities is sourced from the existing electricity infrastructure in the local area, including the CHPP

Diesel is the major energy source in the open cut mining areas as it is used to power the equipment that is used to dig and move both overburden and the coal from the bottom of the pit to the surface. Diesel consumption has been included in this assessment.

The Business Activity Indicator (BAI) for each site is Run-of-Mine (ROM) tonnes of coal and Bank Cubic Metres (BCM) of overburden (a measure of material moved in mining operations). These indicators have been chosen as they are most likely to drive energy efficiency improvements for the site.

### **Opportunities**

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A review of energy management systems was previously conducted at the site in order to rate the site against ESAP Energy Management Review focus areas using a facilitated workshop approach. Energetics' One-2-Five®Energy system was utilised to undertake this assessment.

Some projects included in this section were initially identified in June 2008. Projects will be tracked using Xstrata's internal project management tools.

This review covers those projects that have been considered appropriate to deliver energy efficiency gains to the complex.

## Management Action

**Table 1: Management Actions**

Project	Energy Management Action	Responsibility	Planned Completion	Actual Completion
MAN-01	<b>Demonstrated corporate commitment</b>	Environment & Climate Change Manager (XCN)	October 2008	Complete
	Arrange for an executive-level officer to sign an energy policy or directive containing specific goals and objectives for improving energy efficiency and reducing energy costs. Select an executive manager to oversee the development of energy management. This is very useful for keeping top management focused on energy.			
MAN-02	<b>Understanding of performance and opportunities</b>	Environment & Community Manager	October 2008	Complete
	Formalise the process by which energy savings potential is established.			
MAN-03	<b>Targets, performance indicators (KPI) and motivation</b>	Environment & Community Manager	12 months are required for the site to reach steady state operation. To be reviewed– October 2009	Being Investigated
	Set overall energy savings targets for reducing energy costs or improving energy efficiency based on benchmarking or an assessment of opportunities.			
MAN-04	<b>Procedures - plant design/retrofit, purchasing/replacement</b>	Mining Superintendent	Captured in normal operating procedures.	In progress
	Recognise the linkage between energy efficiency and production throughput in all operating instructions and include actions to reduce energy use during turndowns, stoppages, and delays.			
MAN-05	<b>Accountabilities</b>	Environment & Community Manager	Product Stewardship Plan (October 2008) & Ongoing	In progress
	Establish a mechanism to assist in coordination of energy management activities. Discuss energy use / productivity and targets on a regular basis.			
MAN-06	<b>Awareness and training</b>	Environment &	Education /	Being

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Project	Energy Management Action	Responsibility	Planned Completion	Actual Completion
	Solicit ideas to cut energy waste and improve efficiency from your staff/teams.	Community Manager	Training / Awareness / Induction. December 2008	Investigated

## Management Projects – Glendell & Ravensworth East

### Management Projects

<b>Project Name:</b> Blast design review. Capture productivity information per blast			
<b>Brief Description</b> Good diggability = good productivity. Energy savings are difficult to quantify as there is a long chain of events from blast. Need to develop the process for capturing all of the variables so that you can determine what the effect of the blast is on the operations; Explosives suppliers need to develop trial blast plan which incorporates the parameters which need to be measured - include energy efficiency here; Develop KPIs for powder factor, potential to develop new KPIs and report for throw blasting and productivity improvements in the pit. This may be constrained by other parties.			
<b>Project Owner</b>		Drill and Blast Engineer / Tech Services	
<b>Other Team Members</b>		Technical Services team	
<b>Current Development Level</b>			
<b>Desired Development Level</b>			
<b>Current Actions Agreed</b>			
<b>Action 1</b>	Develop the process for capturing all of the variables to determine what the effect of the blast is on the operations.	<b>Target Date</b> Not specified	<b>Status</b> Procedure in place. Quality assurance implemented. Payback has been estimated. Data (powder factor, productivity) available from tax services
<b>Action 2</b>	Explosives suppliers need to develop trial blast plan which incorporates the parameters which need to be measured - include energy efficiency here.	<b>Target Date</b> Not specified	<b>Status</b>
<b>Action 3</b>	Develop KPIs for powder factor, potential to develop new KPIs and report for throw blasting and productivity improvements in the pit.	<b>Target Date</b> Not specified	<b>Status</b>
<b>Stage of development</b>		To be implemented	
<b>Energy Savings (GJ)</b>		TBC	

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<b>Payback period</b>	TBC
<b>Data assessment is to an acceptable level of accuracy for inclusion in external reports?</b>	YES / NO (% Accuracy level)
<b>Decision to Progress</b>	TBC

<b>Project Name:</b> Haul road maintenance reviews			
<b>Brief Description</b> Review maintenance practices on the haul road to reduce rolling resistance and decrease fuel consumption			
<b>Project Owner</b>		Mining and Planning	
<b>Other Team Members</b>			
<b>Current Development Level</b>		1a	
<b>Desired Development Level</b>		1c	
<b>Current Actions Agreed</b>			
<b>Action 1</b>	Regularly review haul road and its maintenance to ensure rolling resistance is minimised	<b>Target Date</b> Ongoing	<b>Status</b> Tests conducted by Proof engineering. Report on potential rolling resistance savings revealed improvements in road quality had the potential to reduce fuel usage by 3.61% per annum.
<b>Stage of development</b>		Under investigation	
<b>Energy Savings (GJ)</b>		N/A	
<b>Payback period</b>		N/A	
<b>Data assessment is to an acceptable level of accuracy for inclusion in external reports?</b>		YES / NO (% Accuracy level)	
<b>Decision to Progress</b>			

<b>Project Name:</b> Trial of thinner lip on shovel			
<b>Brief Description</b> Investigate the use of a thinner lip on shovel – a new design reportedly improves efficiency (bucket lip) Initial investigation indicates benefits are minimal with possible additional maintenance - ongoing investigation. It is believed the efficiency improvement is minimal - maybe 1% if that, but maintenance would possibly be greater.			
<b>Project Owner</b>		XCN	
<b>Other Team Members</b>			
<b>Current Development Level</b>		1a	
<b>Desired Development Level</b>		1c	
<b>Current Actions Agreed</b>			
<b>Action 1</b>	Conduct a feasibility study and / or trial of thinner lip on shovel. Record performance information before (baseline) and after for energy savings calculation.	<b>Target Date</b> Not specified	<b>Status</b>
<b>Stage of development</b>		Under investigation	
<b>Energy Savings (GJ)</b>		TBC	
<b>Payback period</b>		TBC	
<b>Data assessment is to an acceptable level of accuracy for inclusion in external reports?</b>		YES / NO (% Accuracy level)	
<b>Decision to Progress</b>		TBC	

<b>Project Name:</b> Review control requirements for new lighting plants			
<b>Brief Description</b>			
15 lighting plants are to be purchased for mining operations. Automatic timers will switch off lighting plants between 7 am and 5 pm.			
Lighting plants now have a timer. If set to auto mode, they start at ~5pm and run to ~7am. Operators are currently being trained. Auto mode off until they are. There are typically up to 16 lighting plants on site and each use about 2L/hr. We save ~1 hr per day per lighting plant. 70 tonnes of CO2 saved annually.			
<b>Project Owner</b>		Maintenance Manager	
<b>Other Team Members</b>			
<b>Current Development Level</b>		1a	
<b>Desired Development Level</b>		1c	
<b>Current Actions Agreed</b>			
<b>Action 1</b>		<b>Target Date</b>	<b>Status</b>
			Automatic timers will switch off lighting plants between 7 am and 5 pm. All lighting plants automated. A savings of 70t CO2-e estimated.
<b>Stage of development</b>		In progress	
<b>Energy Savings (GJ)</b>		TBC	
<b>Payback period</b>		TBC	
<b>Data assessment is to an acceptable level of accuracy for inclusion in external reports?</b>		YES / NO (% Accuracy level)	
<b>Decision to Progress</b>		TBC	

<b>Project Name:</b> Dust suppression trial			
<b>Brief Description</b> Use chemical dust suppression on site. Reduced use of the water cart due to alternative means of dust suppression.			
<b>Project owner</b>		Mining Superintendent	
<b>Other team members</b>			
<b>Current development level</b>			
<b>Desired development level</b>			
<b>Current actions agreed</b>			
<b>Action 1</b>	Trial dust suppression	<b>Target date</b>	<b>Status</b> Study on dust suppression conducted by Environ found that the use of RT-9 water extender had the potential to reduce roadside dust levels by an average of 40%.
<b>Data required to inform analysis / Assumptions</b>			
<b>Stage of development</b>			
<b>Energy savings (GJ)</b>			
<b>Project cost (\$)</b>			
<b>Greenhouse gas savings (t CO<sub>2</sub>-e)</b>			
<b>Other benefits</b>			
<b>Data assessment is to an acceptable level of accuracy for inclusion in external reports?</b>		<b>YES / NO</b> (% Accuracy level)	
<b>Decision to progress</b>			

<b>Project Name:</b> Idle time alarms on equipment			
<b>Brief Description</b> If park up brake is applied, truck will stop after a certain period of idling. This may also be tracked through minestar (equipment running but stationary).			
<b>Project owner</b>		Maintenance Manager / System Engineer	
<b>Other team members</b>			
<b>Current development level</b>			
<b>Desired development level</b>			
<b>Current actions agreed</b>			
<b>Action 1</b>		<b>Target date</b>	<b>Status</b> No alarms to be installed on equipment. System Engineer to provide minestar data.
<b>Data required to inform analysis / Assumptions</b> May be possible with Minestar			
<b>Stage of development</b>		Under investigation	
<b>Energy savings (GJ)</b>			
<b>Project cost (\$)</b>			
<b>Greenhouse gas savings (t CO<sub>2</sub>-e)</b>			
<b>Other benefits</b>			
<b>Data assessment is to an acceptable level of accuracy for inclusion in external reports?</b>		YES / NO (% Accuracy level)	
<b>Decision to progress</b>			

<b>Project Name</b> Truck queue management			
<b>Brief Description</b> Use of Minestar to reduce truck queuing, reduce fuel consumption.			
<b>Project owner</b>		Systems Engineer	
<b>Other team members</b>			
<b>Current development level</b>			
<b>Desired development level</b>			
<b>Current actions agreed</b>			
<b>Action 1</b>		<b>Target date</b>	<b>Status</b>
<b>Data required to inform analysis / Assumptions</b>			
<b>Stage of development</b>			
<b>Energy savings (GJ)</b>			
<b>Project cost (\$)</b>			
<b>Greenhouse gas savings (t CO<sub>2</sub>-e)</b>			
<b>Other benefits</b>			
<b>Data assessment is to an acceptable level of accuracy for inclusion in external reports?</b>		<b>YES / NO</b> (% Accuracy level)	
<b>Decision to progress</b>			

<b>Project Name</b> Payload management			
<b>Brief Description</b> Maximise payload for each truck haul.  Implemented and monitored. Usually about 83% or higher within target range.			
<b>Project owner</b>		Maintenance Manager	
<b>Other team members</b>			
<b>Current development level</b>			
<b>Desired development level</b>			
<b>Current actions agreed</b>			
<b>Action 1</b>	Quantify savings and document as a case study.	<b>Target date</b>	<b>Status</b> Glendell is doing best practise
<b>Data required to inform analysis / Assumptions</b>			
<b>Stage of development</b>			
<b>Energy savings (GJ)</b>			
<b>Project cost (\$)</b>			
<b>Greenhouse gas savings (t CO<sub>2</sub>-e)</b>			
<b>Other benefits</b>			
<b>Data assessment is to an acceptable level of accuracy for inclusion in external reports?</b>		<b>YES / NO</b> (% Accuracy level)	
<b>Decision to progress</b>			

<b>Project Name</b> Barrett Pit Mobile Crib Hut			
<b>Brief Description</b> The mobile crib hut can be moved closer to where work is taking place. Energy savings are associated with not having to transport personnel as far before and after crib breaks.			
<b>Project owner</b>		Mine Manager	
<b>Other team members</b>			
<b>Current development level</b>			
<b>Desired development level</b>			
<b>Current actions agreed</b>			
<b>Action 1</b>		<b>Target date</b>	<b>Status</b> Up and running end of this year (Oct). Capital justification has been conducted.
<b>Data required to inform analysis / Assumptions</b> Savings to be quantified based on trips avoided - vehicle type, typical fuel consumption, distance, no. of trips.			
<b>Stage of development</b>		To be implemented	
<b>Energy savings (GJ)</b>			
<b>Project cost (\$)</b>			
<b>Greenhouse gas savings (t CO<sub>2</sub>-e)</b>			
<b>Other benefits</b>			
<b>Data assessment is to an acceptable level of accuracy for inclusion in external reports?</b>		YES / NO (% Accuracy level)	
<b>Decision to progress</b>			

<b>Project Name</b> In-pit servicing			
<b>Brief Description</b> In-pit servicing avoids the need to transport mine equipment to workshops (on and off-site).			
<b>Project owner</b>		Maintenance Manager	
<b>Other team members</b>			
<b>Current development level</b>			
<b>Desired development level</b>			
<b>Current actions agreed</b>			
<b>Action 1</b>		<b>Target date</b>	<b>Status</b>
<b>Data required to inform analysis / Assumptions</b> Savings to be quantified based on trips avoided - vehicle type, typical fuel consumption, distance, no. of trips.			
<b>Stage of development</b>		Under investigation	
<b>Energy savings (GJ)</b>			
<b>Project cost (\$)</b>			
<b>Greenhouse gas savings (t CO<sub>2</sub>-e)</b>			
<b>Other benefits</b>			
<b>Data assessment is to an acceptable level of accuracy for inclusion in external reports?</b>		YES / NO (% Accuracy level)	
<b>Decision to progress</b>			

<b>Project Name</b> Re-fuelling efficiency			
<b>Brief Description</b> Optimisation of the timing of re-fuelling - avoiding carrying excess fuel (weight) and utilising planned down-times.			
<b>Project owner</b>		Maintenance Manager	
<b>Other team members</b>			
<b>Current development level</b>			
<b>Desired development level</b>			
<b>Current actions agreed</b>			
<b>Action 1</b>		<b>Target date</b>	<b>Status</b>
<b>Data required to inform analysis / Assumptions</b> Need to include quantification of energy savings as part of the review of refuelling strategy.			
<b>Stage of development</b>		Under investigation	
<b>Energy savings (GJ)</b>			
<b>Project cost (\$)</b>			
<b>Greenhouse gas savings (t CO<sub>2</sub>-e)</b>			
<b>Other benefits</b>			
<b>Data assessment is to an acceptable level of accuracy for inclusion in external reports?</b>		YES / NO (% Accuracy level)	
<b>Decision to progress</b>			

<b>Project Name:</b> Biodiesel tests for trucks			
<b>Brief Description</b> Review the potential to trial 5% biodiesel in all trucks. Incorporate into review of use of waste oil burn in trucks to reduce waste.			
<b>Project Owner</b>		Maintenance Manager	
<b>Other Team Members</b>			
<b>Current Development Level</b>		1a	
<b>Desired Development Level</b>		1c	
<b>Current Actions Agreed</b>			
<b>Action 1</b>	Review the potential to trial 5% biodiesel in all trucks.	<b>Target Date</b>	<b>Status</b>
<b>Action 2</b>	Contact biodiesel suppliers to review supply and cost information	<b>Target Date</b>	<b>Status</b>
<b>Action 3</b>	Contact truck manufacturers to help inform risks associated with biodiesel additives	<b>Target Date</b> December 2008	<b>Status</b> We have had problems with fuel filters requiring replacement sooner of late.
<b>Action 4</b>	Calculate savings	<b>Target Date</b>	<b>Status</b>
<b>Stage of development</b>		Idea	
<b>Energy Savings (GJ)</b>		GHG savings	
<b>Payback period</b>		TBC	
<b>Data assessment is to an acceptable level of accuracy for inclusion in external reports?</b>		YES / NO (% Accuracy level)	
<b>Decision to Progress</b>		TBC	

**Project ID:** ESO-09

<b>Project Name:</b> Routine maintenance reviews – review performance against contract			
<b>Brief Description</b> Perform regular maintenance reviews to ensure machinery is performing most efficiently. Review excavator performance against maintenance contract.			
<b>Project Owner</b>		Maintenance Manager	
<b>Other Team Members</b>			
<b>Current Development Level</b>		1a	
<b>Desired Development Level</b>		7	
<b>Current Actions Agreed</b>			
<b>Action 1</b>	Elicit operator feedback, collect hours of operation and fuel consumption information to inform maintenance scheduling.	<b>Target Date</b>	<b>Status</b> Ongoing improvements to fuel monitoring required and frequency of downloads/ease of downloads
<b>Action 2</b>	Perform regular maintenance reviews to ensure machinery is performing most efficiently. Review excavator performance against the terms of the maintenance contract.	<b>Target Date</b>	<b>Status</b> Records of fuel burn rates and other maintenance records are provided to stakeholders and discussed. Meetings held with Hitachi monthly.
<b>Action 3</b>	Meetings with Westrac to be formalised (most communication is via e-mailed reports/correspondence or direct informal communication.)	<b>Target Date</b>	<b>Status</b>
<b>Stage of development</b>		To be implemented	
<b>Energy Savings (GJ)</b>		TBC	
<b>Payback period</b>		TBC	
<b>Data assessment is to an acceptable level of accuracy for inclusion in external reports?</b>		YES / NO (% Accuracy level)	
<b>Decision to Progress</b>		In progress	

<b>Project Name:</b> Fuel burn tracking to inform maintenance			
<b>Brief Description</b> Review VIMS / vehicular downloads on a regular basis. Track fuel burn information on a per-machine basis. This information is available via VIMS (CAT trucks) or MineStar.			
<b>Project Owner</b>		Maintenance Manager	
<b>Other Team Members</b>			
<b>Current Development Level</b>		1a	
<b>Desired Development Level</b>		7	
<b>Current Actions Agreed</b>			
<b>Action 1</b>	Regularly track fuel burn information on a per-machine basis. This information is available, for example, from VIMS (CAT trucks) or MineStar. This is useful in conjunction with ESO-09.	<b>Target Date</b> Ongoing	<b>Status</b> There is a fuel service sheet, which has been amended to include instructions, in each fuel cart.
<b>Action 2</b>	Awaiting a quote from MIR (Mining Industry Resources) for fuel metering on fuel carts so that everything is accounted for. This is a theoretical calculation based on ambient temperature etc.	<b>Target Date</b>	<b>Status</b>
<b>Stage of development</b>		Implementation commenced	
<b>Energy Savings (GJ)</b>		Indirect	
<b>Payback period</b>		N/A	
<b>Data assessment is to an acceptable level of accuracy for inclusion in external reports?</b>		YES / NO (% Accuracy level)	
<b>Decision to Progress</b>		In progress	

<b>Project Name:</b> Ensure leak reviews are performed on future air compressor			
<b>Brief Description</b> Perform regular leak reviews on workshop compressor when installed to reduce the possibility of leaks and energy wastage.			
<b>Project Owner</b>		Maintenance Supervisor	
<b>Other Team Members</b>			
<b>Current Development Level</b>		1a	
<b>Desired Development Level</b>		7	
<b>Current Actions Agreed</b>			
<b>Action 1</b>	Conduct leak review to determine location of leaks and cracked valves	<b>Target Date</b>	<b>Status</b> Done – maintenance program
<b>Action 2</b>	Fix leaks and assess energy savings as a result of this action	<b>Target Date</b>	<b>Status</b> Regular 3 monthly maintenance regime.
<b>Action 3</b>	Hunter Compressors conduct the work. It does not mention leak detection on their inspection sheet and Brad is to confirm with them that they do check for leaks.	<b>Target Date</b>	<b>Status</b>
<b>Stage of development</b>		Implementation commenced	
<b>Energy Savings (GJ)</b>		TBC	
<b>Payback period</b>		TBC	
<b>Data assessment is to an acceptable level of accuracy for inclusion in external reports?</b>		YES / NO (% Accuracy level)	
<b>Decision to Progress</b>		In progress	
<b>Project Name:</b> Targets, performance indicators (KPIs) & motivation			
<b>Brief Description</b> Set overall energy savings targets for reducing energy costs or improving energy efficiency based on benchmarking or an assessment of opportunities.			

<b>Project Owner</b>		Environment & Community Manager	
<b>Other Team Members</b>			
<b>Current Development Level</b>		1a	
<b>Desired Development Level</b>		7	
<b>Current Actions Agreed</b>			
<b>Action 1</b>	Ensure the site has reached "steady state" operation to be able to assess the energy consumption (baseline / benchmarking) relative to projections.	<b>Target Date</b>	<b>Status</b>
<b>Action 2</b>	Based on the current suite of energy saving opportunities at the time, and both site and corporate aims, set overall energy savings targets based on benchmarking information.	<b>Target Date</b> October 2009	<b>Status</b>
<b>Stage of development</b>		Under investigation	
<b>Energy Savings (GJ)</b>		TBC	
<b>Payback period</b>		N/A	
<b>Data assessment is to an acceptable level of accuracy for inclusion in external reports?</b>		YES / NO (% Accuracy level)	
<b>Decision to Progress</b>		In progress	

<b>Project Name</b> Ancillary equipment hours management			
<b>Brief Description</b> Review how best to manage this tracking fuel consumption by ancillary equipment.			
<b>Project owner</b>		Maintenance Manager	
<b>Other team members</b>			
<b>Current development level</b>			
<b>Desired development level</b>			
<b>Current actions agreed</b>			
<b>Action 1</b>		<b>Target date</b>	<b>Status</b>
<b>Data required to inform analysis / Assumptions</b> Lighting plants are looking more at fuel used than fuel consumption per hour. Fuel service cart operators are not currently required to record hours on equipment such as lighting plants.			
<b>Stage of development</b>		Under investigation	
<b>Energy savings (GJ)</b>			
<b>Project cost (\$)</b>			
<b>Greenhouse gas savings (t CO<sub>2</sub>-e)</b>			
<b>Other benefits</b>			
<b>Data assessment is to an acceptable level of accuracy for inclusion in external reports?</b>		YES / NO (% Accuracy level)	
<b>Decision to progress</b>			

<b>Project Name</b>			
Incorporate energy saving objectives into operations documentation where appropriate			
<b>Brief Description</b>			
Review mine planning docs, procurement, establishing KPIs/annual review doc.			
<b>Project owner</b>		Environment & Community Manager	
<b>Other team members</b>			
<b>Current development level</b>			
<b>Desired development level</b>			
<b>Current actions agreed</b>			
<b>Action 1</b>		<b>Target date</b>	<b>Status</b>
<b>Data required to inform analysis / Assumptions</b>			
<b>Stage of development</b>		Under investigation	
<b>Energy savings (GJ)</b>			
<b>Project cost (\$)</b>			
<b>Greenhouse gas savings (t CO<sub>2</sub>-e)</b>			
<b>Other benefits</b>			
<b>Data assessment is to an acceptable level of accuracy for inclusion in external reports?</b>		YES / NO (% Accuracy level)	
<b>Decision to progress</b>			

<b>Project Name</b> Energy savings KPIs for contractors			
<b>Brief Description</b> a) Include energy efficiency in contractor forums. b) Introduction to site for contractors' equipment to include energy efficiency specifications.			
<b>Project owner</b>		Maintenance Manager	
<b>Other team members</b>			
<b>Current development level</b>			
<b>Desired development level</b>			
<b>Current actions agreed</b>			
<b>Action 1</b>		<b>Target date</b>	<b>Status</b> Already commenced contractor forums - to be developed further down the track following feedback from first contractor forum.
<b>Data required to inform analysis / Assumptions</b>			
<b>Stage of development</b>			
<b>Energy savings (GJ)</b>			
<b>Project cost (\$)</b>			
<b>Greenhouse gas savings (t CO<sub>2</sub>-e)</b>			
<b>Other benefits</b>			
<b>Data assessment is to an acceptable level of accuracy for inclusion in external reports?</b>		YES / NO (% Accuracy level)	
<b>Decision to progress</b>			

<b>Project Name</b>			
Improve site quantification and verification of energy savings			
<b>Brief Description</b>			
Make sure that a review of energy projects is included in the Xtrasafe and change management systems.			
<b>Project owner</b>		Environment & Community Coordinator	
<b>Other team members</b>			
<b>Current development level</b>			
<b>Desired development level</b>			
<b>Current actions agreed</b>			
<b>Action 1</b>	Included a review of energy projects in the Xtrasafe and change management systems.	<b>Target date</b>	<b>Status</b>
<b>Data required to inform analysis / Assumptions</b>			
<b>Stage of development</b>		To be implemented	
<b>Energy savings (GJ)</b>			
<b>Project cost (\$)</b>			
<b>Greenhouse gas savings (t CO<sub>2</sub>-e)</b>			
<b>Other benefits</b>			
<b>Data assessment is to an acceptable level of accuracy for inclusion in external reports?</b>		YES / NO (% Accuracy level)	
<b>Decision to progress</b>			

<b>Project Name</b>			
Improve rigour around assessment process including baseline information			
<b>Brief Description</b>			
Improve metering and monitoring of diesel, the major energy type consumed on site.			
<b>Project owner</b>		Maintenance Superintendent	
<b>Other team members</b>			
<b>Current development level</b>			
<b>Desired development level</b>			
<b>Current actions agreed</b>			
<b>Action 1</b>	Implement improved measurement systems – e.g. fuel management system.	<b>Target date</b>	<b>Status</b>
<b>Data required to inform analysis / Assumptions</b>			
<b>Stage of development</b>			
<b>Energy savings (GJ)</b>			
<b>Project cost (\$)</b>			
<b>Greenhouse gas savings (t CO<sub>2</sub>-e)</b>			
<b>Other benefits</b>			
<b>Data assessment is to an acceptable level of accuracy for inclusion in external reports?</b>		<b>YES / NO</b> (% Accuracy level)	
<b>Decision to progress</b>			

## Management Projects – Mt Owen Mine

Project Number	Project Name	Project Description	Responsibility	Status
5-09	Cogged Vee Belts/Full Sized Impeller Replacement on Pump Drives	Install cogged vee belts in pump drives to eliminate slip. Replace the impellers on pump drives with 100% full sized impellers.	CHPP Manager	Final Stages (Implemented): Equipment installed on 2/3 pumps. Third belt to be installed once current impeller has worn out. Synchronous drives and poly chain carbon belts installed on the same two modules.
8-09	Monitoring Tools	Payload reduction/ production/ fuel burn. Fuel to machine monitoring for NGER support. Part of the BI tool in JDE	Maintenance Manager	Completed
24-09	Kidney Looping Oil Filtration	Recycling oil to decrease usage. Currently used on Hitachi EH4500, Caterpillar 785 and 793	Maintenance Department	Completed
25-09	Coal Recovery Through CHPP	Improving coal recovery through CHPP.	CHPP Manager	Ongoing
6/10	Flocculent/Thickener Control	To improve tailings underflow control through automated pump control in order to reduce water wastage.	CHPP Manager	Final Stages: Flocculent control equipment installed. Sonar equipment installed on both tailings thickeners. Software fine-tuning is under way to implement automation of pumping.
1/10	Payload Management	To reduce diesel consumption per BCM of ROM. This is done through finding an optimal payload, and other factors such as ramp and haul road design, and understand loss incurred with respect to intrusion of large rocks/ dirty coal.	Mine Manager	Ongoing

## Planned Energy Savings Projects at Mt Owen

The following Energy Saving Action Plan Projects are at the development stage and could be implemented over the 2011/2012 financial year if feasible to do so.

Project Description	Responsibility	Cost to Implement (\$)	Fuel Savings (L)	Savings Cost (\$) - Annual	Planned Completion	Status
<b>Compressor Management System for Drill Rigs.</b>	Mine Manager	\$143,444	423	\$83,575.30	-	Feasibility study completed – Implementation will be reliant on whether funding is granted.
<b>Introduction of Long Life Tyres on Trucks</b>	Maintenance Manager	-	-	To quantify	-	Trial of new tyres is under way but they have not reached the extended life that had been expected. Bridgestone will be coming to Mount Owen to investigate why they have not reached the estimated life. Purchase of new tyres will continue to be of the new Bridgestone's in the hope of extending tyre life.

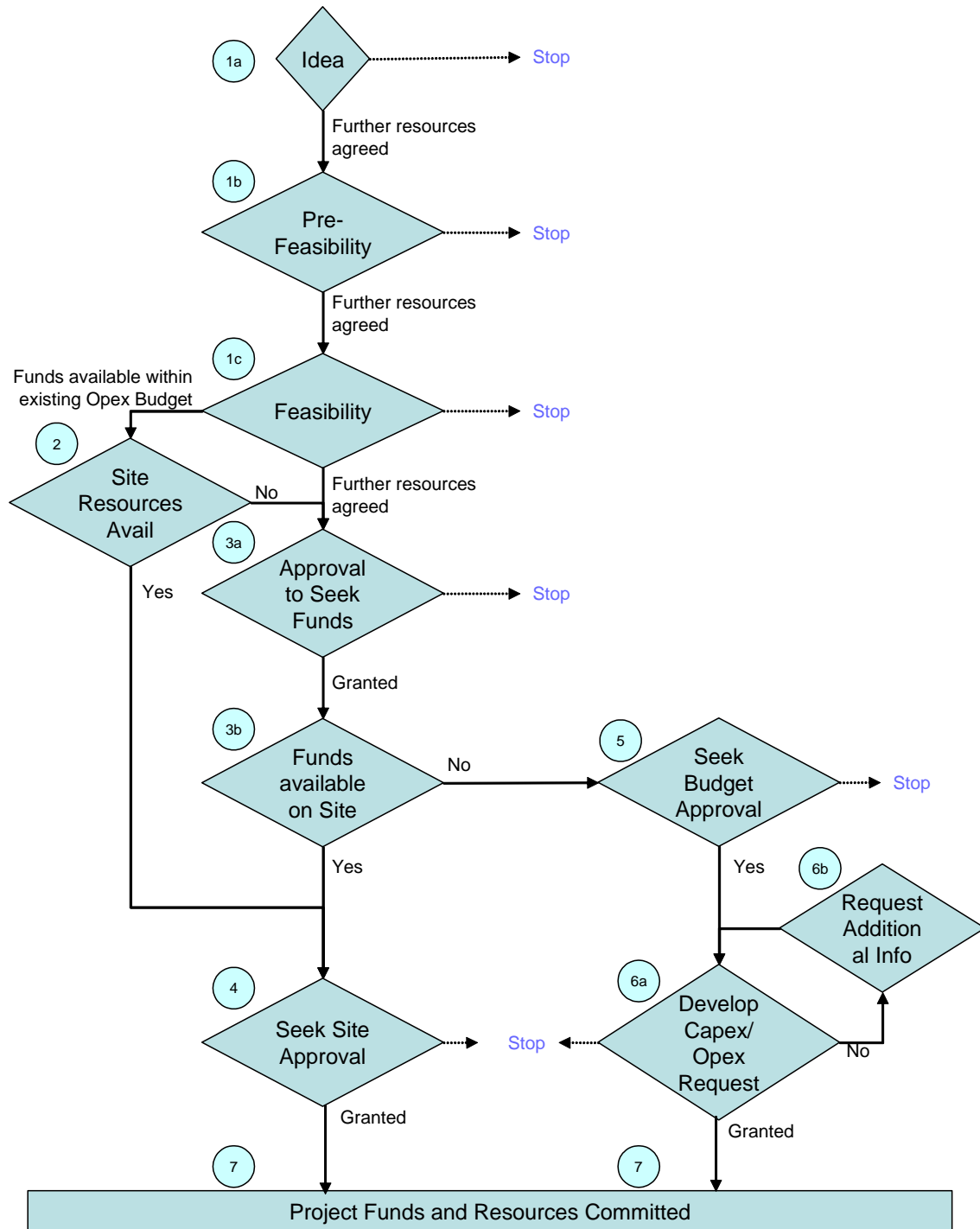
## Current Energy Savings Projects at Mt Owen

A summary of the ESAP projects that are in progress or planned to be implemented throughout 2011 and 2012 are provided below.

Project Number	Project Description	Responsibility	Cost to Implement (\$)	Energy Savings (GJ)	Savings Cost (\$) - Annual	Planned Completion	Status
1/10	Payload Management	Mine Manager	0	5,641	To quantify	On-going	On-going, Savings to be quantified.
4/10	Coal Recovery through CHPP	CHPP Manager	0	980	To quantify	On-going	On-going investigations underway to identify opportunities to increase yield.
6/10	Flocculent/Thickener Control	CHPP Manager	\$24,870	To quantify	To quantify	Q2-2011	Equipment installed on both Thickeners. Programming of units underway to allow for automated pump control and increase water savings by May 2011.

# Energy Savings Action Plan

## XCN Project Process



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## Energy Savings Action Plan

### Measurement and Evaluation

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Measurement and evaluation will be assessed annually based on the actions specified in the action plans.

### Action Plan Review

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The status of the implementation of energy saving activities under this plan will be reported in the Annual Review. An overview of the energy saving actions implemented under this plan will be presented at Mt Owen Complex Community Consultative Committee (CCC) on an annual basis.

The ESAP is to be reviewed at least every three years or as otherwise directed by the Director-General of the Department of Planning and Infrastructure (DoPI). The review process is to reflect changes in environmental legislation and guidelines and changes in technology or operational procedures.

In accordance with Development Consent Conditions for Glendell mine, Mt Owen Mine and Ravensworth East Mine, every three years XMO will commission an Independent Environmental Audit to the satisfaction of DoPI. The audit will include an assessment of the adequacy of the ESAP. Where necessary following the audit, the plan will be updated and action taken to improve performance and management practices.