HUNTER VALLEY OPERATIONS

AIR QUALITY AND GREENHOUSE GAS MANAGEMENT PLAN

Prepared by Rio Tinto Coal Australia | 11 February 2014

This Air Quality and Greenhouse Gas Management Plan describes the existing air quality, meteorology and receptors, the regulatory criteria that applies, defines best management practice and details the management framework and mitigation actions to be taken in operating the Project.

AIR QUALITY AND GREENHOUSE GAS MANAGEMENT PLAN

Document control

Version	Date	Prepared by	Reviewed by
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Revisions

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PREFACE

AIR QUALITY & GREENHOUSE GAS MANAGEMENT PLAN

1. PREFACES

1.1 Introduction

Hunter Valley Operations (HVO) is an open cut mining complex located approximately 24 kilometres north-west of Singleton, New South Wales (NSW) and geographically divided by the Hunter River into HVO North and HVO South. While HVO is managed as one operation, HVO North and HVO South each have separate planning approvals.

This Air Quality & Greenhouse Gas Management Plan (AQMP) applies to the whole HVO complex (the Project).

The Project is generally bounded by Lemington Road and Jerrys Plains Road alongside its western boundary. The New England Highway is located to the north and east of the Project area with the Golden Highway and Wallaby Scrub Road to the south.

Coal & Allied Operations Pty Ltd (Coal & Allied) was granted approval on 12 June 2004 (DA 450-10-2003) for HVO North by the Minister for Infrastructure and Planning and the Minister for Natural Resources (the HVO North Approval). Subsequent modifications were approved in August 2005, June 2006 and in March 2013.

HVO South operates in accordance with the Project Approval granted on 24 March 2009 (DA 06_0261) by the Minister for Planning (the HVO South Approval). Subsequent modifications were approved in December 2009, February 2012 and October 2012.

The HVO North Approval and the HVO South Approval are jointly referred to herein as 'the Approvals'.

The March 2013 modification to the HVO North Approval which was granted by the Planning Assessment Commission of NSW as delegate of the Minister for Planning and Infrastructure involved an extension to the south-west of the existing Carrington Pit and it is that modification which brought about the requirement for this AQMP. The Project is described in detail in:

- the EIS titled '*Hunter Valley Operations – West Pit Extension and Minor Modifications*', dated October 2003, and prepared by Environmental Resources Management Australia;
- the section 96(1A) modification application for the '*Hunter Valley Loading Point*', dated 30 June 2005, and prepared by Matrix Consulting;
- the '*Carrington Pit Extended Statement of Environmental Effects*', dated October 2005, and prepared by Environmental Resources Management Australia;
- the '*Carrington West Wing Environmental Assessment*', dated 1 October 2010, and prepared by EMGA Mitchell McLennan (CWW EA);
- the Environmental assessment titled '*Hunter Valley Operations South Coal Project Environmental Assessment Report*', Volumes 1, 2 and 3, dated January 2008, including the response to submissions;
- the Environmental Assessment titled '*Raising of Lake James Dam*', dated October 2009, and the response to submissions (including its Statement of Commitments) dated November 2009;
- the Environmental Assessment titled '*Proposed Modification to HVO South Project'*, dated May 2010, and the response to submissions dated August 2010;
- the Environmental Assessment titled '*Hunter Valley Operations South Project Approval – Modification 4 – Administrative Omissions and Clarifications*' [sic], dated 26 September 2012; and
- the Environmental Assessment titled '*Hunter Valley Operations South Project Approval – Modification 5*' – Dedication of Lands for Offsets [sic], dated 26 September 2012.

The Project will occur in an area where mining is already a feature of the landscape. HVO is located in the Hunter Valley coalfields with surrounding mines and infrastructure including Mount Thorley Warkworth (MTW), Wambo and Ravensworth.

An Air Quality Study was prepared as part of the CWW EA (EMGA Mitchell McLennan dated 1 October 2010) to assess potential air quality and greenhouse gas impacts.

Similarly, an air quality assessment was undertaken as part of the HVO South Coal Project Environmental Assessment (Environmental Resource Management, 2008)

This AQMP is the primary tool that will be utilised to reduce potential air quality impacts related to the Project.

1.2 Scope of the Air Quality & Greenhouse Gas Management Plan

This AQMP was prepared by Rio Tinto Coal Australia in accordance with Schedule 4, Condition 6 of the HVO North Approval. This AQMP was submitted for approval on 28 June 2013.

This AQMP applies to the area within HVO North and HVO South boundaries, including:

- Operating Pits;
- Coal Preparation Plants (CPPs); and
- Loading Points.

This AQMP is to be applied from the time of approval of this plan, during construction and operation of the Project and incorporates mitigation measures and strategies that HVO will employ to comply with the relevant air quality and greenhouse gas conditions of the Approvals and Environment Protection Licence (EPL). Table 1.1 below highlights the conditions required to be covered by this AQMP and the sections within this document in which they are addressed.

Table 1.2 highlights where items in the Statement of Commitments (SOC) related to air quality impacts are addressed in this AQMP.

Table 1.1 Consent Conditions Addressed

Consent Condition	Environmental Performance Conditions	Section of AQMP which addresses this requirement
HVO North Consent (DA 450-10-2003)		
Sch 4, Cond 3	Odour The Applicant shall ensure that no offensive odours are emitted from the site, as defined under the POEO Act.	Section 6.3.1
Sch 4, Cond 4	Greenhouse Gas Emissions The Applicant shall implement all reasonable and feasible measures to minimise the release of greenhouse gas emissions from the site to the satisfaction of the Director-General.	Section 7
Sch 4, Cond 4A	Air Quality Criteria Except for the air quality affected land in Table 1, the Applicant shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the development do not exceed the criteria listed in Tables 2, 3 or 4 at any residence on privately-owned land or on more than 25 percent of any privately-owned land. In this condition 'reasonable and feasible avoidance and mitigation measures' includes, but is not limited to, the operational requirements in Condition 5 of Schedule 4 and the requirements in Conditions 5 and 6 of Schedule 4 to develop and implement a real-time air quality management system that ensures effective operational responses to the risks of exceedance of the criteria.	This AQMP

Table 2: Long term criteria for particulate matter

Pollutant	Averaging Period	[d] Criterion
Total suspended particulate (TSP) matter	Annual	[a] 90 µg/m^3
Particulate matter < 10 µm (PM_{10})	Annual	[a] 30 µg/m^3

Table 3: Short term criterion for particulate matter

Pollutant	Averaging Period	[d] Criterion
Particulate matter < 10 µm (PM_{10})	24 hour	[a] 50 µg/m^3

Table 4: Long term criteria for deposited dust

Pollutant	Averaging Period	Maximum increase in deposited dust level	Maximum total deposited dust level
[c] Deposited dust	Annual	[b] 2 g/m^2/month	[a] 4 g/m^2/month

Notes to Tables 2–4:

· a Total impact (i.e. incremental increase in concentrations due to the development plus background concentrations due to all other sources);

· b Incremental impact (i.e. incremental increase in concentrations due to the development on its own);

c Deposited dust is to be 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.

d 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.

Consent Condition	Environmental Performance Conditions	Section of AQMP which addresses this requirement
Sch 4, Cond 4B	Air Quality Acquisition Criteria If particulate matter emissions generated by the development exceed the criteria in Tables 5, 6 or 7 on a systemic basis at any residence on privately-owned land or on more than 25 percent of any privately-owned land, then upon receiving a written request for acquisition from the landowner the Applicant shall acquire the land in accordance with the procedures in Conditions 7 and 8 of Schedule 5.	This AQMP

Table 5: Long term acquisition criteria for particulate matter

Pollutant	Averaging Period	[d] Criterion
Total suspended particulate (TSP) matter	Annual	[a] 90 µg/m^3
Particulate matter < 10 µm (PM_{10})	Annual	[a] 30 µg/m^3

Table 6: Short term acquisition criteria for particulate matter

Pollutant	Averaging period	[d] Criterion
Particulate matter < 10 µm (PM_{10})	24 hour	[a] 150 µg/m^3
Particulate matter < 10 µm (PM_{10})	24 hour	[b] 50 µg/m^3

Table 7: Long term acquisition criteria for deposited dust

Pollutant	Averaging Period	Maximum increase in deposited dust level	Maximum total deposited dust level
[c] Deposited dust	Annual	[b] 2 g/m^2/month	[a] 4 g/m^2/month

Notes to Tables 5-7:

· a Total impact (i.e. incremental increase in concentrations due to the development plus background concentrations due to all other sources);

· b Incremental impact (i.e. incremental increase in concentrations due to the development on its own);

· c Deposited dust is to be 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.

· d 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.

Sch 4, Cond 4C (a)	Mine-owned Land The Applicant shall ensure that particulate matter emissions generated by the development do not exceed the criteria listed in Table 2, Table 3 and Table 4 at any occupied residence on any mine-owned land (including land owned by adjacent mines) unless: the tenant and landowner has been notified of health risks in accordance with the notification requirements under Schedule 5 of this consent;	Section 5.3
Sch 4, Cond 4C (b)	the tenant on land owned by the Applicant can terminate their tenancy agreement without penalty, subject to giving reasonable notice, and the Applicant uses its best endeavours to provide assistance with relocation and sourcing of alternative accommodation;	Section 5.3
Sch 4, Cond 4C (c)	air mitigation measures (such as air filters, a first flush roof water drainage system and/or air conditioning) are installed at the residence, if requested by the tenant and landowner (where owned by another mine other than the Applicant);	Section 5.3
Sch 4, Cond 4C (d)	particulate matter air quality monitoring is undertaken to inform the tenant and landowner of potential health risks; and	Section 5.3

Consent Condition	Environmental Performance Conditions	Section of AQMP which addresses this requirement
Sch 4, Cond 4C (e)	monitoring data is presented to the tenant in an appropriate format, for a medical practitioner to assist the tenant in making an informed decision on the health risks associated with occupying the property, to the satisfaction of the Director-General.	Section 5.3
Sch 4, Cond 5 (a)	Air Quality Operating Conditions The Applicant shall: implement best management practice to minimise the off-site odour, fume and dust emissions of the development, including best practice coal loading and profiling and other measures to minimise dust emissions from coal transportation by rail;	Sections 5.2 and 6.7
Sch 4, Cond 5 (b)	operate a comprehensive air quality management system on site that uses a combination of predictive meteorological forecasting, predictive and real time air dispersion modelling and real-time air quality monitoring data to guide the day to day planning of mining operations and implementation of both proactive and reactive air quality mitigation measures to ensure compliance with the relevant conditions of this approval;	Section 6
Sch 4, Cond 5 (c)	manage $PM_{2.5}$ levels in accordance with any requirements of any EPL;	Section 6.3.2
Sch 4, Cond 5 (d)	minimise the air quality impacts of the development during adverse meteorological conditions and extraordinary events (see note d above under Table 5-7);	Section 6
Sch 4, Cond 5 (e)	minimise any visible off-site air pollution;	Section 6
Sch 4, Cond 5 (f)	minimise the surface disturbance of the site generated by the development; and	Section 6
Sch 4, Cond 5 (g)	co-ordinate air quality management on site with the air quality management at nearby mines (Mount Thorley Warkworth, Wambo, Ravensworth and HVO South mines) to minimise the cumulative air quality impacts of these mines and the development, to the satisfaction of the Director-General.	Section 3.2
Sch 4, Cond 6	Air Quality & Greenhouse Gas Management Plan The Applicant shall prepare and implement a detailed Air Quality & Greenhouse Gas Management Plan for the development to the satisfaction of the Director-General. This plan must:	This AQMP
Sch 4, Cond 6(a)	be prepared in consultation with the EPA, and submitted to the Director-General for approval by the end of June 2013;	Sections 3.1 and 1.2
Sch 4, Cond 6(b)	describe the measures that would be implemented to ensure: • best management practice is being employed; • the air quality impacts of the development are minimised during adverse meteorological conditions and extraordinary events; and • compliance with the relevant conditions of this consent.	Sections 5.2, 6, and 9
Sch 4, Cond 6(c)	describe the proposed air quality management system;	Section 6
Sch 4, Cond 6(d)	include a risk/response matrix to codify mine operational responses to varying levels of risk resulting from weather conditions and specific mining activities;	Section 6.5
Sch 4, Cond 6(e)	include commitments to provide summary reports and specific briefings at CCC meetings on issues arising from air quality monitoring;	Section 10.1.2
Sch 4, Cond 6(f)	include an air quality monitoring program that: • uses a combination of real-time monitors and supplementary monitors to evaluate the performance of the development; • adequately supports the proactive and reactive air quality management system;	Section 8

Consent Condition	Environmental Performance Conditions	Section of AQMP which addresses this requirement
	• includes $PM_{2.5}$ monitoring; • includes monitoring of occupied development-related residences and residences on air quality-affected land listed in Table 1, subject to the agreement of the tenant; • evaluates and reports on the effectiveness of the air quality management system; and • includes a protocol for determining any exceedances of the relevant conditions in this approval; and	
Sch 4, Cond 6(g)	include a protocol that has been prepared in consultation with the owners of nearby mines (Mt Thorley Warkworth, Wambo, Ravensworth and HVO South mines) to minimise the cumulative air quality impacts of these mines and the development.	Section 3.2
Sch. 5, Cond. 3(a)	As soon as practicable after obtaining monitoring results showing: a) an exceedance of any criteria in schedule 4, the Applicant shall: • notify each affected landowner and/or tenant of the land (including the tenants of any mine-owned land) in writing of the exceedance; and • provide each affected party with regular monitoring results until the development is again complying with the relevant criteria; and	Section 5.3
Sch. 5, Cond. 3(b)	b) an exceedance of the air quality criteria in schedule 4, the Applicant shall additionally provide each affected party with: • a copy of the NSW Health fact sheet entitled "Mine Dust and You" (as may be updated from time to time), if not recently provided; and • monitoring data in an appropriate format such that the party's medical practitioner can assist them in making an informed decision on the health risks associated with continued occupation of the property, to the satisfaction of the Director-General.	Section 5.3
Sch. 6, Cond. 4(a)	The Applicant shall ensure that the management plans required under this consent are prepared in accordance with any relevant guidelines, and include: detailed baseline data	Section 4.3
Sch. 6, Cond. 4(b)	a description of: • the relevant statutory requirements (including any relevant consent, licence or lease conditions); • any relevant limits or performance measures/criteria; • the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures/criteria	Sections 2, 4.4 and 9
Sch. 6, Cond. 4(c)	a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria	Sections 6 and 9
Sch. 6, Cond. 4(d)	a program to monitor and report on the: • impacts and environmental performance of the development; • effectiveness of any management measures (see c above)	Sections 8 and 10.1
Sch. 6, Cond. 4(e)	a contingency plan to manage any unpredicted impacts and their consequences	Section 6.6
Sch. 6, Cond. 4(f)	a program to investigate and implement ways to improve the environmental performance of the development over time	Section 6.7
Sch. 6, Cond. 4(g)	a protocol for managing and reporting any: • incidents; • complaints;	Sections 9 and 10.1

Consent Condition	Environmental Performance Conditions	Section of AQMP which addresses this requirement
	• non-compliances with statutory requirements; and • exceedances of the impact assessment criteria and/or performance criteria	
Sch. 6, Cond. 4(h)	a protocol for periodic review of the plan	Section 11
Sch. 6, Cond. 5	Annual Review By the end of March 2014, and annually thereafter, unless otherwise agreed, the Applicant shall review the environmental performance of the development to the satisfaction of the Director-General. This review must: (a) describe the development (including any rehabilitation) that was carried out in the past calendar year, and the development that is proposed to be carried out over the next calendar year; (b) include a comprehensive review of the monitoring results and complaints records of the development over the past calendar year, which includes a comparison of these results against the: · the relevant statutory requirements, limits or performance measures/criteria; · the monitoring results of previous years; and · the relevant predictions in the EA; (c) identify any non-compliance over the past calendar year, and describe what actions were (or are being) taken to ensure compliance; (d) identify any trends in the monitoring data over the life of the development; (e) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and (f) describe what measures will be implemented over the next year to improve the environmental performance of the development.	Section 11
Sch. 6, Cond. 5A	Revision of Strategies, Plans and Programs Within 3 months of: (a) the submission of an annual review under Condition 5 above; (b) the submission of an incident report under Condition 5B below; (c) the submission of an audit under Condition 6 below; and (d) any modification to the conditions of this consent (unless the conditions require otherwise), the Applicant shall review, and if necessary revise, the strategies, plans, and programs required under this consent to the satisfaction of the Director-General. *Note: This is to ensure the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the development.*	Section 11
Sch. 6, Cond. 5B	Incident Reporting The Applicant shall notify, at the earliest opportunity, the Director-General and any other relevant agencies of any incident that has caused, or threatens to cause, material harm to the environment. For any other incident associated with the development, the Applicant shall notify the Director- General and any other relevant agencies as soon as practicable after the Applicant becomes aware of the incident. Within 7 days of the date of the incident, the Applicant shall provide the Director- General and any relevant agencies with a detailed report on the incident, and such further reports as may be requested.	Section 10.1
Sch. 6, Cond. 5C	Regular Reporting The Applicant shall provide regular reporting on the environmental performance of the development on its website in accordance with: (a) the reporting arrangements in any plans or programs approved under the conditions of this approval; (b) the requirements of condition 9; and (c) the requirements of an approved on-line communication plan to be submitted to the Director- General by the end of September 2013 containing a description of the content and frequency of posting for information that could reasonably be expected to be provided on the website concerning:	Section 10.1

Consent Condition	Environmental Performance Conditions	Section of AQMP which addresses this requirement
	· incidents of the type included in condition 5B; · any other non-compliance by the development; · responses to operational requirements imposed by real-time management systems for air and noise; · data from real-time management systems for air and noise.	
HVO South Project Approval (DA06_0261)		
Sch. 3, Cond.19	Impact Assessment Criteria The Proponent shall ensure that dust generated by the project does 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, the Hunter Valley Gliding Club (when in use) or on more than 25 percent of any privately-owned land.	Sections 4.4 and 9

Table 8: Long term impact assessment criteria for particulate matter

Pollutant	*Averaging period*	*Criterion*
Total suspended particulate (TSP) matter	Annual	90 µg/m^3
Particulate matter < 10 µm (PM_{10})	Annual	30 µg/m^3

Table 9: Short term impact assessment criterion for particulate matter

Pollutant	*Averaging period*	*Criterion*
Particulate matter < 10 µm (PM_{10})	24 hour	50 µg/m^3

Table 10: Long term impact assessment criteria for deposited dust

Pollutant	*Averaging period*	*Maximum increase in deposited dust level*	*Maximum total deposited dust level*
Deposited dust	Annual	2 g/m^2/month	4 g/m^2/month

Notes:
Air quality impacts at HVGC are to be assessed in the immediate vicinity of its residential facilities and/or clubhouse. Air quality limits are only applicable during times of use that have been notified by HVGC to the Proponent.
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, or its latest version.

However, if the Proponent has a written negotiated air quality agreement with any landowner or HVGC to exceed the air quality limits in Table 8, 9 and/or 10, and a copy of this agreement has been forwarded to the Department and EPA, then the Proponent may exceed the air limits in Table 8, 9 and/or 10 in accordance with the negotiated air quality agreement.

Sch. 3, Cond. 20	Land Acquisition Criteria If the dust emissions generated by the project 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 Proponent shall, upon receiving a written request for acquisition from the landowner, acquire the land in accordance with the procedures in conditions 7-9 of schedule 4.	Sections 4.4 and 9

Table 11: Long term land acquisition criteria for particulate matter

Consent Condition	Environmental Performance Conditions	Section of AQMP which addresses this requirement

Pollutant	Averaging period	Criterion
Total suspended particulate (TSP) matter	Annual	90 µg/m^3
Particulate matter < 10 µm (PM_{10})	Annual	30 µg/m^3

Table 12: Short term land acquisition criteria for particulate matter

Pollutant	Averaging period	Criterion	Percentile[1]	Basis
Particulate matter < 10 µm (PM_{10})	24 hour	150 µg/m^3	99[2]	Total[3]
Particulate matter < 10 µm (PM_{10})	24 hour	50 µg/m^3	98.6	Increment[4]

[1]Based on the number of block 24 hour averages in an annual period.
[2]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 EPA.
[3]Background PM_{10} concentrations due to all other sources plus the incremental increase in PM_{10} concentrations due to the mine alone.
[4]Incremental increase in PM_{10} concentrations due to the mine alone.

Table 13: Long term land acquisition criteria for deposited dust

Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level
Deposited dust	Annual	2 g/m^2/month	4 g/m^2/month

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.

Sch. 3, Cond. 21	Additional Air Quality Impact Mitigation Measures Upon receiving a written request from: · an owner of land listed in Table 1 (unless the landowner has requested acquisition); or · an owner of land listed in Table 14 the Proponent shall implement reasonable and feasible air quality impact mitigation measures (such as air conditioning, first flush drinking water collection systems etc) at any residence on the land, in consultation with the landowner. However, if the Proponent has an air quality agreement with the owner of any land listed in Table1 or Table 14 and a copy of this agreement has been forwarded to the Department and EPA, then the Proponent does not have to implement such measures. If within 3 months of receiving this request from the landowner, the Proponent and the landowner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Director-General for resolution. Within 3 months of the date of this approval, the Proponent shall notify all applicable landowners that they are entitled to receive air quality impact mitigation measures, to the satisfaction of the director- General.	Section 6.6 and 5

Table 14: Land subject to additional air quality impact mitigation upon request

7 – Stapleton (Cheshunt East) 24 – Clifton and Edwards and residences located within 250 metres of this residence.	34 – Ernst 50 – Nelson 56 – Edwards

Sch. 3, Cond. 22	Operating Conditions The Proponent shall:	Sections 6.3, 6.4 and 6.5

Consent Condition	Environmental Performance Conditions	Section of AQMP which addresses this requirement
(a)	(a) ensure any visible air pollution generated by the project is assessed regularly, and that mining operations are relocated, modified, and/or stopped as required to minimise air quality impacts on privately-owned land;	
Sch. 3, Cond. 22 (b)	(b) ensure that the real-time air quality monitoring and meteorological monitoring data is assessed regularly and, where the dust is generated by the project, that mining operations are relocated, modified and/or stopped as required to ensure compliance with the relevant air quality criteria, and in particular to mitigate dust emission impacts for Maison Dieu and Warkworth residences; and	Sections 6.3, 6.4 and 6.5
Sch. 3, Cond. 22 (c)	(c) implement all practicable measures to minimise the off-site odour and fume emissions generated by any spontaneous combustion or blasting activities on site to the satisfaction of the Director-General.	Section 6.3.1
Sch. 3, Cond. 23	Monitoring The Proponent shall prepare and implement an Air Quality Monitoring Program for the project to the satisfaction of the Director-General. This program must: (a) be submitted to the Director-General for approval within 6 months of the date of this approval, or as otherwise agreed by the Director-General; and (b) include: · high-volume and real-time samplers to monitor the dust emissions of the project; and · an air quality monitoring protocol for evaluating compliance with the air quality impact assessment and land acquisition criteria in this approval. *Note: The requirement for this Air Quality Monitoring Program may, with the Director-General's approval, be satisfied as a component of CNA's Hunter regional air quality monitoring program. This program should take into account monitoring requirements of neighbouring mines, and where possible, be integrated with these mines' monitoring networks.*	Sections 6 and 9
Sch. 3, Cond. 24	Meteorological Monitoring During the life of the project, the Proponent shall ensure that there is a suitable meteorological station in the vicinity of the site that complies with the requirements in the *Approved Methods for Sampling of Air Pollutants in New South Wales* guideline.	Section 8
Sch. 4, Cond. 2	Notification of Landowners If the results of monitoring required in Schedule 3 identify that impacts generated by the project are greater than the relevant impact assessment criteria in Schedule 3, except where this is predicted in the documents listed in condition 2 of Schedule 2 or where a negotiated agreement has been entered into in relation to that impact, then the Proponent shall, within 2 weeks of obtaining the monitoring results, notify the Director-General, the affected landowners and tenants (including tenants of mine owned properties) accordingly, and provide quarterly monitoring results to each of these parties until the results show that the project is complying with the criteria in Schedule 3.	Sections 5.3 and 9
Sch. 4, Cond. 3	Notification of Landowners If the results of monitoring required in Schedule 3 identify that impacts generated by the project are greater than the relevant air quality impact assessment criteria in Schedule 3, then the Proponent shall send the relevant landowners and tenants (including tenants of mine owned properties) a copy of the NSW Health fact sheet entitled "Mine Dust and You" (and associated updates) in conjunction with the notification required in condition 2.	Sections 5.3 and 9
Sch. 5, Cond 2	Incident Reporting As soon as practicable after the Proponent becomes aware of any incident associated with the project, the Proponent shall notify the Director-General and any other relevant agencies of the incident. Within 7 days of becoming aware of the incident, the Proponent shall provide the Director- General and any relevant agencies with a detailed report on the incident.	Section 10.1
Sch. 5, Cond 3	Regular Reporting The Proponent shall provide regular reporting on the environmental performance of the project on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this approval.	Section 10.1
Sch. 5, Cond 4	Annual Review By the end of March each year, the Proponent shall review the environmental performance of the project to the satisfaction of the Director-General. This review must: (a) describe the development that was carried out in the previous calendar year, and the development that is proposed to be carried out over the next year; (b) include a comprehensive review of the monitoring results and complaints records of the project over the previous calendar year, which includes a comparison of these results against: · the relevant statutory requirements, limits or performance measures/criteria; · the monitoring results of previous years; and · the relevant predictions in the EA; (c) identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance;	Section 11

Consent Condition	Environmental Performance Conditions	Section of AQMP which addresses this requirement
	(d) identify any trends in the monitoring data over the life of the project; (e) identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and (f) describe what measures will be implemented over the next year to improve the environmental performance of the project.	
Sch. 5, Cond 9	Access to Information The Proponent shall: (a) make the following information publicly available on its website: · the EA; · current statutory approvals for the project; · approved strategies, plans or programs required under the conditions of this approval; · a comprehensive summary of the monitoring results of the project, which have been reported in accordance with the various plans and programs approved under the conditions of this approval; · a complaints register, which is to be updated on a monthly basis; · minutes of CCC meetings; · the last five annual reviews; · any independent environmental audit, and the Proponent's response to the recommendations in any audit; · any other matter required by the Director-General; and (b) keep this information up to date, to the satisfaction of the Director-General.	Section 10.1.2
Environment Protection Licence 640		
P1	Location of monitoring/discharge points and areas P1.1 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.	Section 8

Air

EPA identi-fication no.	Type of Monitoring Point	Type of Discharge Point	Location Description
1	Dust Deposition Network		At locations 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	Total Suspended Particles Network		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.

O3	Dust O3.1 The premises must be maintained in a condition which minimises or prevents the emission of dust from the premises.	Section 5.2 and 6
O3	O3.2 Activities occurring in or on the premises must be carried out in a manner that will minimise the generation or emission from the premises, of wind-blown or traffic generated dust.	Section 5.2 and 6
O3	O3.3 All trafficable areas, coal storage areas and vehicle manoeuvring areas in or on the premises must be maintained, at all times, in a condition that will minimise the generation, or emission from the premises, of wind-blown or traffic generated dust.	Section 6
O3	O3.4 Trucks transporting coal from the premises must be covered immediately after loading to prevent wind-blown emissions and spillage. The covering must be maintained until immediately before unloading the trucks.	Section 6
M1	Monitoring Records M1.2 All records required to be kept by this licence must be: a) in a legible form, or in a form that can readily be reduced to a legible form; b) kept for at least 4 years after the monitoring or event to which they relate took place; and c) produced in a legible form to any authorised officer of the EPA who asks to see them.	Section 8
M1	M1.3 The following records must be kept in respect of any samples required to be collected for the purposes of this licence:	Section 8

Consent Condition	Environmental Performance Conditions	Section of AQMP which addresses this requirement

a) the date(s) on which the sample was taken;

b) the time(s) at which the sample was collected;

c) the point at which the sample was taken; and

d) the name of the person who collected the sample.

M2 Requirement to monitor concentration of pollutants discharged — Section 8

M2.1 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:

M2.2 Air Monitoring Requirements

POINT 1

Pollutant	Units of measure	Frequency	Sampling Method
Particulates - Deposited Matter	grams per square metre per month	Once a month (min. of 4 weeks)	AM-19

POINT 2

Pollutant	Units of measure	Frequency	Sampling Method
Total Solid Particles	micrograms per cubic metre	Every 6 days	AM-15

M3 Testing methods - concentration limits — Section 8

M3.1 Monitoring for the concentration of a pollutant emitted to the air required to be conducted by this licence must be done in accordance with: a) any methodology which is required by or under the Act to be used for the testing of the concentration of the pollutant; or 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 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. Note: The Protection of the Environment Operations (Clean Air) Regulation 2010 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".

M4 Weather monitoring — Section 8

M4.1 The licensee must collect and analyse meteorological data at the following monitoring point for the parameters specified, at a frequency specified, and using a method as specified for each parameter. Meteorological Monitoring Point: HVO Weather Station located at Easting 310315; Northing 6406189

Parameter	Units of Measure	Averaging Period	Method (see note 1)	Frequency
Siting	NA	NA	AM-1 & AM-4	
Measurement	NA	NA	AM-2 & AM-4	
Wind Speed @ 10m	m/s	10 minutes	AM-2 & AM-4	Continuous
Wind Direction @ 10m		10 minutes	AM-2 & AM-4	Continuous
Temperature @ 1.2m	0C	1 hour	AM-4	Continuous
Rainfall	mm	24 hours	Standard rain gauge	

Note: (1) All methods are specified in the Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales and all monitoring must be conducted strictly in accordance with the requirements outlined in this document.

M5 Recording of pollution complaints — Section 10.2

M5.1 The licensee must keep a legible record of all complaints made to the licensee or any employee or agent of the

Consent Condition	Environmental Performance Conditions	Section of AQMP which addresses this requirement
	licensee in relation to pollution arising from any activity to which this licence applies. M5.2 The record must include details of the following: a) the date and time of the complaint; b) the method by which the complaint was made; c) any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect; d) the nature of the complaint; e) the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and f) if no action was taken by the licensee, the reasons why no action was taken. M5.3 The record of a complaint must be kept for at least 4 years after the complaint was made. M5.4 The record must be produced to any authorised officer of the EPA who asks to see them.	
R2	Notification of environmental harm R2.1 Notifications must be made by telephoning the Environment Line service on 131 555. R2.2 The licensee must provide written details of the notification to the EPA within 7 days of the date on which the incident occurred. *Note: The licensee or its employees must notify all relevant authorities of incidents causing or threatening material harm to the environment immediately after the person becomes aware of the incident in accordance with the requirements of Part 5.7 of the Act.*	Section 10.1.2
U2	Particulate Matter Control Best Practice Implementation – Wheel Generated Dust U2.1 The Licensee must achieve and maintain a dust control efficiency of 80% or more on all active haul roads by 2 September 2013. Control efficiency is calculated as: CE = E (uncontrolled) - E (controlled) x 100 E (uncontrolled) Where E = the emission rate of the activity	NA
U2	U2.2 The Licensee must prepare a Monitoring Program to assess its compliance with Condition U2.1 under varying meteorological conditions. The Monitoring Program must detail the: • parameters to be monitored; • methods to be used to monitor each parameter; • locations where each parameter will be monitored; • frequency at which each parameter will be monitored; • Key Performance Indicators that will be used to determine compliance with Condition U2.1; and • A detailed justification for each Key Performance Indicator selected. As a guide, the EPA anticipates that the following parameters will be monitored: • moisture and silt contents of haul roads; • frequency, duration, rate and quantity of water applied to haul roads; • frequency, duration, rate and quantity of suppressant applied to haul roads in comparison to manufacturer's specifications; • vehicle kilometres travelled; • haul truck weight; • haul truck speed; and • dust levels on haul roads. The Monitoring Program must be submitted by the Licensee to the Environment Protection Authority Regional Manager Hunter, at PO Box 488G, NEWCASTLE by 31 May 2013. The EPA intends to require the licensee to implement the Monitoring Program once it is approved by the EPA.	NA
U2	U2.3 The Licensee must submit a written report to the EPA providing the results of the Monitoring Program. The report must include an assessment of the dust control effectiveness, dust levels and the Licensee's compliance with Condition	NA

Consent Condition	Environmental Performance Conditions	Section of AQMP which addresses this requirement
	U2.1. The report must be submitted by the Licensee to the Environment Protection Authority Regional Manager Hunter, at PO Box 488G, NEWCASTLE by 15 August 2014.	
U3	Particulate Matter Control Best Practice Implementation – Disturbing and Handling Overburden under Adverse Weather Conditions U3.1 The licensee must alter or cease the use of equipment on overburden and the loading and dumping of overburden during adverse weather conditions to minimise the generation of particulate matter from 22 March 2013.	NA
U3	U3.2 The Licensee must prepare a Monitoring Program to assess its compliance with Condition U3.1. The Monitoring Program must detail the following: • parameters to be monitored; • methods to be used to monitor each parameter; • locations where each parameter will be monitored; • frequency at which each parameter will be monitored; • way in which changes to operational activities will be documented; • Key Performance Indicators that will be used to determine compliance with Condition U3.1; and • detailed justification for each parameter and Key Performance Indicator selected. As a guide, the EPA anticipates that the following parameters will be monitored: • wind speed and direction; • temperature; • rainfall/humidity; • evaporation rate; • solar radiation; • operational activities; and • dust levels. The Monitoring Program must be submitted by the Licensee to the Environment Protection Authority Regional Manager Hunter, at PO Box 488G, NEWCASTLE by 31 May 2013. The EPA intends to require the licensee to implement the Monitoring Program once it is approved by the EPA.	NA
U3	U3.3 The Licensee must submit a written report to the EPA providing the results of the Monitoring Program. The report must detail the following: • weather conditions during which activities were ceased or altered; • changes made to operational activities as a result of adverse weather; and • resultant dust levels when activities were altered or ceased. The report must be submitted by the Licensee to the Environment Protection Authority Regional Manager Hunter, at PO Box 488G, NEWCASTLE by 15 August 2014.	NA
U4	Particulate Matter Control Best Practice Implementation – Trial of Best Practice Measures for Disturbing and Handling Overburden U4.1 The Licensee must submit a report documenting an investigation and trial of best practice measures for the control of particulate matter from the use of equipment on overburden and the loading and dumping of overburden. Best practice measures may include, but should not be limited to, the following: • use of foggers; • use of water sprays; and • reduction of drop heights. The report must document the investigation and trial of each best practice measure. It must quantify the particulate matter control effectiveness and discuss the practicability of each best practice measure.	NA

Consent Condition	Environmental Performance Conditions	Section of AQMP which addresses this requirement
	The report must be submitted by the Licensee to the Environment Protection Authority Regional Manager Hunter, at PO Box 488G, NEWCASTLE by 14 April 2014.	

Table 1.2 Statement of Commitments Addressed

SOC reference	Commitments	Where Commitment is addressed
HVO North – Carrington West Wing		
Air Quality	Only the minimum area necessary for mining will be disturbed. Completed overburden emplacement areas will be reshaped, topsoiled and rehabilitated as soon as practicable after the completion of overburden emplacement.	Section 6
Air Quality	Coal handling areas/ stockpiles will be maintained in a moist condition to minimise wind-blown and traffic-generated dust.	Section 6
Air Quality	Water sprays will be available on ROM stockpiles and used to reduce airborne dust, as required.	Section 6
Air Quality	All roads and trafficked areas will be watered as required, using water trucks, to minimise the generation of dust.	Section 6
Air Quality	All haul roads will have edges clearly defined with marker posts or equivalent to control their locations, especially when crossing large overburden emplacement areas.	Section 6
Air Quality	Obsolete roads will be ripped and re-vegetated.	Section 6
Air Quality	Development of minor roads will be limited and the locations of these will be clearly defined.	Section 6
Air Quality	Minor roads in regular use will be watered.	Section 6
Air Quality	Obsolete roads will be ripped and re-vegetated.	Section 6
Air Quality	Access tracks used by topsoil stripping equipment will be watered.	Section 6
Air Quality	Long term topsoil stockpiles, not used for over three months, will be re-vegetated.	Section 6
Air Quality	Dust aprons will be lowered during drilling.	Section 6
Air Quality	Drills will be equipped with dust extraction cyclones, or water injection systems.	Section 6
Air Quality	Water injection or dust suppression sprays will be used when high levels of dust are being generated.	Section 6
Greenhouse Gas	Coal & Allied's existing energy saving and GHG emission reduction plans and standards will be implemented at HVO, inclusive of the proposal, and will be revised as required.	Section 7
HVO South Coal Project		
Air Quality	In addition to the mitigation measures undertaken at HVO for air quality management, efficient mine planning and operations will ensure: - the mine plan is regularly reviewed with a view to controlling dust emissions and keeping emissions to the lowest levels practicable; - exposed areas are kept to the minimum practicable; and - haul roads are kept to the shortest routes practicable and material handling is kept to the minimum levels practicable.	Section 6

1.3 Objectives

The purpose of this AQMP is to describe reasonable and feasible measures to address potential air quality and greenhouse gas impacts of the Project as identified in the Approvals and satisfy the relevant conditions of the Approvals.

This AQMP describes procedures required to ensure compliance with conditions of the Approvals relating to potential air quality and greenhouse gas impacts. This AQMP also provides a mechanism for assessing air quality monitoring results against the relevant air quality impact assessment criteria.

The objectives of this AQMP are to:

- Identify activities that generate airborne dust;
- Describe control measures to minimise dust generated by these activities;
- Describe how Coal & Allied intends to ensure that operational dust from HVO is effectively managed;
- Describe how Coal & Allied will manage community complaints in a timely and effective manner;
- Provide a program for monitoring performance, evaluating air quality compliance and measuring the effectiveness of controls undertaken by site to effectively manage air quality;
- Describe the steps to be taken where criteria are being exceeded;
- Describe the installation, operation and calibration of monitors in accordance with relevant Australian Standards;
- Describe the process for implementing a continuous improvement system for managing air quality;
- Describe how Coal & Allied intends to cooperate with neighbouring mines to minimise the cumulative air quality impacts of those mines and HVO.
- Detail compliance and reporting protocols; and
- Establishing specific responsibilities for the management of air quality.

BODY

AIR QUALITY AND GREENHOUSE GAS MANAGEMENT PLAN

2. REGULATORY REQUIREMENTS

2.1 Background

This AQMP has been prepared to fulfil the requirements of relevant legislation, the Approvals, EA commitments, EPL conditions and relevant standards and guidelines.

2.2 Project Approval

The Approvals and subsequent amendments were assessed under the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act.). The current HVO North Approval was granted on 12 June 2004 and subsequently modified by the Planning Assessment Commission as delegate of the Minister for Planning and Infrastructure on 19 March 2013.

The current HVO South Approval was granted on 24 March 2009, and was subsequently modified on 31 October 2012.

The Approvals stipulate air quality criteria that operational activities at HVO must comply with. The HVO North Approval sets out the core requirements of this AQMP. The air quality criteria under the Approvals are reproduced in Table 1.1

The requirement for this AQMP arises from Condition 6 of Schedule 4 of the HVO North Approval. A list of the relevant conditions of the HVO North Approval and where they are addressed in this AQMP is found in Section 1.2 (see in particular Tables 1.1 and 1.2).

2.3 Environmental Protection Licence

The *Protection of the Environment Operations Act 1997* (NSW) (PoEO Act) is the principal piece of legislation regulating pollution (including air pollution) emissions in NSW. EPL 640 for HVO was issued on 29 September 2000 by the Environmental Protection Authority (EPA) under the PoEO Act.

A variation to EPL 640 to include the Carrington West Wing mining area approved by the most recent modification of the HVO North Approval was granted on 24 May 2013

While not required by the Air Quality conditions of EPL640, this AQMP lists the measures which will be implemented so as to ensure compliance with the relevant air quality conditions of EPL 640.

Condition 5(c) in Schedule 4 of the HVO North Approval requires that HVO *"manage $PM_{2.5}$ levels in accordance with any requirements of any EPL".* At the time of submission of this AQMP, EPL 640 does not contain any specific requirements relating to $PM_{2.5}$.

2.4 Relevant Standards and Guidelines

Guidelines and standards applying to dust management at HVO include:

- NSW Office of Environment and Heritage Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (DECC 2005)
- Australian Standard AS / NZS 3580.9.3:2003: Methods for sampling and analysis of ambient air– Determination of suspended particulate matter – Total suspended particulate matter (TSP) – High Volume sampler gravimetric method
- Australian Standard AS / NZS 3580.9.6:2003: Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – PM_{10} high volume sampler with size selective inlet – Gravimetric method.
- Australian Standard AS / NZS 3580.9.8:2008: Methods for sampling and analysis of ambient air – PM_{10} continuous direct mass method using a tapered element oscillating microbalance analyser.
- Australian Standard AS / NZS 3580.10.1:2003: Methods for sampling and analysis of ambient air – Determination of particulate matter – Deposited matter – Gravimetric Method.

2.5 Internal Requirements

Clause 2.1 of Rio Tinto Environmental Performance Standard E2 specifies that HVO must:

> *"Implement appropriate control procedures or control technologies to manage those emissions selected in the risk assessment as having potential or actual significant environmental or community health impacts."*

Annual review of Environmental Aspects and Impacts has identified the following risk scenarios which remained at the HIGH classification at the time of submission of this AQMP. Accordingly, this AQMP details the control procedures / control technologies which will be implemented to adequately control these risks.

> *"Blast detonation with incomplete combustion resulting in Level 4, or higher blast fume emissions impacting on community and ecosystems."*

> *"Dust emissions as a result of Mining operations resulting in Exceedance of dust limits"*

> *"Dust emissions as a result of mining operations resulting in complaint from community"*

3. CONSULTATION

Schedule 4, Condition 6 of the HVO North Approval requires the AQMP to be prepared in consultation with the EPA and include a protocol to minimise cumulative air quality impacts prepared in consultation with neighbouring mines.

3.1 Government Agencies

On 16 May 2013 correspondence was forwarded to the EPA inviting consultation on this AQMP.

On 15 June 2013, the EPA advised HVO in writing that consultation on this Air Quality and Greenhouse Gas Management Plan would not be required (see Appendix A).

3.2 Nearby Mines

HVO South and HVO North are managed as a single operation, with common controls implemented on a whole-of-site basis. As such, a formal communication protocol between HVO North and HVO South is not considered appropriate.

Rio Tinto Coal Australia also manages the neighbouring MTW mine. As environmental management is undertaken by a shared Environmental Services team, there is no formal cooperation agreement in place with respect to air quality between HVO and MTW. Where practical however, monitoring systems and reactive processes are common across both HVO and MTW. This includes access to all real time monitoring data to operational personnel at both sites.

Liaison with Wambo and Ravensworth mines to discuss potential cooperation options is yet to occur. A future revision of this AQMP will be submitted by 30 June 2014 which will outline the communication protocols under a cooperative arrangement with these two mines.

4. EXISTING CHARACTER & IMPACT ASSESSMENT CRITERIA

4.1 Existing Character

The HVO North complex comprises the:

- Carrington Pit;
- West Pit;
- North Pits;
- Hunter Valley Coal Preparation Plant (HVCPP);
- West Pit (Howick) Coal Preparation Plant (HCPP);
- Newdell Coal Preparation Plant (NCPP);
- Hunter Valley Load Point (HVLP); and
- Newdell Loading Point (NLP).

HVO South comprises the:

- Cheshunt Pit;
- Riverview Pit; and
- South Lemington Pit.

Figure 1 shows the layout of HVO.

4.2 Existing Approved Activities

HVO's mining activities north of the Hunter River are comprised of:

- four coal mining areas, including the West and Mitchell Pits, Carrington and North Pit;
- use of the HCPP, NCPP and HVCPP;
- use of the NLP and the HVLP train loading facilities;
- use of two administration areas including bathhouses, one adjacent to the HVCPP and one adjacent to the HCPP;
- two workshops, one adjacent to the HVCPP and one adjacent to the HCPP; and
- use of numerous internal haul roads and conveyors.

HVOs mining activities south of the Hunter River are comprised of:

- opencut and highwall mining of coal reserves in Cheshunt Pit, Riverview Pit;
- mining by a combination of draglines, shovels, excavators and associated haul trucks;
- use of an administration area (Southern Facilities);
- maintenance of Heavy Mining Equipment (HME) at the Lemington Workshop;
- Storage of explosives (Orica reload facility);
- use of numerous internal haul roads; and

4.3 Background Air Quality

A detailed air quality assessment has been undertaken as part of the environmental assessment phase of the HVO West Pit and minor modifications development, Carrington West Wing, and the HVO South Coal Project. The air quality studies detail key receptors and background conditions, as well as modelled impacts under a range of meteorological scenarios at different stages of the life of the developments. The modelling also takes into account typical meteorological conditions, based on measured conditions in the years prior to the study. Each of these modelling exercises has been undertaken using methodologies which are accepted by the NSW EPA. The Carrington West Wing Extension Air Quality Study and HVO South Coal Project modelling exercises were undertaken in accordance with the guideline '*Approved Methods for the modelling and assessment of air pollutants in New South Wales*" (DEC 2005).

For full details, refer to:

- *'Air Quality Impact Assessment'*, Volume Three – Supporting Appendices, Carrington West Wing Environmental Assessment, EMGA Mitchell McLennan – October 2010.

- '*Air Quality Assessment: Hunter Valley Operations South Coal Project '*, Volume 2 – Environmental Assessment Report, Environmental Resource Management – January 2008.

- '*Air Quality Assessment*: *West Pit Extension and Minor Modifications*', Volume Three – Technical Reports, Environmental Resource Management – October 2003.

These studies can be found on the Rio Tinto Coal Australia website (www.riotintocoalaustralia.com.au), and are available for internal stakeholders via the Site Document Register.

Section 6 of the Carrington West Wing study details representative properties (key receptors).

Details of nearby receptors (nearby private residences and occupied mine-owned properties) are maintained by Environmental Services, Community Relations and Land & Property teams.

4.4 Impact Assessment Criteria

The air quality criteria for HVO North and HVO South, as specified in the Approvals, are provided in full in Table 1.1 above.

The air quality criteria include impact assessment criteria, used for assessing compliance, and land acquisition criteria. An exceedance of the land acquisition criteria may trigger acquisition rights for the impacted property.

The Approvals require the monitoring of:

- Total Suspended Particulates (TSP);

- Particulate Matter with an aerodynamic diameter less than 10 µm (PM_{10});

- Particulate Matter with an aerodynamic diameter less than 2.5 µm ($PM_{2.5}$); and

- Deposited dust (insoluble solids).

All of the criteria refer to the mass of the substance measured over a period of time; please refer to Table 1.1.

TSP refers to the total dust particles that are suspended in the air. PM_{10} is a subset of TSP, as is deposited dust. TSP is assessed as defined by Standards Australia AS / NZS 3580.9.3:2003: Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – Total suspended particulate matter (TSP) – High Volume sampler gravimetric method (AS 3580.9.3:2003). This method can be used for regulatory compliance monitoring.

PM_{10} refers to particulate matter with an aerodynamic diameter less than 10µm. PM_{10} is assessed as defined by Standards Australia AS / NZS 3580.9.6:2003: Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – PM_{10} high volume sampler with size selective inlet – Gravimetric method. This method can be used for regulatory compliance monitoring.

HVO also employs real time PM_{10} measurement via a network of Tapered Element Oscillating Microbalance (TEOM) units, as well as supplementary units using light scattering techniques, favoured for indicative or portable monitoring purposes..

$PM_{2.5}$ refers to particulate matter with an equivalent sperical aerodynamic diameter less than 2.5µm. HVO does not maintain $PM_{2.5}$ monitoring as a component of the Air Quality Monitoring network surrounding the mine. Compliance with the requirements to monitor $PM_{2.5}$ will be achieved by way of reporting $PM_{2.5}$ measurements as assessed via the Upper Hunter Air Quality Monitoring Network at monitoring locations in Singleton, Muswellbrook and Camberwell.

Deposited dust relates to the largest dust particles in the air. These particles rarely travel far from the source as they rapidly settle under gravity. 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. This method can be used for regulatory compliance monitoring.

4.5 Existing or Background Air Quality

This section provides a brief overview of the existing, or background, dust levels in the area based on data drawn from the HVO monitoring network which provide measurements of 24-hour average concentrations of TSP and PM_{10} on a six-day cycle and monthly averages of dust fallout levels. Table 4 provides a summary of the annual average PM_{10} and TSP values for monitoring locations around HVO from 2005 to 2013 inclusive.

Table 4: Annual average PM_{10} and TSP concentrations at High Volume Air Sampling (HVAS) sites

Monitoring site	2005	2006	2007	2008	2009	2010	2011	2012	2013
				PM_{10} (µg/m^3)					
Jerrys Plains	14	15	18	16	19.3	14.0	22.9	20.1	NA
Kilburnie South	16	17	20	15	17.5	12.8	13.9	15.4	19.3
Wandewoi	17	18	19	17	17.6	13.4	15.1	NA	NA
Cheshunt East	NA	25	24	22	27.3	19.1	19.5	NA	NA
Maison Dieu	NA	23	21	18	17.4	16.5	23.9	20.4	18.7
				TSP (µg/m^3)					
Jerrys Plains	30	52	49	52	59.9	41.2	38.9	40.3	NA
Kilburnie South	33	45	52	37	42.5	34.3	35.8	57.0	49.3
Wandewoi	42	49	47	40	46.4	39.4	14.3	NA	NA
Maison Dieu	NA	68	57	51	61.3	45.5	61.4	63.4	64.6

Figure 1: Layout of HVO

5. MANAGEMENT & MITIGATION

5.1 Principles and framework

Environmental Management at HVO is based on the following principles and framework which are described in more detail in the *Environmental Management Strategy* (Coal & Allied 2013);

- Rio Tinto Environment Performance Standard E2 – Air Quality Control;
- Rio Tinto Coal Australia (RTCA) integrated Health, Safety, Environment, Quality Management System (HSEQMS) Framework - policy, plan, do, measure, review;
    - "Policy" component of framework – understand all regulatory requirements
    - "Plan" component of framework – undertake risk analysis of air quality emissions;
    - "Do" component of Framework – manage operations
    - "Measure" component of framework – regular monitoring; and
    - "Review" component of framework - reporting and analysis.
- Complaints management;
- Dynamic improvement/evolution;
- Implementation of effective Reactive and proactive controls; and
- Co-ordination/cumulative impact management.

5.2 Best Management Practice

Section 128 of the *PoEO Act* requires that the Project must operate "*...by such practicable means as may be necessary to prevent or minimise air pollution.*" This requirement applies the concept of practicable means to air quality management.

Part 7.2.1 of the NSW Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (2005) introduces the concept of minimising (toxic) air pollutants "*...to the maximum extent achievable through the application of best-practice process design and/ or emission controls..*" and outlines that this would have regard to technical, logistical (i.e. practicable) and financial (cost-effective) considerations.

Best management practice in this AQMP is defined as practices used to manage air quality that is consistent with the following:

- The measure should firstly aim to prevent emissions, and where that is not practicable, to generally reduce emissions and impacts[1] to the environment as a whole[2];
- The measure is reasonably accessible and is developed on a scale which allows implementation in the Project, under economically and technically viable conditions, taking into consideration the costs and advantages; and
- Of the options available, it is the most effective in achieving a generally high level of protection of the environment as a whole.

This definition is derived from the European Union Directive 2008/1/EC definition of Best Available Techniques.

5.3 Management of Mine Owned Residences

Schedule 4, Condition 4C and Schedule 5, Conditions 1(b) and (c), 2 and 3 of the HVO North Approval outline specific requirements for the management of mine-owned residences. Specifically,

1 Due to the often large distances between the source of emissions and the potentially impacted receptor, priority should be given to measures that can be shown to minimise impact over measures that simply minimise emissions. For example, to manage deposited dust at a location, the nearest sources are most likely to influence the level of impact, even if these are relatively minor sources compared to others.

2 Meaning more than just air quality impacts should be considered.

1. HVO North must ensure that the air quality criteria listed in Schedule 4 are not exceeded at any occupied residence on mine-owned land (including land owned by adjacent mines), unless a range of administrative measures are undertaken; and

2. Must ensure that prescribed notification requirements are met.

5.3.1 Coal & Allied Owned, Occupied, Residences

To comply with these requirements at Coal & Allied owned and occupied residences HVO will:

- As soon as practicable after an exceedance of HVO North Air Quality criteria:

    1. Provide the tenant with written notice of the exceedance;

    2. Provide the tenant with regular monitoring results until the development is again complying with the relevant criteria previously exceeded;

    3. Provide the tenant with a copy of the NSW Health fact sheet entitled “Mine Dust and You” (if not recently provided); and

    4. Provide the tenant with a copy of the most recent ‘monthly meaningful summary’, submitted to the EPA in accordance with the data reporting requirements of the PoEO Act. The data is in an appropriate format for the tenant’s medical practitioner to assist them in making an informed decision on the health risks associated with continued occupation of the property.

- Subject to giving reasonable written notice, permit tenants to terminate their tenancy agreement with Coal & Allied without penalty. A clause making provision for this will be inserted into new tenancy arrangements entered into post 30 September 2013.

- Where the tenant has given reasonable notice that they wish to terminate their tenancy arrangement in accordance with the HVO North consent, the tenant will receive assistance from Coal & Allied with relocation and sourcing of alternative accommodation. Assistance will be offered by Coal & Allied in the form of:

    1. Firstly, offering alternate available Coal & Allied owned property; and

    2. Secondly, where Coal & Allied does not hold any other available residence, refer the tenant to Coal & Allied’s preferred real estate agent/property manager to assist the outgoing tenant in finding alternate accommodation.

- Install air mitigation measures (such as air filters, a first flush roof water drainage system and/or air conditioning) at the residence if the tenant so requests.

- Provide particulate matter monitoring data collected from existing nearby monitors (see Appendix B – Air Quality Monitoring Programme). This data will be presented in a form suitable for a medical practitioner to assist the tenant in making an informed decision on the health risks associated with occupying the property.

HVO North has provided written notification to the tenants of Coal & Allied owned residences of their rights as described above.

5.3.2 Other Mine Owned, Occupied, Residences

To comply with the relevant requirements for tenants and landowners of residences owned by mining companies, other than Coal & Allied, HVO will:

- As soon as practicable after an exceedance of applicable HVO North air quality criteria:

    - Provide the landowner with a notice of an exceedance;

  - Provide the landowner with regular monitoring results until the development is again complying with the relevant criteria previously exceeded;
  - Provide the landowner with a copy of the NSW Health fact sheet entitled “Mine Dust and You” (if not recently provided);
  - Provide the landowner with a copy of the most recent ‘monthly meaningful summary’, submitted to the EPA in accordance with the data reporting requirements of the PoEO Act. The data is in an appropriate format for the tenant’s medical practitioner to assist them in making an informed decision on the health risks associated with continued occupation of the property; and
  - Request that the landowner provide a copy of all this information to any tenant occupying those residences.
- Install air mitigation measures (such as air filters, a first flush roof water drainage system and/or air conditioning) at the residence if the tenant and landowner jointly requests such, unless:
  - the listed mitigation measures are required as a condition in the neighbouring mine’s existing project approval; and/or
  - the listed mitigation measures are already installed at the affected property.
- Provide particulate matter monitoring data collected from existing nearby monitors (see Appendix B – Air Quality Monitoring Programme). This data will be presented in a form suitable for a medical practitioner to assist the tenant in making an informed decision on the health risks associated with occupying the property.

HVO North has provided written notification of these rights to the landowners and request that a copy of the notification be passed on to the tenants of those properties which are occupied now or in the future.

6. AIR QUALITY MANAGEMENT CONTROLS

6.1 Introduction

To understand how mining activities may affect air quality four factors should be considered:

1. The generation of dust from mining activities;
2. The dispersion in the air of the generated dust ;
3. How various size fractions of dust behave in the air; and
4. The prevailing background dust levels.

Overall, there are two distinct weather conditions under which most short term dust impacts will occur:

- Hot, high wind conditions, especially where winds are relatively constant - under these conditions the quantity of dust from an operation can be high, leading to high impacts; and
- Stable atmospheric conditions with a gentle wind drift towards receptors - often these are temperature inversion conditions where there is little vertical mixing of the air, and hence relatively low dispersion of the dust leaving the site.

Background dust levels will vary considerably in the wider area around a mine, and from day-to-day. The background levels at a monitoring site are affected by localised sources of dust including dirt roads, activities on, and wind erosion of, exposed or grazed agricultural land, burning, particles from urban areas, wood heating in winter and pollens. In addition, background levels will include regional events, such as extremely dry and windy conditions, dust storms and bushfires.

6.2 Sources of Dust

The generation of dust emissions from open cut mine activities can be considered in three distinct categories:

1. Wind generated emissions, such as wind erosion of exposed surfaces, including stockpiles, overburden dumps and active pit areas, among others;
2. Wind sensitive emissions, such as dragline tipping, loading, dumping, emplacement, (essentially wherever material falls through the air); and
3. Wind insensitive emissions, such as wheel generated dust from hauling, and dust from blasting and drilling where the amount of dust does not depend on the wind speed at the time.

On windy days, particularly during prolonged dry periods, wind generated emissions and wind sensitive emissions will greatly increase. Dust generating activities identified from HVO comprise:

- Hauling of materials along unsealed roads;
- Loading and unloading of materials;
- Dozers/excavators operating on material;
- Dragline operations;
- Wind erosion from exposed areas;
- Clearing of vegetation, topsoil and subsoil stripping;
- Stockpiling of coal, topsoil and gravels;
- Drilling and blasting of materials;
- Grading roads;
- Re-handling of materials;
- Handling of washed product coal;
- Transport to and loading of trains at the load points.

The prevailing atmospheric stability class conditions greatly affect the dispersion of dust emissions in the air. The degree of atmospheric dispersion effects the concentration of dust in the air at a distance away from the source.

The various size fractions of particulate matter generated by mining activity will remain entrained in the air for different periods due to gravitational settling. Larger fractions will rapidly fall out of the air, while the smaller fractions can travel large distances before settling out of the atmosphere. It is important to note the further the dust travels the more dispersion will occur and the lower the concentration will be.

6.3 Operational Controls

6.3.1 Odour

Measures will be put in place to ensure, as far as practicable, that no offensive odours, as defined under the PoEO Act, are emitted from HVO. Spontaneous combustion is considered the only substantial odour risk at HVO. An existing area of chitter emplacement in the vicinity of the Newdell CHPP has been identified as a known spontaneous combustion risk area, and continues to be actively monitored and managed accordingly.

Covering of exposed material during spontaneous combustion events in this area is the key control used to minimise odour and air quality emissions from this area.

Additionally, the following preventative measures are currently in place at HVO to manage the risk of Spontaneous Combustion in coal stockpiles and in the pit:

- Keeping discrete piles separate where possible;
- Avoid building stockpiles by coning. Coning increases the surface area and tends to encourage size segregation of the coal;
- Build longer piles;
- Follow the FIFO (first in first out) principle where possible, for both raw coal and washed product;
- Contingency planning for early washing, dispatch, recycling or excavation will be triggered by either visual signs of spontaneous combustion commencing or stockpile temperature monitoring.
- Blast Fume events also have the potential to produce odour. Management measures for control of odour emissions resulting from blasting fume are outlined in the HVO Post Blast Fume Mitigation and Management Plan;
- Waste and oxidised coal will be buried progressively in the pit and not allowed to accumulate anywhere on the mine site;
- A register of known occurrences will be maintained for seams exposed within the pit that are assessed as having a significant risk of spontaneous combustion; and
- Seams that are abandoned and have a significant risk of spontaneous combustion will be covered with at least 3 metres of compacted inert material

6.3.2 Dust

The best practice control measures and actions, (both proactive and reactive), for air quality management at HVO can be broken down into a number of sub categories based on control target, as listed below.

6.3.2.1 General

- Where applicable, make use of trees and shrubs as windbreaks around permanent areas that have potential for wind generated dust;
- Site induction is to include air quality requirements to ensure employee awareness of potential dust impacts
- A programme of regular monitoring for the measurement of TSP, PM_{10}, $PM_{2.5}$, dust deposition and meteorological conditions is to be implemented, using a combination of static monitors (HVAS and depositional dust gauges) and supplementary real-time air quality monitoring and implementation of warning systems. $PM_{2.5}$ monitoring will be undertaken through access to existing, publically available monitoring data through the UHAQMN.
- Operate a proactive system to provide appropriate warning of adverse conditions when trigger levels may be exceeded in concert with the meteorological forecasting project underway through the Upper Hunter Mining Dialogue (see section 6.3.2.2).

6.3.2.2 Proactive management

- Predictive modelling is undertaken and received by HVO Environmental and Drill and Blast staff on a daily basis, which is used to identify periods of the day where air pollutant (particularly blast plume) dispersion is favourable / unfavourable. The forecast dispersion conditions are reviewed and used to inform drill and blast staff of the optimum time to fire, based on the risk of plume trajectory towards sensitive receptors. See Appendix D – Examples of typical Air Quality control tools.

- At the time of submission of the AQMP, HVO is participating in a three month trial of predictive meteorological forecast information as a participating member of the Upper Hunter mining dialogue. The forecast information highlights periods of the day which are predicted to present potential dust risk. Initial triggers (developed through external review of regional exceedances as measured during 2012 via the Upper Hunter Air Quality Monitoring Network) are being evaluated for adequacy. The next phase of the project, occurring in 2014 will include:
    - validation of forecast data against actual meteorological conditions
    - Review of meteorological data and air quality data during times which have been identified as presenting dust risk via the forecast
    - Industry wide agreement on actions (if any) which can be taken proactively based on forecast conditions

6.3.2.3 Disturbed Areas

- Minimise advance clearing/ site preparation to reduce wind erosion. Only the minimum area necessary for mining will be disturbed.
- Design overburden placement to minimise the disturbance area, i.e. use of in-pit dumping when available following receipt of a trigger in conjunction with the real time air quality monitoring network.
- Progressively reshape, topsoil and rehabilitate completed overburden emplacement areas. Temporary cover crops will be used to stabilise rehabilitation areas if sowing of long term species is unlikely to occur within four weeks (waiting for more favourable sowing conditions in Autumn/Spring).
- Temporary stabilisation of unused areas or dump slopes will be undertaken annually by way of aerial seeding or similar. Autumn and Spring are the preferred times to undertake temporary stabilisation to assist successful vegetation establishment. Review of operating areas will be conducted in the weeks leading up to each seeding event. Seed will be applied to any area foreshadowed to be inactive for six months or more.
- Cleared vegetation is mulched and then used for stabilising rehabilitated landforms; this may include spreading of mulch and branches on completed overburden landform.
- Regularly water cleared areas during construction activities, where visual inspection necessitates watering.

6.3.2.4 Handling of Materials

- During topsoil stripping, make dust suppression options available to increase topsoil moisture if significant dust lift off occurs during stripping.
- Avoid or postpone ripping/pre-strip of overburden if significant dust lift off occurs and winds direct dust towards receptors in accordance with the permissions page.
- Load and dump operations will be managed to minimise dust generation with the development of allocation options which take into consideration wind speed and direction as per the permissions page (see Appendix D).
- Cease or modify activities as required during adverse conditions as defined by EPA dust stop program

6.3.2.5 Roads design

Consideration should be given to:

- Using the largest practical and cost-effective truck size for transporting coal and overburden;
- Minimising haul lengths when dumping in-pit based on potential noise and air impacts; and
- Locating haul roads in the lee of terrain rather than across the top of exposed terrain, where feasible.
- Major Haul Roads will be constructed using preferentially selected material.

6.3.2.6 Roads, all

- Impose speed limits on all roads;
- Utilise the existing watercart fleet to maintain haul road dust control effectiveness;
- Suspend operations of unused road networks as soon as practicable;
- All roads and regularly trafficked unpaved areas will be routinely watered using water carts to minimise the generation of dust;
- Roads which are seldom used will be watered as appropriate;
- Obsolete roads will be ripped and revegetated.
- Development of minor roads will be limited.
- Implement a system to track water application rates on major haul roads
- Implement a monitoring programme to measure and report on watering effectiveness in accordance with the relevant EPL condition, also refer to section 4.1.1.
- All haul roads will have edges clearly defined with marker posts or equivalent to control their locations, especially when crossing large overburden emplacement areas.

6.3.2.7 Primary haul roads (i.e. haul roads that would be used for 12 months or more)

- Construct primary roads to achieve a compact, stable and durable surface using material with a low silt/ fines content.
- Regularly maintain haul roads to maintain a smooth surface, define road edges and remove excessively fine/ silty material.

6.3.2.8 Temporary haul roads (i.e. haul roads that would be used for fewer than 12 months)

- Watering is to be applied to temporary haul roads to manage dust emissions, as necessary.
- All haul roads will have edges clearly defined with marker posts or equivalent to control their locations, especially when crossing large overburden emplacement areas.

6.3.2.9 Other unsealed roads and tracks

- Road vehicles should aim to remain on formed roads and tracks at all times, i.e. limited discretionary off-road driving. Limit off-road driving to necessary situations, e.g. survey/ inspection work.
- Access tracks used by topsoil stripping scrapers during their loading and unloading cycle will be watered.
- Appropriate speed limits assigned to minimise dust generation.
- Closure of auxiliary roads as required under adverse conditions.
- Any inactive tip head (not planned for use during the next 24 hours) will have water applied to the access road and windrows to reduce particulate lift-off potential
- Following suppression application, un-used tip heads will be closed to traffic to avoid surface disturbance

6.3.2.10 Topsoil stockpiles

- Long term stockpiles will be re-vegetated as soon as practicable

6.3.2.11 Drilling and blasting

- Conduct blasting when dispersion is favourable in accordance with the permissions page, unless otherwise required for safety reasons.
- Drill rigs will utilise water injection or be fitted with dust mitigation such as sprays and dust aprons will be lowered during drilling. Drill rigs will not be operated without adequate dust control. Stem blast holes to prevent venting of explosion gases.

- Use adequate stemming in drill holes at all times.
- Operate a pro-active (predictive) dust and blast fume management system based on forecast and real time weather data. The system will be available for operational use by 30th September 2013.
- Water will be applied to drill cuttings / turkey nests to reduce dust potential.

6.3.2.12 CHPP

- Water sprays will be employed at the feeder, crusher, conveyor and transfer points unless operating conditions do not necessitate additional suppression.
- All conveyors will be fitted with appropriate cleaning and collection devices.
- Where possible use of 'hood and spoon' chutes.
- Use enclosed conveyor transfer.
- Regularly clean areas where spilt material can build up, e.g. under transfer chutes and conveyors.
- Daily completion of area environmental inspection.

6.3.3 Design measures

The potential design measures that can be considered for the Project will be limited by the established mine plan design. The key measures that are available within the existing mine plan designs for the Project are as follows:

- Limiting the spatial extent of activity on exposed areas, i.e. working more intensely in limited areas rather than working less intensely over larger areas;
- Where possible use alternative, low elevation dumps (for use during adverse conditions); and
- Limiting the haul lengths, and constructing roads from carefully selected materials to form a tightly bound, stable surface.

Many of these design related aspects are also included within the operational measures.

6.4 Real-time Air Quality Alarms

HVO currently utilises a network of Tapered Element Oscillating Microbalance (TEOM) units in support of the proactive and reactive air quality management system. Implementation of a number of the available reactive management options is triggered following recoding of elevated PM_{10} measurements at these monitoring locations. Real time air quality alarms are currently in place at the following locations:

- Maison Dieu
- Knodlers Lane
- Warkworth
- Wandewoi

The trigger levels and operational response matrix are detailed in Table 6 and Figure 2.

In support of the TEOM network described above, Hunter Valley Operations will deploy additional supplementary real time monitors on an as required basis, primarily targeting dust migration risks associated with public roads (Golden Highway and Lemington Road).

6.5 Risk / Response Matrix

Table 6: Real Time Air Quality Alarm System Overview

Monitoring location	Trigger level	Response actions
HVO Corporate Met Station	Wind Speed >8m/sec	• Validation of alarm (verify monitors functioning correctly and review meteorological conditions) • Notify relevant Open Cut Examiner • Response as per flowchart below
HVO Cheshunt Met Station	Wind Speed >8m/sec	
Maison Dieu	**Stage one** • 10 min average PM_{10} > 150µg/m^3 • 1 hour average PM_{10} > 50µg/m^3 for three consecutive hours **Stage two** • rolling 24hr average PM_{10} > 50µg/m^3 for six consecutive hours (winds in arc of mine to monitor) • 10min average PM_{10} >150 µg/m^3 for three consecutive hours (winds in arc of mine to monitor)	
Knodlers Lane		
Warkworth		
Wandewoi		

Figure 2: Stage Two air quality alarms - wind arcs from 'mine-to-monitor'

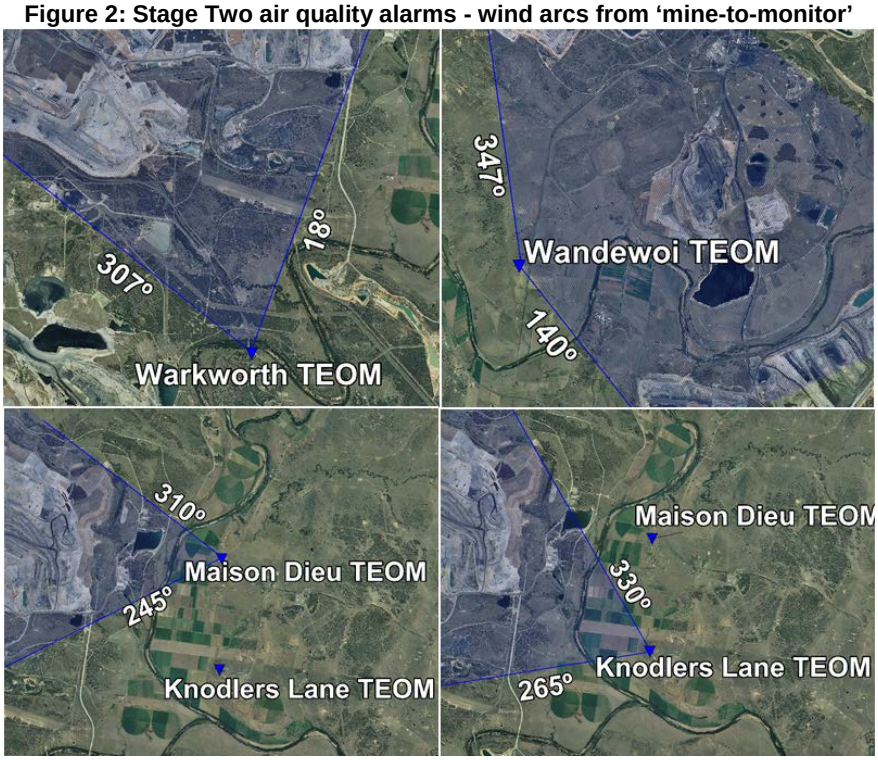
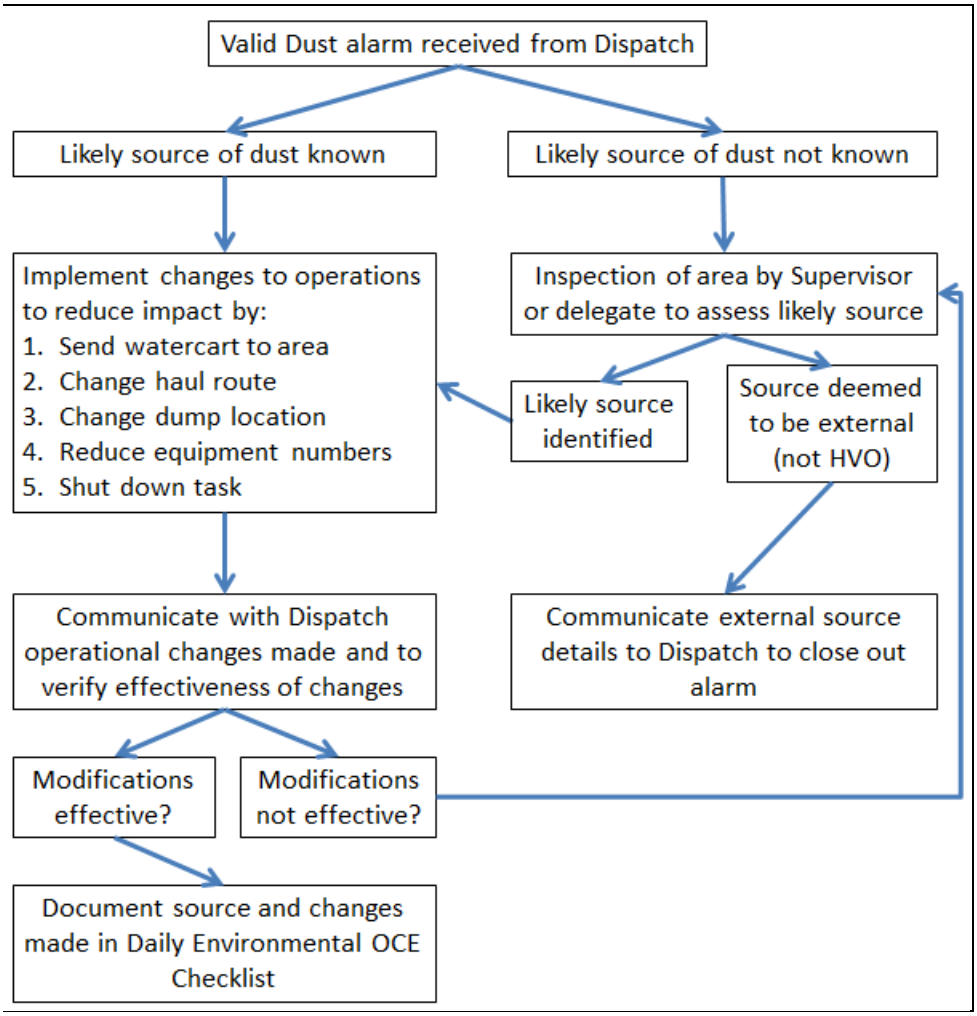


Figure 2: Matrix of Predetermined Actions



6.6 Management of Unpredicted Impacts

In the unlikely event that unpredicted air quality impacts are found to be occurring at nearby privately owned residences, HVO will consider management options such as:

- Entering into an impact cooperation agreement with the landowner
- Review of management controls and monitoring systems specific to the affected residence
- Mitigation options (such as installation of double glazed windows and air conditioning units)
- Acquisition of the affected property

6.7 Management of Air Quality impacts from Coal transport by rail

HVO continues to manage potential air quality emissions associated with coal transportation to the Port of Newcastle through the following measures:

- Design of train loading facilities supports effective profiling of coal in train wagons, minimising wind blown dust; and
- Transport of coal following the coal washing process ensures that approximately 10% Total Moisture (TM) is retained.

6.8 Continuous Improvement

In accordance with the requirements of the Rio Tinto Coal Australia Health, Safety, Environment and Quality Management System , HVO will continuously seek to further air quality management by way of improving existing controls and investigating new and emerging technologies, implementing new controls where required, and thoroughly investigating any exceedance and non-compliance events.

7. GREENHOUSE GAS MANAGEMENT PLAN

7.1 Introduction

The generation and emission of greenhouse gases (GHGs) as a result of anthropogenic activities contribute to climate change which can cause large scale environmental detriment. Global action is required to improve the understanding of the problem and provide solutions for both the adaptation and abatement of GHG emissions. It is important that the Project contributes to climate change solutions and invests in research and development initiatives to find ways to reduce greenhouse gas emissions throughout the coal chain.

The Project's climate change programme has objectives in four key areas, delivered through ongoing integration into existing business processes:

- Supporting research and promotion of technologies that reduce carbon dioxide emissions from the use of coal;
- The improved use of energy at operations, projects and supply chain;
- Designing future projects with energy efficiency and climate change risks considered; and
- Raising awareness amongst stakeholders that climate change is an issue that requires us all to change how we currently operate.

7.2 Emissions from the Project

GHG emissions attributable to operations at the Project arise from the following sources:

7.2.1 Scope 1 Emissions

- Fugitive emissions of carbon dioxide and methane released from coal seams when the coal is mined;
- Combustion of diesel fuel in the mine fleet, light vehicles and stationary diesel powered equipment and in explosives;
- Combustion of petrol, oils, greases and other hydrocarbons in internal combustion engines; and
- Emissions resulting from land clearing (with sequestration provided by rehabilitation plantings).

7.2.2 Scope 2 Emissions:

Emissions at the power station from the generation of electricity purchased for use onsite.

7.2.3 Scope 3 Emissions

- The transport of consumables to site, e.g. diesel, electricity and explosives;
- The transport of the product coal to the Port of Newcastle and the transport of the product coal overseas; and
- The final use of the product coal, e.g. the combustion of the product coal in power generating facilities.

Scope 3 emissions are specifically defined to avoid double counting of emissions. The accountability for the Scope 3 emissions rests with the emitter, e.g. the user of the coal and not the producer. These emissions should be viewed separately to the Scope 1 and 2 emissions as they are outside the direct control of the Project.

7.2.4 Reporting & Carbon Pricing

The Project reports its energy use and GHG emissions monthly via the S&E Survey HVO Greenhouse (GH) workbook. This data is used for internal and external reporting purposes including the *National Greenhouse & Energy Reporting Act 2007* (Cth) (NGER*)* and the *Clean Energy Act 2011* (Cth) (CEA). The requirements for NGER reporting are defined in the Rio Tinto NGER technical guideline. This guidance describes how to determine GHG emissions and energy use including emissions sources, methodologies and activity data required to estimate emissions and energy consumption/production, with references to applicable sections in the NGER Regulations and Determination.

Rio Tinto's GHG emissions reporting requirements exceed the scope of reporting for NGER with the inclusion of additional sources and sinks of emissions that exceed the Group reporting thresholds as defined in the S&E Survey GH workbook guideline e.g. land management emissions.

In accordance with the carbon pricing mechanism under the CEA, covered emissions (primarily fugitive methane) from the Project have attracted a direct carbon liability

since 1 July 2012. Emissions from diesel combustion and electricity consumption have also attracted an indirect liability through equivalent price rises.

7.3 Energy Efficiency Programme

The *Energy Efficiency Opportunities Act 2006* (Cth) (EEO Act) is administered by the Department of Resources, Energy & Tourism (DRET) and requires the Project to identify, assess and report available energy efficiency opportunities. The provisions of EEO work through a series of 5-year assessment cycles; the current cycle runs from July 2011 through to June 2016.

Rio Tinto has developed an EEO site assessment approach which describes how sites will carry out their EEO assessments to meet the requirements of the EEO Act, as well as EEO Technical Guidelines that provide additional guidance to sites for preparing and undertaking their EEO assessments. The Project is currently implementing the requirements of EEO through the RTCA Business Improvement Framework.

Bulk diesel consumption is monitored and reported monthly through records of diesel deliveries to site from fuel suppliers. The onsite fuel management system provides for monitoring of fuel dispensing from tanks and service trucks through metering. The majority of the fleet (haul trucks, dozers, drills, excavators, generators, remote lighting plants, graders, maintenance trucks and light vehicles) is fitted with identification tags to assist in tracking consumption . Regular maintenance of diesel equipment ensures operational efficiency.

Total site electricity consumption is monitored and reported monthly. Significant infrastructure and equipment such as the coal handling and preparation plants, draglines and electric rope shovels are fitted with various electricity meters allowing varying levels of electricity consumption monitoring.

Energy efficiency performance metrics for fuel and electricity use are tracked monthly against internal targets.

7.4 Research Programme

The Project provides funding to the COAL21 Fund, the Australian Coal Association Research Programme (ACARP) and the Cooperative Research Centre for Greenhouse Gas Technologies (CO2CRC) to support and develop the research of low emission coal technologies.

7.5 Waste Minimisation and Management

Waste will be managed across the Project in accordance with an appropriate waste management procedure. Waste management contributes to energy efficiency through measures such as:

- Planning when purchasing items to avoid or minimise waste so that preference is given to products that are recyclable or reusable over products that are not recyclable or reusable, as well as minimum of packaging and/or packaging which is reusable or recyclable;
- Segregating waste to facilitate maximum reuse or recycling;
- Awareness through environmental training to ensure that all employees are aware of the waste management procedures at the Project; and
- Disposal of waste by a licensed contractor.

8. MONITORING PROGRAM

Air Quality Monitoring at the Project site will be undertaken in accordance with the Air Quality Monitoring Programme set out in Appendix B. The monitoring programme will be reviewed annually.

9. COMPLIANCE PROTOCOL

Exceedance of the criteria as outlined in the Approvals will be determined in accordance with Appendix B.

10. IMPLEMENTATION OF THE AIR QUALITY AND GREENHOUSE GAS MANAGEMENT PLAN

10.1 Reporting

10.1.1 Internal reporting

Determining exceedances of air quality criteria will be undertaken in accordance with the protocol for evaluating compliance (Section 9) reproduced in Appendix B.

Internal reporting of air quality related incidents (exceedances and non-compliances of criteria, blast fume / dust plume affecting private residence or public road) will be undertaken in accordance with Rio Tinto Coal Australia HSEQ14 – Incident and Action Management.

The Environmental Specialist – Systems and Monitoring will report any potential or confirmed exceedance / non-compliance of air quality criteria to the Environmental Services Manager.

Non-compliance events will be investigated. Where additional controls are identified for implementation to reduce the risk of repeated non-compliance, these will be assigned to the relevant accountable person. Actions are tracked to completion.

10.1.2 External Reporting

The Environmental Specialist – Systems and Monitoring will report any potential or confirmed exceedance / non-compliance of air quality criteria in writing to the DoPI and NSW EPA as soon as practicable following receipt of information indicating any such potential or confirmed exceedance / non-compliance. No further agencies are considered relevant, and thus will not be notified of air quality non-compliance events.

Affected residences will be notified in writing in the event of a confirmed non-compliance with air quality criteria. Any air quality non-compliance attributed to HVO North will also trigger notification in writing to tenants in mine-owned properties (in addition to privately owned land).

Air quality monitoring data, collected in accordance with this AQMP will be made available on the Rio Tinto Coal Australia website (www.riotintocoalaustralia.com.au) in accordance with the HVO Online Communication Plan.

Any non-compliance relating to the air quality monitoring conditions of EPL640 will be reported to the EPA via the Annual Return.

The Annual Review prepared each year for HVO will include all air quality monitoring results for the corresponding year. The Annual Review will also detail any complaints relating to air quality received at HVO.

A summary of air quality monitoring results will also be presented to the HVO Community Consultative Committee (CCC) meetings which are held three times per calendar year. The CCC will also be briefed on any issues relating to air quality which may arise from time to time.

10.2 Complaints Management

Community Complaints are lodged via the Community Complaints line (1800 656 892). The hotline number will be prominently displayed on the Rio Tinto Coal Australia website, and regularly advertised in the local newspaper. The Complaints Hotline will be in operation 24 hours per day, seven days a week. Complaints will be recorded and investigated by HVO staff. All other complaints lodged via letter, in person or by fax, will also be recorded and investigated by the Environmental Coordinator.

All complaints will be investigated, and, where the investigation identifies potential non-compliance with a consent or licence condition, mitigating action will be taken. Investigation into air quality complaints will generally involve a visual inspection of operating areas

and a check of real time monitoring data to confirm dust levels at nearby sensitive receptors.

The details of all air quality complaints, and any mitigating actions taken, will be circulated to senior management. Where requested, follow-up correspondence with the complainant will be provided.

In accordance with the conditions of EPL640 relating to handling of pollution complaints, HVO will maintain a register of complaints, recording the following information (at minimum):

- Date and time of the complaint
- Method by which the complaint was made
- Any personal details of the complainant which were provided
- The nature of the complaint
- Any action taken in relation to the complaint
- If no action, the reason why no action was taken

A record of each complaint will be kept for a minimum of four years, and will be produced on request to any authorised officer of the EPA.

10.3 Roles and Responsibilities

Table 10: Roles and Responsibilities

Manager – Mining
• Direction and operational oversight
Manager – Technical Services
• Provision of mine plans for proactive model
Manager – Environmental Services
• Technical oversight
Site Environmental Co-ordinator
• Exceedance investigation
Environmental Specialist – Systems and Monitoring
• Management of air quality monitoring programme
• Non-compliance reporting
• Manage maintenance of unattended monitoring network
• Management Plan reviews
• Technical oversight
• Systems development
Environmental Advisor – Systems and Monitoring
• Scheduled reporting
• Monitoring data review
• Operation of predictive tools
• Technical oversight
Supervisors / Open Cut Examiners
• Operational modification following trigger
• Respond to community complaints
Mine Monitoring and Control / Dispatch
• Receipt of dust alarms
• Receipt of community complaints
Community Relations
• Follow up with community as required
Consultants
• Static Air Quality Monitoring

11. REVIEW

The AQMP will be reviewed within three months of the submission of the Annual Review and updated to the satisfaction of the Director-General of the DP&I where necessary.

The AQMP will also be reviewed within three months of the completion of an independent environmental audit, any non-compliance of the Approvals' criteria or any modification to the conditions of the Approvals.

Any major amendments to the AQMP that affect its application will be undertaken in consultation with the appropriate regulatory authorities and stakeholders. Minor changes such as formatting edits may be made with version control on the Project website.

The AQMP may also be revised due to:

- deficiencies being identified;
- introduction of additional mitigation measures or controls;
- results from the monitoring and review programme, including exceedances of criteria;
- recommendations resulting from the monitoring and review programme;
- changing environmental requirements;
- improvements in knowledge or technology becoming available;
- changes in legislation;
- identification of a requirement to alter the AQMP following a risk assessment; or,
- updating of the Mining Operation Plan.

REFERENCES

Project Approval - DA 450-10-2003.

Project Approval - DA 06_0261.

The EIS titled '*Hunter Valley Operations – West Pit Extension and Minor Modifications*', dated October 2003, and prepared by Environmental Resources Management Australia;

The section 96(1A) modification application for the '*Hunter Valley Loading Point*', dated 30 June 2005, and prepared by Matrix Consulting;

The '*Carrington Pit Extended Statement of Environmental Effects*', dated October 2005, and prepared by Environmental Resources Management Australia;

The '*Carrington West Wing Environmental Assessment*', dated 1 October 2010, and prepared by EMGA Mitchell McLennan (CWW EA);

The Environmental assessment titled '*Hunter Valley Operations South Coal Project Environmental Assessment Report*', Volumes 1, 2 and 3, dated January 2008, including the response to submissions;

The Environmental Assessment titled '*Raising of Lake James Dam*', dated October 2009, and the response to submissions (including its Statement of Commitments) dated November 2009;

The Environmental Assessment titled '*Proposed Modification to HVO South Project*', dated May 2010, and the response to submissions dated August 2010;

The Environmental Assessment titled '*Hunter Valley Operations South Project Approval – Modification 4 – Administrative Omissions and Clarifications*' [sic], dated 26 September 2012; and

The Environmental Assessment titled '*Hunter Valley Operations South Project Approval – Modification 5 – Dedication of Lands for Offsets*' [sic], dated 26 September 2012.

NSW Office of Environment and Heritage Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (DECC 2005)

Australian Standard AS / NZS 3580.9.3:2003: Methods for sampling and analysis of ambient air– Determination of suspended particulate matter – Total suspended particulate matter (TSP) – High Volume sampler gravimetric method

Australian Standard AS / NZS 3580.9.6:2003: Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – PM10 high volume sampler with size selective inlet – Gravimetric method.

Australian Standard AS / NZS 3580.9.8:2008: Methods for sampling and analysis of ambient air – PM10 continuous direct mass method using a tapered element oscillating microbalance analyser.

Australian Standard AS / NZS 3580.10.1:2003: Methods for sampling and analysis of ambient air – Determination of particulate matter – Deposited matter – Gravimetric Method.

Rio Tinto Environmental Performance Standard E6

‘Air Quality Impact Assessment’, Volume Three – Supporting Appendices, Carrington West Wing Environmental Assessment, EMGA Mitchell McLennan – October 2010.

‘Air Quality Assessment: Hunter Valley Operations South Coal Project ’, Volume 2 – Environmental Assessment Report, Environmental Resource Management – January 2008.

‘Air Quality Assessment: West Pit Extension and Minor Modifications’, Volume Three – Technical Reports, Environmental Resource Management – October 2003.

Approved Methods for the modelling and assessment of air pollutants in New South Wales” (DEC 2005)

Standards Australia AS / NZS 3580.9.3:2003: Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – Total suspended particulate matter (TSP) – High Volume sampler gravimetric method.

Standards Australia AS / NZS 3580.9.6:2003: Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – PM10 high volume sampler with size selective inlet – Gravimetric method.

Standards Australia AS / NZS 3580.9.8:2008: Methods for sampling and analysis of ambient air – PM10 continuous direct mass method using a tapered element oscillating microbalance analyser

Standards Australia AS / NZS 3580.10.1:2003: Methods for sampling and analysis of ambient air – Determination of particulate matter – Deposited matter – Gravimetric Method

Environmental Management Strategy (Coal & Allied 2013);

Rio Tinto Environment Performance Standard E2 – Air Quality Control;

Rio Tinto Coal Australia (RTCA) integrated Health, Safety, Environment, Quality Management System (HSEQMS) Framework

NSW Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (2005)

European Union Directive 2008/1/EC

Rio Tinto Coal Australia HSEQ14 – Incident and Action Management

Concessions and Mitigation Agreement - (Coal and Allied and Hunter Valley Gliding Club)

Appendix A – Consultation with the EPA

COAL & ALLIED

Managed by Rio Tinto Coal Australia

16 May 2013

Environmental Protection Authority NSW
PO Box 448G
NEWCASTLE NSW 2300

ATTN: Karen Marler

Dear Sir/Madam

RE: Coal & Allied Operations Pty Ltd's Hunter Valley Operation's - North Noise Management Plan and Air Quality & Greenhouse Gas Management Plan – conditions 6 and 10 of Schedule 4 of DA 450-10-2003 as modified on 19 March 2013

We refer to conditions 6 and 10 of Schedule 4 of Hunter Valley Operations - North Development Consent (DA 450-10-2003) which was modified by the Planning and Assessment Commission as delegate for the minister for Planning on 19 March 2013.

Under conditions 6 and 10 of Schedule 4 of that consent Coal & Allied Operations Pty Ltd is required to prepare and implement a detailed Air Quality & Greenhouse Gas Management Plan and a Noise Management Plan (respectively) for the development (Hunter Valley Operations – North). It is a requirement that these plans are:

- prepared in consultation with the EPA, and
- submitted to the Director-General for approval by the end of June 2013.

Coal & Allied Operations Pty Ltd is in the process of preparing these plans. The plans are not yet in a draft form suitable for circulation.

We note that, with regard to the Mount Thorley Warkworth's Air Quality & Greenhouse Gas Management Plan and a Noise Management Plan, the EPA has previously advised that, while "*the…EPA encourages the development of such plans…*[the] *EPA does not review these documents as our role is…not to be directly involved in the development of strategies to achieve those objectives*". We therefore write seeking confirmation from the EPA as to whether or not the EPA would like to

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be consulted further on the drafting of these plans for Hunter Valley Operations or otherwise.

We would be grateful if you could please advise of the EPA's position in this regard by 3 June 2013.

We look forward to hearing from you.

Yours sincerely

Mark Nolan
Manager Project Approvals NSW
Approvals, Environment and Land, Coal Australia

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NSW EPA

Our reference: DOC13/22620, LIC07/2074-07
Contact: Karen Marler 02 4908 6803

Ms Kelly O'Mullane
Coal & Allied Operations Pty Ltd
Hunter Valley Operations
PO Box 315
SINGLETON NSW 2330

19 JUN 2013

Dear Ms O'Mullane

Hunter Valley Operations - Noise and Air Management Plans

Thank you for forwarding the subject plans for our records.

The Environment Protection Authority (EPA) encourages the development of such plans to ensure that proponents have determined how they will meet their statutory obligations and designated environmental objectives. However, the EPA does not review these documents as our role is to set environmental objectives for environmental management, not to be directly involved in the development of strategies to achieve those objectives.

Should you have any questions please phone me on 02 4908 6803.

Yours sincerely

KAREN MARLER
Head Regional Operations Unit – Hunter
Environment Protection Authority

PO Box 488G Newcastle NSW 2300
117 Bull Street, Newcastle West NSW 2302
Tel: (02) 4908 6800 Fax: (02) 4908 6810
ABN 43 692 285 758
www.epa.nsw.gov.au

Appendix B – Air Quality Monitoring Programme & Compliance Protocol

HUNTER VALLEY OPERATIONS

AIR QUALITY MONITORING PROGRAMME

1 Purpose

This document provides a summary of the air quality monitoring programme for Hunter Valley Operations.

The monitoring locations are subject to change and will be updated periodically to align with management needs and to accommodate progression of mining.

A protocol for evaluating compliance with the air quality impact assessment and land acquisition criteria is attached as Appendix 1. Appendix 2 details the private residences which are represented through this monitoring programme.

Monitoring locations to be used to ensure compliance with the relevant subclauses to conditions 4C and 6 (f) of Schedule 4 (DA 450-10-2003) are outlined in Appendix 3.

2 Programme

Parameter	Frequency	Monitor Location	Limit/Guideline	Sampling Method
Depositional Dust – privately owned land	Monthly	D118 D119 D122 DL14 DL21 DL22 DL30 Knodlers Lane Warkworth	Maximum increase in deposited dust level 2 g/m^2/month (Annual Average) Maximum total deposited dust level 4 g/m^2/month (Annual Average)	Approved Methods[1] 19 Australian Standards 3580.10.1:2003
Total Suspended Particulate	24 hours every 6 days	Kilburnie South Knodlers Lane Maison Dieu Warkworth Long Point (30/09/2013) Jerrys Plains (31/12/3013)	Concentration 90 µg/m^3 (Annual Average)	AM-15 AS3580.9.3:2003 (High Volume Air Samplers).
PM_{10}	24 hours every 6 days	HVGC[4] Kilburnie South Knodlers Lane Long Point (30/09/2013) Maison Dieu Warkworth Jerrys Plains (31/12/3013)	Short Term Concentration 50 µg/m^3 (24 hour) Long Term Concentration 30 µg/m^3 (Annual Average)	AS3580.9.6:2003 (High Volume Air Samplers).

Parameter	Frequency	Monitor Location	Limit/Guideline	Sampling Method
PM_{10}	Continuous[3]	Jerrys Plains Village[3] Knodlers Lane Maison Dieu Warkworth Wandewoi HVGC (31/12/3013)	Measurement for management purposes	AS3580.9.8:2008 (Tapered Element Oscillating Mass Balance.)
Meteorological Stations	Continuous	HVO Corporate[5] Cheshunt[6]	Measurement for management purposes	AM1 AM2 AM4 AS 2923-1987 (Measurement of horizontal wind)[5]
Supplementary Monitors (Early Warning Units)	Continuous	EWU1 EWU2	Measurement for management purposes, protection of public roads	

[1] New South Wales Environment Protection Agency 'Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales' (AM) guidelines.

[2] Australian Standard (AS).

[3] All continuous air quality monitors are TEOM units with the exception of Jerrys Plains Village which uses a DusTrak monitor.

[4] Air quality monitoring required only during times that have been notified by the HVGC.

[5] Meteorological stations are calibrated and maintained to a Class 2 performance standard.

3 Requirements

Hunter Valley Operations South Coal Project (PA 06_0261)

Schedule 3, Condition 23

"The proponent shall prepare and implement an Air Quality Monitoring Program for the project to the satisfaction of the Director-General. This program must:

a) Be submitted to the Director-General for approval within 6 months of the date of this approval, or as otherwise agreed by the Director-General; and

b) Include:

- *High-Volume and real-time samplers to monitor the dust emissions of the project; and*
- *An air quality monitoring protocol for evaluating compliance with the air quality impact assessment and land acquisition criteria in this approval.*

Note: The requirement for this Air Quality Monitoring Program may, with the Director-General's approval, be satisfied as a component of CNA's Hunter regional air quality monitoring program. This program should take into account monitoring requirements of neighbouring mines, and where possible, be integrated with these mines' monitoring networks.

Hunter Valley Operations – West Pit Extension and Minor Modifications (DA 450-10-2003)

Schedule 4, Condition 6

The Applicant shall prepare and implement a detailed Air Quality & Greenhouse Gas Management Plan for the development to the satisfaction of the Director-General. This plan must:

(f) include an air quality monitoring program that:

- *Uses a combination of real-time monitors and supplementary monitors to evaluate the performance of the development;*
- *Adequately supports the proactive and reactive air quality management system;*
- *Includes PM2.5 monitoring*
- *Includes monitoring of occupied development-related residences and residences on air-quality affected land listed in Table 1, subject to the agreement of the tenant;*

- *Evaluates and reports on the effectiveness of the air quality management system; and*
- *Includes a protocol for determining any exceedances of the relevant conditions in this approval.*

Environmental Protection Licence 640

M2.2 Air Monitoring Requirements

POINT1

Pollutant	*Units of measure*	*Frequency*	*Sampling Method*
Particulates – Deposited Matter	*Grams per square metre per month*	*Once a month (min. of 4 weeks)*	*AM-19*

POINT 2

Pollutant	*Units of measure*	*Frequency*	*Sampling Method*
Total Solid Particulates	*Micrograms per cubic metre*	*Every 6 days*	*AM-15*

M4 Weather Monitoring

M4.1 The licensee must collect and analyse meteorological data at the following monitoring point for the parameters specified, at a frequency specified for each parameter.

Point: HVO Weather Station located at Easting 310315; Northing: 6406189

Parameter	*Units of Measure*	*Averaging Period*	*Method (see note 1)*	*Frequency*
Siting	*NA*	*NA*	*AM-1 & AM-4*	
Measurement	*NA*	*NA*	*AM-2 & AM-4*	
Wind Speed @ 10m	*m/s*	*10 minutes*	*AM-2 & AM-4*	*Continuous*
Wind Direction @10m		*10 minutes*	*AM-2 & AM-4*	*Continuous*
Temperature @ 1.2m	*°C*	*1 hour*	*AM-4*	*Continuous*
Rainfall	*Mm*	*24 hours*	*Standard rain gauge*	

4 Reference Documents

Hunter Valley Operations South Coal Project Approval (06_0261)

Hunter Valley Operations North Development Consent (DA 450-10-2003)

Environment Protection Licence 640

NSW EPA 'Approved Methods for Sampling and Analysis of Air Pollutants in NSW'

HVO-13-ENVMM-SITE-E2-003 Hunter Valley Operations Air Quality Monitoring Manual

HVO-10-ENVMP-SITE-E2-002 Hunter Valley Operations Air Quality Management Plan

Rio Tinto HSEQMS 13 – Measuring and Monitoring

CNA-02-ENVMP-SITE-025 Coal and Allied Environmental Management Strategy

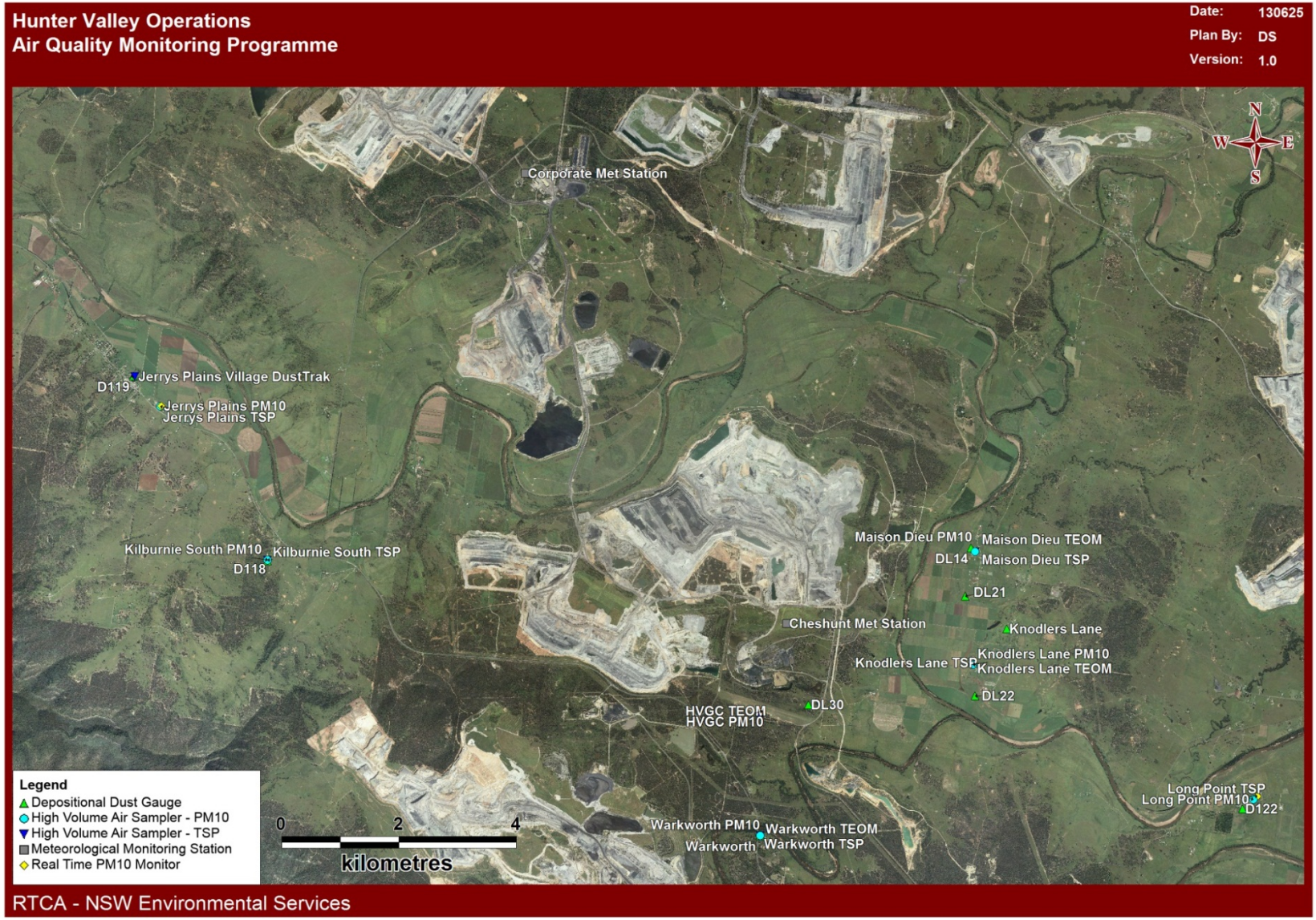
AS3580.1.1 (2007) Guide to siting air monitoring equipment

AS3580.10.1 (2003) Methods for sampling and analysis of ambient air, Determination of Particulate Matter – Deposited Matter- Gravimetric Method

AS3580.9.3 (2003) Methods for sampling and analysis of ambient air, Determination of Particulate Matter – Total Suspended Particulates (TSP) - Gravimetric Method

AS3580.9.6 (2003) Methods for sampling and analysis of ambient air, Determination of Particulate Matter – PM_{10} High Volume Sampler with size-selective inlet – Gravimetric Method

Concessions and Mitigation Agreement – (Coal and Allied and Hunter Valley Gliding Club)


Hunter Valley Operations
Air Quality Monitoring Programme
Date: 130625
Plan By: DS
Version: 1.0
N
W
E
S
Corporate Met Station
Jerrys Plains Village DustTrak
D119
Jerrys Plains PM10
Jerrys Plains TSP
Kilburnie South PM10
Kilburnie South TSP
D118
Maison Dieu PM10
Maison Dieu TEOM
DL14
Maison Dieu TSP
DL21
Cheshunt Met Station
Knodlers Lane
Knodlers Lane PM10
Knodlers Lane TSP
Knodlers Lane TEOM
DL22
DL30
HVGC TEOM
HVGC PM10
Long Point TSP
Long Point PM10
D122
Warkworth PM10
Warkworth TEOM
Warkworth
Warkworth TSP
Legend
Depositional Dust Gauge
High Volume Air Sampler - PM10
High Volume Air Sampler - TSP
Meteorological Monitoring Station
Real Time PM10 Monitor
0
2
4
kilometres
RTCA - NSW Environmental Services

HUNTER VALLEY OPERATIONS

AIR QUALITY MONITORING PROGRAMME

APPENDIX ONE - PROTOCOL FOR EVALUATING COMPLIANCE

1 PURPOSE

Condition 23 in Schedule 3 of Hunter Valley Operations (HVO) South Coal Project, Project Approval 06_0261, 24 March 2009, requires that the air quality monitoring program for the project include;

- *"an air quality monitoring protocol for evaluating compliance with the air quality impact assessment and land acquisition criteria in this approval".*

Similarly, Condition 6(f) in Schedule 4 of Hunter Valley Operations North Development Consent (DA 450-10-2003) requires that the air quality monitoring program for the project;

- "includes a protocol for determining any exceedances of the relevant conditions in this approval."

This document outlines the key considerations in evaluating compliance with the air quality impact assessment and land acquisition criteria outlined in the Planning Approvals.

2 AIR QUALITY DESCRIPTORS & MEASUREMENT

The HVO South Coal Project Approval 06_0261, and HVO North Development Consent DA 450-10-2003 require monitoring of air quality parameters to measure and assess any impact of the development on neighbouring communities. The criteria to be measured refer to particulate matter, classified on the basis of size. All of the criteria require measurement of the mass of the substance, over a specified period of time.

Total Suspended Particulates (TSP) refers to the total particles that are suspended in the air. TSP is assessed as defined by Standards Australia AS 3580.9.3:2003: Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – Total Suspended Particulate Matter (TSP) – High Volume Sampler Gravimetric Method.

PM_{10} refers to particulate matter with an equivalent spherical aerodynamic diameter less than 10 µm. PM_{10} is assessed as defined by Standards Australia AS 3580.9.6:2003: Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – PM_{10} High volume sampler with size selective inlet – Gravimetric method. PM_{10} is also measured in real time using a Tapered Element Oscillating Mass Balance (TEOM). PM_{10} is assessed for the purpose of real time environmental management as defined by Standards Australia AS 3580.9.8:2008: Methods for sampling and analysis of ambient air – PM_{10} continuous direct mass method using a tapered element oscillating microbalance analyser.

PM_{10} can also be indirectly inferred using other instruments that generally use light scattering techniques to infer the mass of particles present. The DusTrak monitor is an example of this and is not used for regulatory compliance purposes by Coal & Allied, as the result can vary significantly according to particle properties such as size, colour and reflectivity. These instruments are suitable for operational management, e.g. for indicative or portable monitoring.
$PM_{2.5}$ refers to particulate matter with an equivalent spherical aerodynamic diameter less than 2.5 µm. PM_{10} is assessed as defined by Standards Australia AS3580.9.7:2009: Methods for sampling and analysis of ambient air Method 9.7: Determination of suspended particulate matter—Dichotomous sampler (PM_{10}, coarse PM and $PM_{2.5}$)—Gravimetric method

Deposited dust relates to the largest dust particles in the air. These particles rarely travel far from the source as they rapidly settle under gravity. Deposited dust is assessed as insoluble solids as defined by Standards Australia AS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air – Determination of Particulate Matter – Deposited Matter – Gravimetric Method.

3 MONITORING

Air quality monitoring will be conducted around HVO as detailed in the HVO Air Quality Monitoring Programme.

Monitoring will be undertaken in accordance with the New South Wales Environmental Protection Authority (EPA) 'Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales' guideline, relevant Australia Standards and Rio Tinto Coal Australia Procedure HSEQMS13 – Measuring and Monitoring.

Compliance assessment for TSP and PM_{10} will be undertaken by way of High Volume Air Sampler (HVAS) monitoring, which will be undertaken every 6th day, in accordance with the NSW EPA six-day cycle. Where a sample is unable to be obtained a 'make up sample' will be collected at the next available opportunity.

$PM_{2.5}$ will be monitored via the Singleton monitoring location from the regional Upper Hunter Air Quality Monitoring Network. Rolling 24hr Average values from this monitoring location (as recorded at midnight for the previous day) will be recorded for each day of the calendar year.

A network of "Early Warning Units" will be utilised to satisfy the requirement for "supplementary monitoring" as described in the Project Approval. The Early Warning Units (EWU's) will be semi-portable, and able to be relocated as required to support operational control.

Real-time meteorological data will be collected in conjunction to air quality monitoring data. This information shall include wind speed and direction, rainfall, temperature and humidity.

4 MINING & AIR QUALITY

To understand how mining activities may affect air quality four factors should be considered:

- The generation of dust emissions from mining activities;
- The dispersion of generated dust in the air;
- How various size fractions of dust behave in the air; and
- The prevailing background dust levels.

The generation of dust emissions from open cut mine activities can be considered in three distinct categories:

- Wind generated emissions, such as wind erosion of exposed surfaces, such as stockpiles, overburden dumps, active pit areas etc;
- Wind sensitive emissions, such as dragline tipping, loading, dumping, emplacement, (wherever material falls through the air); and
- Wind insensitive emissions, such as wheel generated dust from hauling, and dust from blasting and drilling where the amount of dust does not depend on the wind speed at the time.

On windy days, particularly during prolonged dry periods, wind generated emissions and wind sensitive emissions will increase.

The prevailing atmospheric stability class conditions greatly affect the dispersion of generated dust emissions in the air. The degree of atmospheric dispersion has a dramatic effect on the concentration of dust in the air at a distance away from the source.

The various size fractions of dust (TSP, PM_{10}, $PM_{2.5}$ and deposited dust) generated by mining activity will remain entrained in the air for different periods of time due to gravitational settling. Dispersion profiles can be described such that the smaller dust fractions need lower wind speeds to settle than the large fractions. Thus deposited dust will rapidly fall out of the air, TSP will also fall out of the air but will travel further on lower winds than deposited dust, and PM_{10} can travel large distances. It is important to note the further the dust travels the more dispersion will occur and the lower the concentration will be.

The impact of mining dust is a function of the generation of emissions in the first instance and also the effective dispersion of emissions in the air that arrives at the receptor.

Background dust levels will naturally vary from day to day in the area around the mine site. The background levels at a monitoring site are affected by localised sources of dust including activities on dirt roads, wind erosion of exposed or grazed agricultural land, burning, urban areas, wood heating in winter, salt spray from the ocean and pollens. In addition, background levels will include regional events, such as extremely dry and windy conditions, dust storms and bushfires.

5 APPROVAL & CRITERIA

5.1 Current Approvals

HVO is the combined operations of the West Pit, Mitchell Pit and Carrington Pit situated to the north of the Hunter River; and Cheshunt Pit, Riverview Pit, Hunter Valley South Pit and South Lemington Pits situated south of the Hunter River. Air quality impacts around HVO are addressed in the following two most recent project approvals detailed in Table 1.

Table 1 APPLICABLE CONSENTS FOR HVO

Consent Area	Consent	Applicable Pits
HVO South	Hunter Valley Operations South Coal Project, Project Application 06_0261	Riverview Pit (South Pit) Cheshunt Pit South Lemington Pits
HVO North	HVO North Development Consent 450-10-2003	West Pit Carrington Pit North Pit

Air quality impacts must be assessed against each of the project approvals. Accordingly the consent criteria from both projects are used to assess the performance of HVO with regard to air quality.

5.2 Compliance Criteria

HVO North Development Consent (DA450-10-2003) Schedule 4, Condition 4A – Air Quality Criteria

Except for the air quality affected land in Table 1 *(refer to the Project Approval)*, the Proponent shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the development do not exceed the criteria listed in Tables 2, 3 and 4 *(below)* at any residence on privately owned land, or on more than 25 percent of any privately owned land.

Table 2 LONG TERM IMPACT ASSESSMENT CRITERIA FOR PARTICULATE MATTER (TABLE 2)

Pollutant	Averaging Period	[d] Criterion
Total Suspended Particulate (TSP) matter	Annual	[a] 90 µg/m^3
Particulate Matter < 10µm (PM_{10})	Annual	[a] 30 µg/m^3

Table 3 SHORT TERM IMPACT ASSESSMENT CRITERIA FOR PARTICULATE MATTER (TABLE 3)

Pollutant	Averaging Period	[d] Criterion
Particulate Matter < 10µm (PM_{10})	24 hour	[a] 50 µg/m^3

Table 4 LONG TERM IMPACT ASSESSMENT CRITERIA FOR DEPOSITED DUST (TABLE 4)

Pollutant	Averaging Period	Maximum increase in deposited dust level	Maximum total deposited dust level
[c] Deposited Dust	Annual	[b] 2 g/m^2/month	[a] 4 g/m^2/month

Notes to tables 2, 3 and 4
[a] Total impact (i.e. incremental increase in concentrations due to the development plus background concentrations due to all other sources);
[b] Incremental impact (i.e incremental increase in concentrations due to the development on its own)
[c] Deposited Dust is to be 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; and
[d] Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents or any other activity agreed by the Director-General

Schedule 4, Condition 4B – Air Quality Acquisition Criteria

If particulate matter emissions generated by the development exceed the criteria in Tables 5, 6 or 7 *(below)* at any residence on privately-owned land, or on more than 25 percent of any privately owned land, then upon written request for acquisition from the landowner, the Proponent shall acquire the land in accordance with the procedures in conditions 7 and 8 of Schedule 5.

Table 5 LONG TERM LAND ACQUISITION CRITERIA FOR PARTICULATE MATTER (TABLE 5)

Pollutant	Averaging Period	[d] Criterion
Total Suspended Particulate (TSP) matter	Annual	[a] 90 µg/m^3
Particulate Matter < 10µm (PM_{10})	Annual	[a] 30 µg/m^3

Table 6 SHORT TERM LAND ACQUISITION CRITERIA FOR PARTICULATE MATTER (TABLE 6)

Pollutant	Averaging Period	[d] Criterion
Particulate Matter < 10µm (PM_{10})	24 hour	[a] 150 µg/m^3
Particulate Matter < 10µm (PM_{10})	24 hour	[b] 50 µg/m^3

Table 7 LONG TERM LAND ACQUISITION CRITERIA FOR DEPOSITED DUST (TABLE 7)

Pollutant	Averaging Period	Maximum increase in deposited dust level	Maximum total deposited dust level
[c] Deposited Dust	Annual	[b] 2 g/m²/month	[a] 4 g/m²/month

Notes to tables 5, 6 and 7
[a] Total impact (i.e. incremental increase in concentrations due to the development plus background concentrations due to all other sources);
[b] Incremental impact (i.e incremental increase in concentrations due to the development on its own)
[c] Deposited Dust is to be 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; and
[d] Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents or any other activity agreed by the Director-General.

HVO South Coal Project Approval (PA 06_0261) Schedule 3, Condition 19 – Air Quality Criteria
The proponent shall ensure that dust generated by the project does not cause additional exceedances of the air quality criteria listed in Tables 8, 9, and 10 at any residence on privately-owned land, the Hunter Valley Gliding Club (when in use) or on more than 25 percent of any privately-owned land.

Table 8 LONG TERM IMPACT ASSESSMENT CRITERIA FOR PARTICULATE MATTER (TABLE 8)

Pollutant	Averaging Period	Criterion
Total Suspended Particulate (TSP) matter	Annual	90 µg/m³
Particulate Matter < 10µm (PM_{10})	Annual	30 µg/m³

Table 9 SHORT TERM IMPACT ASSESSMENT CRITERION FOR PARTICULATE MATTER (TABLE 9)

Pollutant	Averaging Period	Criterion
Particulate Matter < 10µm (PM_{10})	24 hour	50 µg/m³

Table 10 LONG TERM IMPACT ASSESSMENT CRITERIA FOR DEPOSITED DUST (TABLE 10)

Pollutant	Averaging Period	Maximum increase in deposited dust level	Maximum total deposited dust level
[c] Deposited Dust	Annual	2 g/m²/month	4 g/m²/month

Notes:

- Air quality impacts at HVGC are to be assessed in the immediate vicinity of its residential facilities and/or clubhouse. Air quality limits are only applicable during times of use that have been notified by HVGC to the Proponent.
- Deposited Dust is to be 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, or its latest version.

Schedule 3, Condition 20 – Land Acquisition Criteria
If the dust emissions generated by the project 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 Proponent shall, upon receiving a written request for acquisition from the landowner, acquire the land in accordance with the procedures in conditions 7 – 9 of schedule 4.

Table 11 LONG TERM LAND ACQUISITION CRITERIA FOR PARTICULATE MATTER (TABLE 11)

Pollutant	Averaging Period	Criterion
Total Suspended Particulate (TSP) matter	Annual	90 µg/m³
Particulate Matter < 10µm (PM_{10})	Annual	30 µg/m³

Table 6 SHORT TERM LAND ACQUISITION CRITERIA FOR PARTICULATE MATTER (TABLE 6)

Pollutant	Averaging Period	Criterion	Percentile[1]	Basis
Particulate Matter < 10µm (PM_{10})	24 hour	150 µg/m³	99[2]	Total[3]
Particulate Matter < 10µm (PM_{10})	24 hour	50 µg/m³	98.6	Increment[4]

[1] – Based on the number of block 24 hour averages in an annual period.
[2] – 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 EPA.
[3] – Background PM10 concentrations due to all other sources plus the incremental increase in PM10 concentrations due to the mine alone.
[4] – Incremental increase in PM10 concentrations due to the mine alone.

Table 13 LONG TERM LAND ACQUISITION CRITERIA FOR DEPOSITED DUST (TABLE 13)

Pollutant	Averaging Period	Maximum increase in deposited dust level	Maximum total deposited dust level
[c] Deposited Dust	Annual	2 g/m²/month	4 g/m²/month

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

5.3 Guides for Interpretation of Compliance Criteria

Guidelines on the interpretation and application of the criteria in Table 2 are as follows:

- Averaging periods;
  - A block 24-hour average is from midnight to midnight for a specific day;
  - Annual average refers to the calendar year (i.e. January to December)
- Result values should be rounded to whole figures for comparison to criteria. Calculations and data appearing in supporting document may use decimal places as appropriate.
- Determination of HVO contribution to measured results (incremental increase due to the development), investigation into measured exceedances will be undertaken by an air quality consultant, examining available information to determine contribution, including real time air quality data, prevailing meteorology, and operational factors.

6 COMPLIANCE EVALUATION

Compliance evaluation will be undertaken for private residences on the basis of the outcomes of air quality assessment from monitors located nearby to neighbouring communities, as detailed in the Air Quality Monitoring Programme. Compliance with the impact assessment criteria and land acquisition criteria requires a direct or indirect assessment of measured results, depending on the averaging period and requirements of the specific condition.
Compliance with the criteria in Tables 3 and 9 is demonstrated where the measured level is below the criteria. However it is not always the case that measured levels above the criteria mean non-compliance. In this case indirect methods are needed to demonstrate compliance.
It should also be noted that the comparison of measured levels against the compliance criteria must be undertaken independently for HVO South and HVO North. This will be undertaken on an as required basis (in the event that measured levels are above the relevant criteria only (i.e. where monitoring data is less than the prescribed criterion, both HVO North and South will be considered compliant with the relevant condition).

6.1 Long term impact assessment criteria for particulate matter

Compliance with the criteria in Tables 2 and 8 can be assessed by direct comparison of the criterion with measured results. Level of compliance against these conditions will be determined by way of comparing the Annual Rolling Average (calendar year) against the relevant criterion, with the outcome being compliant or non-compliant with the condition, for each monitoring location. This assessment will be undertaken at the completion of each calendar year.

Where extraordinary events (as defined in the Project Approval) are considered to have contributed to an annual average exceedance, this will be referred to an air quality consultant for determination.

HVO will be considered non-compliant with the long term impact assessment criteria for particulate matter where the annual average particulate concentration (as measured by High Volume Air Samplers for TSP and PM_{10}), (excluding extraordinary events) exceeds the relevant annual average criterion, and the non-compliant measurement is attributable solely to either of HVO North or HVO South.

6.2 Short term impact assessment criteria for particulate matter

Compliance with the criteria in Tables 3 and 9 can be assessed by direct comparison of the criterion with measured results. Level of compliance against this condition will be determined by way of comparing 24hr PM_{10} results (as measured by High Volume Air Sampler with size-selective inlet) against the impact assessment criterion of 50µg/m³. This assessment will be undertaken on a monthly basis, following receipt of results for the previous month.

This assessment however does not take account of background particulate matter, or particulate matter due to all other sources. Further assessment (indirect) of individual exceedances is therefore required to determine HVO's compliance position in these instances (individually for HVO North and HVO South). Further assessment will be undertaken by a suitably qualified person, and take account of background particulate concentration, prevailing meteorology, and operational factors influencing particulate dispersion.

HVO will be considered non-compliant with the short term impact assessment criteria for particulate matter when investigation into a measured PM_{10} exceedance determines HVO North or South to have been a significant contributor (estimated contribution of >75%) to the measured result.

Any measured result which is in excess of the impact assessment criterion (50 µg/m³), will be considered a potential exceedance of project approval criteria, and will be reported to the Director-General as 'exceedance event to be investigated'. Confirmation of HVO's compliance position will be provided to the Director-General following investigation.

6.3 Long term impact assessment criteria for deposited dust

Compliance with the criteria in Tables 4 and 10 can be assessed by direct comparison of the criterion with measured results. Level of compliance against these conditions will be determined by way of comparing the Annual Rolling Average (calendar year) against the relevant criterion, with the outcome being compliant or non-compliant with the condition, for each monitoring location. This assessment will be undertaken at the completion of each calendar year.

Outcomes of Depositional Dust monitoring will be reviewed on a monthly basis (following receipt of results for the previous month). Where individual samples are noted as contaminated (typically with insects and bird droppings), or where extraordinary events (as defined in the Project Approval) are suspected to have contributed to any exceedance, these will be referred to a suitably qualified person for resolution, to determine the validity of the result in compliance assessment.

HVO will be considered non-compliant with the long term impact assessment criteria for deposited dust where the annual average deposited dust concentration (as measured by Depositional Dust gauges), (excluding contaminated gauges and extraordinary events) exceeds the relevant annual average criterion, or the maximum allowable increase in deposited dust criterion, and the non-compliant result is attributable to either of HVO North or HVO South.

6.4 Long term land acquisition for particulate matter

Compliance with the criteria in Tables 5 and 11 can be assessed by direct comparison of the criterion with measured results. Level of compliance against these conditions will be determined by way of comparing the Annual Rolling Average (calendar year) against the relevant criterion, with the outcome being compliant or non-compliant with the condition, for each monitoring location. This assessment will be undertaken at the completion of each calendar year. It should be noted that the impact assessment criteria and land acquisition criteria are the same in this instance.

Where extraordinary events (as defined in the Project Approval) are considered to have contributed to the annual average exceedance, this will be referred to a suitably qualified person for determination.

HVO will be considered non-compliant with the long term land acquisition criteria for particulate matter where the annual average particulate concentration (as measured by High Volume Air Samplers for TSP and PM_{10}), (excluding extraordinary events) exceeds the relevant annual average criterion, and the non-compliant measurement is attributable to either of HVO North or HVO South.

6.5 Short term land acquisition criteria for particulate matter

Compliance with the criteria in Tables 6 and 12 can be assessed by direct comparison of the criterion with measured results. Level of compliance against this condition will be determined by way of comparing 24hr PM_{10} results (as measured by High Volume Air Sampler with size-selective inlet) against the land acquisition criteria of 50µg/m^3 (incremental increase) and 150µg/m^3 (total impact) This assessment will be undertaken on a monthly basis, following monitoring results for the previous month.

This assessment however does not take account of background particulate matter, or particulate matter due to all other sources. Further assessment (indirect) of individual exceedances is therefore required to determine HVO's compliance position in these instances. Further assessment will be undertaken by a suitably qualified person, and take account of background particulate concentration, prevailing meteorology, and operational factors influence particulate dispersion.

HVO will be considered non-compliant with the short term land acquisition criteria for particulate matter when investigation into a measured PM_{10} exceedance determines HVO North or HVO South to have contributed 50µg/m^3 or more to a measured exceedance (between 50µg/m^3 and 150µg/m^3), or is determined to have been a significant contributor (estimated contribution of >75%) to a measured result of 150µg/m^3 or greater.
Note that the HVO South Coal Project Approval allows for exceedances of these criteria on a percentile occurrence basis.

6.3 Long term impact assessment criteria for deposited dust

Compliance with the criteria in Tables 7 and 13 can be assessed by direct comparison of the criterion with measured results. Level of compliance against these conditions will be determined by way of comparing the Annual Rolling Average (calendar year) against the relevant criterion, with the outcome being compliant or non-compliant with the condition, for each monitoring location. This assessment will be undertaken at the completion of each calendar year. It should be noted that the impact assessment and land acquisition criteria are the same in this instance.

Outcomes of Depositional Dust monitoring will be reviewed on a monthly basis (following receipt of results for the previous month). Where individual samples are noted as contaminated (typically with insects and bird droppings), or where extraordinary events (as defined in the Project Approval) are suspected to have contributed to any exceedance, these will be referred to a suitably qualified person for resolution, to determine the validity of the result in compliance assessment.

HVO will be considered non-compliant with the long term land acquisition criteria for deposited dust where the annual average deposited dust concentration (as measured by Depositional Dust gauges), (excluding contaminated gauges and extraordinary events) exceeds the relevant annual average criterion, or the maximum allowable increase in deposited dust criterion, and the measured result is attributable to either of HVO North or HVO South.

7 REPORTING

A summary of air quality monitoring results will be reported quarterly on Rio Tinto's web site. www.riotintocoalaustralia.com.au. Analysis and summary of air quality monitoring results will be reported in the Annual Environmental Management Report.

- Regular updates (quarterly) in accordance with Schedule 5, Condition 9(a)
- In the Annual Environmental Management Report (AEMR)
- To relevant residents, by exception, in the event of non-compliance (neighbours will be notified by mail in the event of a non-compliance and will be provided a copy of the NSW Health fact sheet "Mine Dust & You")
- To the Director-General, by exception, in the event of potential exceedance and non-compliance (including provision of any investigative report into any potential exceedance)
- Summarised and presented to the Community Consultative Committee

HUNTER VALLEY OPERATIONS

AIR QUALITY MONTORING PROGRAMME

APPENDIX TWO - REPRESENTATION OF PRIVATE RESIDENCES

1. PURPOSE

This document outlines the representation of private residences associated with the Hunter Valley Operations (HVO) Air Quality Monitoring Programme.

2. REPRESENTATION OF PRIVATE RESIDENCES

In order to assess compliance against the impact assessment and land acquisition criteria, results of air quality monitoring as outlined in the Air Quality Monitoring Programme shall be compared against the relevant conditions (outlined in Tables 8 – 13 of the HVO South Coal Project Approval, and Tables 2 – 7 of the HVO North Development Consent).

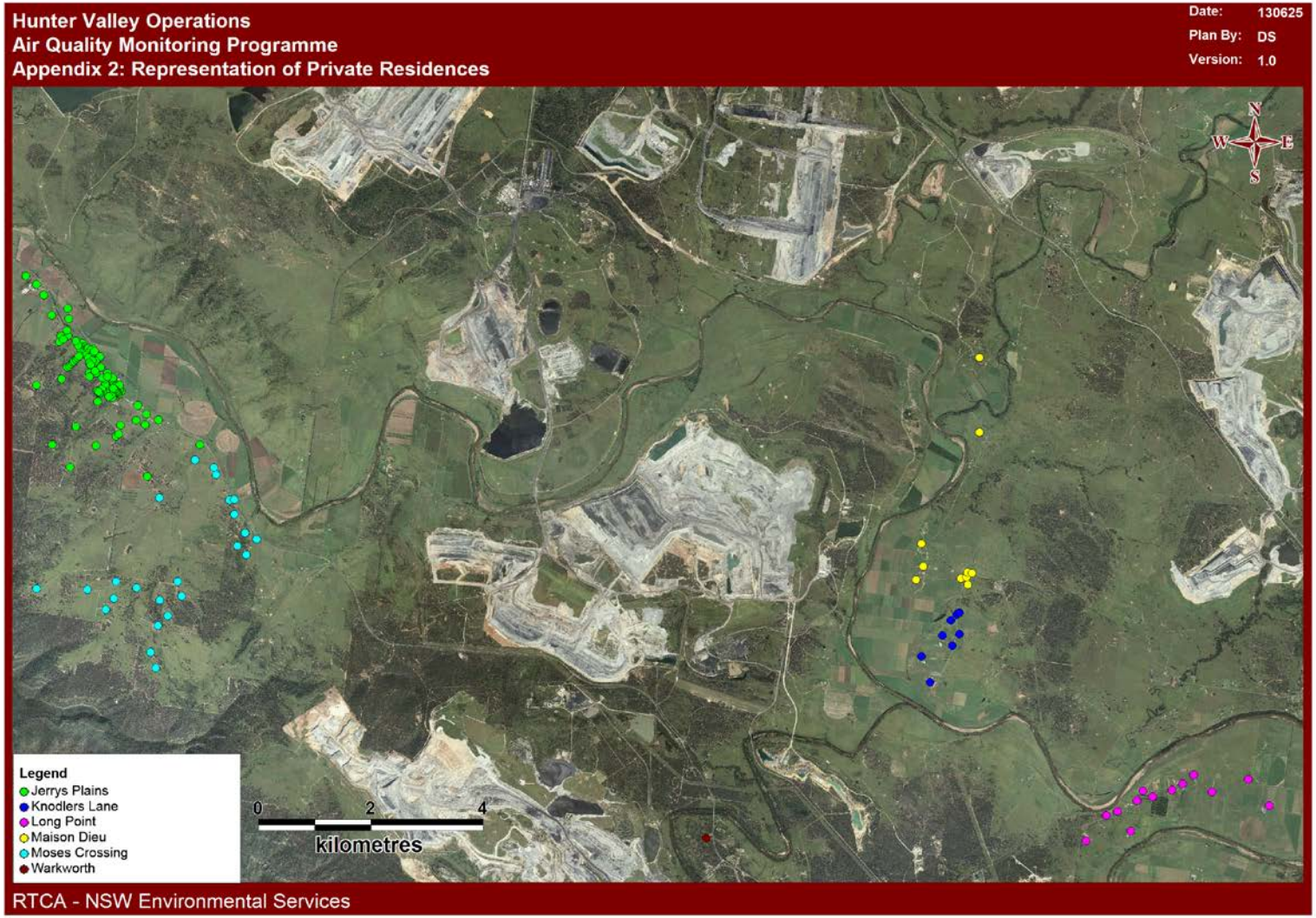
Where monitoring data represents a non-compliance with the criteria, all landowners in the vicinity of the monitoring location (see Figure 1) will be notified in writing.

A review of represented receivers along with property ownership status will be undertaken as required.

Table 1. Representative Groups and associated private properties

Air Quality	Monitoring Programme
Jerrys Plains	MP001, MP002, MP003, MP004, MP005, MP006, MP007, MP008, MP010, MP011, MP012, MP013, MP014, MP015, MP017, MP018, MP019, MP020, MP021, MP022, MP023, MP024, MP025, MP026, MP027, MP028, MP029, MP030, MP031, MP032, MP033, MP034, MP035, MP036, MP037, MP038, MP039, MP040, MP044, MP045, MP046, MP047, MP049, MP050, MP052, MP053, MP054, MP055, MP056, MP057, MP058, MP060, MP061, MP064, MP065, MP066, MP069, MP071, MP072, MP073, MP074, MP075, MP076, MP077, MP078, MP080, MP081, MP083, MP084, MP085, MP086, MP088, MP089, MP090, MP091, MP092, MP093, MP094, MP095, MP096, MP097, MP098, MP099, MP100, MP101, MP102, MP105, MP106, MP107, MP108, MP109, MP110, MP111, MP112, MP113, MP115, MP116, MP189, MP202, MP203, MP204
Knodlers Lane	MP160, MP161, MP162, MP163, MP164, MP188, MP208
Long Point	MP166, MP167, MP169, MP170, MP171, MP174, MP175, MP177, MP178, MP179, MP180, MP181, MP182, MP183
Maison Dieu	MP156, MP157, MP158, MP164, MP184, MP185, MP186, MP187, MP206, MP207
Moses Crossing	MP117, MP120, MP121, MP122, MP122, MP124, MP125, MP126, MP128, MP128, MP129, MP130, MP131, MP190, MP191, MP192, MP193, MP194, MP195, MP196, MP197, MP198, MP199, MP200, MP201, MP205
Warkworth	MP149

Figure 1. Representation of private residences



HUNTER VALLEY OPERATIONS

AIR QUALITY MONITORING PROGRAMME

APPENDIX 3 – AIR QUALITY MONITORING OF MINE-OWNED LAND

1 Purpose

This document details monitoring locations which will be maintained so as to ensure compliance with the relevant subclauses to conditions 4C and 6 (f) of Schedule 4 (DA 450-10-2003). Collection of monitoring data for mine-owned properties will be undertaken at monitoring locations specified in this monitoring programme. The data provided will be from the nearest monitoring location to the residence.

To ensure that the monitoring locations adequately represent all mine-owned land surrounding HVO North a validation survey will be undertaken on request from the resident,. The surveys will be conducted by way of installing a particulate monitoring device (subject to landowner agreement) for a period of up to two (2) weeks to enable comparison with measured levels at nearby monitoring stations as specified in this monitoring programme.

2 Programme

Parameter	Frequency	Monitor Location	Limit/Guideline	Sampling Method
Depositional Dust	Monthly (30 +/- 2 days)	D112 DL2 D118 DL14 DL22	Insoluble Solids Annual Rolling Average – 4g/m^2/month	AS3580.10.1 (2003)
Total Suspended Particulates (TSP)	Every six days	Cheshunt East Wandewoi Kilburnie South Maison Dieu Knodlers Lane	Annual Rolling Average 90µg/m^3	AS3580.9.3 (2003)
Particulate Matter <10µm (PM_{10})	Every six days	Cheshunt East Wandewoi Kilburnie South Maison Dieu Knodlers Lane	24hr - 50µg/m^3 Annual Rolling Average 30µg/m^3	AS3580.9.6 (2003)

3 Requirements

Hunter Valley Operations North Development Consent (DA 450-10-2003)

Schedule 4, Condition 4C

"The Applicant shall ensure that particulate matter emissions generated by the development do not exceed the criteria listed in Table 2, Table 3 and Table 4 at any occupied residence on any mine-owned land (including land owned by adjacent mines) unless:

- particulate matter air quality monitoring is undertaken to inform the tenant and landowner of potential health risks; and High-Volume and real-time samplers to monitor the dust emissions of the project; and
- monitoring data is presented to the tenant in an appropriate format, for a medical practitioner to assist the tenant in making an informed decision on the health risks associated with occupying the property,

to the satisfaction of the Director-General.Schedule 4, Condition 6(f)

"The Applicant shall prepare and implement a detailed Air Quality & Greenhouse Gas Management Plan for the development to the satisfaction of the Director-General. This plan must:

include an air quality monitoring program that:

- includes monitoring of occupied development-related residences and residences on air quality-affected land listed in

Table 1, subject to the agreement of the tenant;"

4 Data provision to residents in mine-owned residences

Residents in mine-owned properties will be presented with monitoring data upon request, in a format that can be presented to a medical practitioner. The data provided will be from the nearest monitoring location to the residence, as listed in this programme. Where the property is owned by a mining company other than Coal and Allied, the monitoring data will be provided to the relevant personnel from the mine concerned for distribution to licensees in tenanted properties.

5 Reference Documents

Hunter Valley Operations West Pit Extension and Minor Modifications (DA 450-10-2003) NSW EPA

'Approved Methods for Sampling and Analysis of Air Pollutants in NSW'

HVO-13-ENVMM-SITE-E2-003 Hunter Valley Operations Air Quality Monitoring Manual HVO-10-

ENVMP-SITE-E2-002 Hunter Valley Operations Air Quality Management Plan Rio Tinto HSEQMS

13 – Measuring and Monitoring

AS3580.1.1 (2007) Guide to siting air monitoring equipment

AS3580.10.1 (2003) Methods for sampling and analysis of ambient air, Determination of Particulate Matter – Deposited Matter- Gravimetric Method

AS3580.9.3 (2003) Methods for sampling and analysis of ambient air, Determination of Particulate Matter – Total Suspended Particulates (TSP) - Gravimetric Method

AS3580.9.6 (2003) Methods for sampling and analysis of ambient air, Determination of Particulate Matter – PM_{10} High Volume Sampler with size-selective inlet – Gravimetric Method

title	version number	revision status	date released	date approved by authority	page
Document No. HVO-13-ENVMPR-SITE-E2-010 HVO Air Quality Monitoring Programme Appendix 3 (Mine Owned Land)	1.1	Final	11/02/2014	12/02/2014	3 of 3

Appendix C – Excerpt from HVO Dust PRP – Adverse Conditions

The following is taken from the HVO submission to the NSW EPA (29th May 2013), defining adverse weather conditions and response to adverse weather conditions as required by the relevant condition of HVO EPL 640.

Adverse Weather Conditions:

In relation to dust impact, adverse weather conditions can be defined as any weather condition giving rise to particulate concentrations measured in excess of regulatory criteria. Hunter Valley Operations will use real time air quality and meteorological monitoring to determine when adverse weather conditions exist. Two types of triggers will be utilised to alert HVO to adverse weather conditions as described below.

PM_{10} Concentration:

- 10 min average >150 µg/m^3 (winds in the arc of mine to monitor)
- 1 hour average >50 µg/m3 for 3 consecutive hours (winds in the arc of mine to monitor)

Wind Speed:

- Wind speed > 8 m/s.

Response to Adverse Weather Conditions:

Triggers alert mine personnel to undertake visual inspection to determine source and severity of dust emissions. Where an inspection identifies unacceptable visible dust emanating from HVO, actions will be taken to alter or cease use of mine equipment.

Dust triggers are currently implemented and active. Wind speed triggers will be developed and implemented to be active by 30 August 2013.

Appendix D – Examples of typical Air Quality control tools

Plate One - Regional dust risk forecast tool

NSW Minerals Council Daily Dust Email Alert

weatherzone

Issued at 8am, 17th December 2013

Muswellbrook LGA Forecast — Next 24hrs (6am-6am) — No Alert Current

Tuesday, 17th December 2013							6am	7am	8am	9am	10am	11am	12pm	1pm	2pm	3pm	4pm	5pm	6pm	7pm	8pm	9pm	10pm	11pm
Wind Speed							1.1m/s	1.3m/s	2.7m/s	2.8m/s	2.8m/s	3.2m/s	3.5m/s	3.8m/s	4.2m/s	4.6m/s	4.6m/s	4.9m/s	5.2m/s	4.1m/s	3.1m/s	4.2m/s	2.8m/s	2.8m/s
Temp							17.3 °C	20.5 °C	22.6 °C	24.3 °C	26.2 °C	27.5 °C	29.2 °C	29.9 °C	30.5 °C	31.0 °C	31.0 °C	30.7 °C	29.1 °C	25.7 °C	23.6 °C	21.9 °C	20.5 °C	18.6 °C
Lapse Rate /100m							0.92 °C	-0.16 °C	-0.4 °C	-0.55 °C	-0.69 °C	-0.78 °C	-0.83 °C	-0.81 °C	-0.73 °C	-0.55 °C	-0.29 °C	0.06 °C	0.52 °C	1.43 °C	1.42 °C	1.33 °C	1.5 °C	1.96 °C
Rainfall							NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Wednesday	12am	1am	2am	3am	4am	5am	6am	7am	8am	9am	10am	11am	12pm	1pm	2pm	3pm	4pm	5pm	6pm	7pm	8pm	9pm	10pm	11pm
Wind Speed	2.0m/s	1.1m/s	0.2m/s	0.8m/s	0.9m/s	0.2m/s	0.9m/s	0.9m/s	2.5m/s	2.8m/s	3.4m/s	4.2m/s	4.8m/s	5.2m/s	5.4m/s	6.4m/s	5.9m/s	5.7m/s	5.7m/s	4.4m/s	3.7m/s	4.3m/s	3.3m/s	2.9m/s
Temp	17.3 °C	16.4 °C	15.2 °C	14.4 °C	14.1 °C	14.0 °C	17.0 °C	21.2 °C	23.5 °C	25.6 °C	28.0 °C	29.3 °C	30.6 °C	31.2 °C	31.6 °C	32.0 °C	31.7 °C	31.4 °C	29.3 °C	26.0 °C	23.6 °C	21.7 °C	20.1 °C	18.2 °C
Lapse Rate /100m	2.46 °C	2.77 °C	3.03 °C	3.17 °C	3.09 °C	2.79 °C	1.48 °C	-0.04 °C	-0.41 °C	-0.56 °C	-0.69 °C	-0.8 °C	-0.84 °C	-0.82 °C	-0.74 °C	-0.57 °C	-0.31 °C	0.03 °C	0.51 °C	1.53 °C	1.76 °C	1.93 °C	2.09 °C	2.34 °C
Rainfall	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Thursday	12am	1am	2am	3am	4am	5am	6am	7am	8am	9am	10am	11am	12pm	1pm	2pm	3pm	4pm	5pm	6pm	7pm	8pm	9pm	10pm	11pm
Wind Speed	2.1m/s	1.6m/s	0.4m/s	1.0m/s	0.9m/s	0.2m/s	0.9m/s	0.8m/s	2.4m/s	2.3m/s	2.5m/s	3.1m/s	3.6m/s	4.0m/s	4.1m/s	4.8m/s	4.2m/s	4.7m/s	4.9m/s	3.6m/s	3.5m/s	4.2m/s	3.2m/s	3.2m/s
Temp	16.8 °C	15.5 °C	14.7 °C	13.6 °C	13.2 °C	13.0 °C	16.1 °C	19.9 °C	22.7 °C	25.1 °C	27.4 °C	29.2 °C	31.2 °C	32.3 °C	33.2 °C	34.0 °C	33.7 °C	33.3 °C	31.3 °C	27.7 °C	24.8 °C	22.5 °C	20.9 °C	19.1 °C
Lapse Rate /100m	2.68 °C	2.97 °C	3.3 °C	3.53 °C	3.05 °C	3.52 °C	2.13 °C	0.34 °C	-0.32 °C	-0.46 °C	-0.6 °C	-0.7 °C	-0.76 °C	-0.75 °C	-0.69 °C	-0.52 °C	-0.25 °C	0.14 °C	0.7 °C	2.16 °C	2.47 °C	2.71 °C	3.01 °C	3.42 °C
Rainfall	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

Singleton LGA Forecast — Next 24hrs (6am-6am) — No Alert Current

Tuesday, 17th December 2013							6am	7am	8am	9am	10am	11am	12pm	1pm	2pm	3pm	4pm	5pm	6pm	7pm	8pm	9pm	10pm	11pm
Wind Speed							1.1m/s	2.2m/s	2.7m/s	3.1m/s	3.3m/s	3.4m/s	3.7m/s	4.1m/s	5.1m/s	5.5m/s	5.6m/s	5.6m/s	5.0m/s	3.3m/s	2.7m/s	3.0m/s	3.0m/s	2.2m/s
Temp							17.0 °C	19.6 °C	21.7 °C	23.0 °C	24.2 °C	24.6 °C	25.6 °C	25.1 °C	26.4 °C	26.5 °C	25.9 °C	25.7 °C	23.9 °C	21.5 °C	19.5 °C	18.6 °C	18.1 °C	16.9 °C
Lapse Rate /100m							-0.19 °C	-0.86 °C	-1.07 °C	-1.21 °C	-1.31 °C	-1.38 °C	-1.42 °C	-1.37 °C	-1.27 °C	-1.15 °C	-0.96 °C	-0.66 °C	-0.28 °C	0.43 °C	0.73 °C	0.91 °C	1.1 °C	1.41 °C
Rainfall							NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Wednesday	12am	1am	2am	3am	4am	5am	6am	7am	8am	9am	10am	11am	12pm	1pm	2pm	3pm	4pm	5pm	6pm	7pm	8pm	9pm	10pm	11pm
Wind Speed	1.6m/s	1.2m/s	1.4m/s	1.0m/s	0.8m/s	0.5m/s	0.6m/s	1.3m/s	2.2m/s	2.7m/s	3.0m/s	3.5m/s	4.1m/s	4.7m/s	5.7m/s	6.2m/s	6.3m/s	5.9m/s	5.1m/s	3.3m/s	2.7m/s	2.8m/s	2.5m/s	2.1m/s
Temp	16.2 °C	16.0 °C	15.9 °C	15.5 °C	15.5 °C	15.4 °C	17.7 °C	20.7 °C	22.9 °C	24.4 °C	25.5 °C	26.5 °C	27.2 °C	27.4 °C	27.4 °C	27.0 °C	26.4 °C	25.7 °C	24.0 °C	21.7 °C	19.5 °C	18.2 °C	17.4 °C	16.8 °C
Lapse Rate /100m	1.71 °C	1.65 °C	1.64 °C	1.64 °C	1.53 °C	1.48 °C	0.12 °C	-0.72 °C	-0.88 °C	-0.99 °C	-1.07 °C	-1.14 °C	-1.17 °C	-1.15 °C	-1.08 °C	-1.03 °C	-0.83 °C	-0.56 °C	-0.16 °C	0.61 °C	0.8 °C	0.92 °C	1.04 °C	0.91 °C
Rainfall	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Thursday	12am	1am	2am	3am	4am	5am	6am	7am	8am	9am	10am	11am	12pm	1pm	2pm	3pm	4pm	5pm	6pm	7pm	8pm	9pm	10pm	11pm
Wind Speed	1.6m/s	1.4m/s	1.5m/s	1.4m/s	0.6m/s	1.0m/s	1.0m/s	1.7m/s	2.2m/s	3.1m/s	3.0m/s	3.3m/s	3.8m/s	4.3m/s	5.2m/s	5.9m/s	5.6m/s	5.9m/s	5.2m/s	3.7m/s	3.2m/s	3.3m/s	3.4m/s	2.9m/s
Temp	15.9 °C	15.5 °C	15.2 °C	14.7 °C	14.5 °C	14.4 °C	16.7 °C	19.4 °C	21.9 °C	23.6 °C	24.9 °C	26.0 °C	26.9 °C	27.7 °C	28.3 °C	28.4 °C	28.1 °C	27.2 °C	25.5 °C	22.8 °C	20.0 °C	18.6 °C	18.0 °C	17.3 °C
Lapse Rate /100m	0.43 °C	0.39 °C	0.35 °C	0.7 °C	1.06 °C	0.71 °C	-0.22 °C	-0.45 °C	-0.63 °C	-0.78 °C	-0.87 °C	-0.94 °C	-1.08 °C	-1.13 °C	-1.06 °C	-0.92 °C	-0.71 °C	-0.43 °C	-0.05 °C	0.64 °C	0.6 °C	0.62 °C	0.79 °C	0.94 °C
Rainfall	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

ACTIONS

- Communicate forecast to relevant staff
- Consider any preparatory actions required for triggers (e.g. ensure water cart availability; reschedule activities)
- Record any preparatory actions taken.

weatherzone

For technical advice regarding this email please contact support@weatherzone.com.au or (02) 9985 9200

Plate Two – Site specific dust / blast plume predictive model

HVO - West Pit S NOx Emissions On Tuesday 17th Of December 2013

- 17th of Dec, 2013
- 16th of Dec, 2013
- 15th of Dec, 2013
- 14th of Dec, 2013
- 13th of Dec, 2013
- 12th of Dec, 2013
- 11th of Dec, 2013
- 10th of Dec, 2013
- 9th of Dec, 2013
- 8th of Dec, 2013
- 7th of Dec, 2013
- 6th of Dec, 2013
- 5th of Dec, 2013
- 4th of Dec, 2013

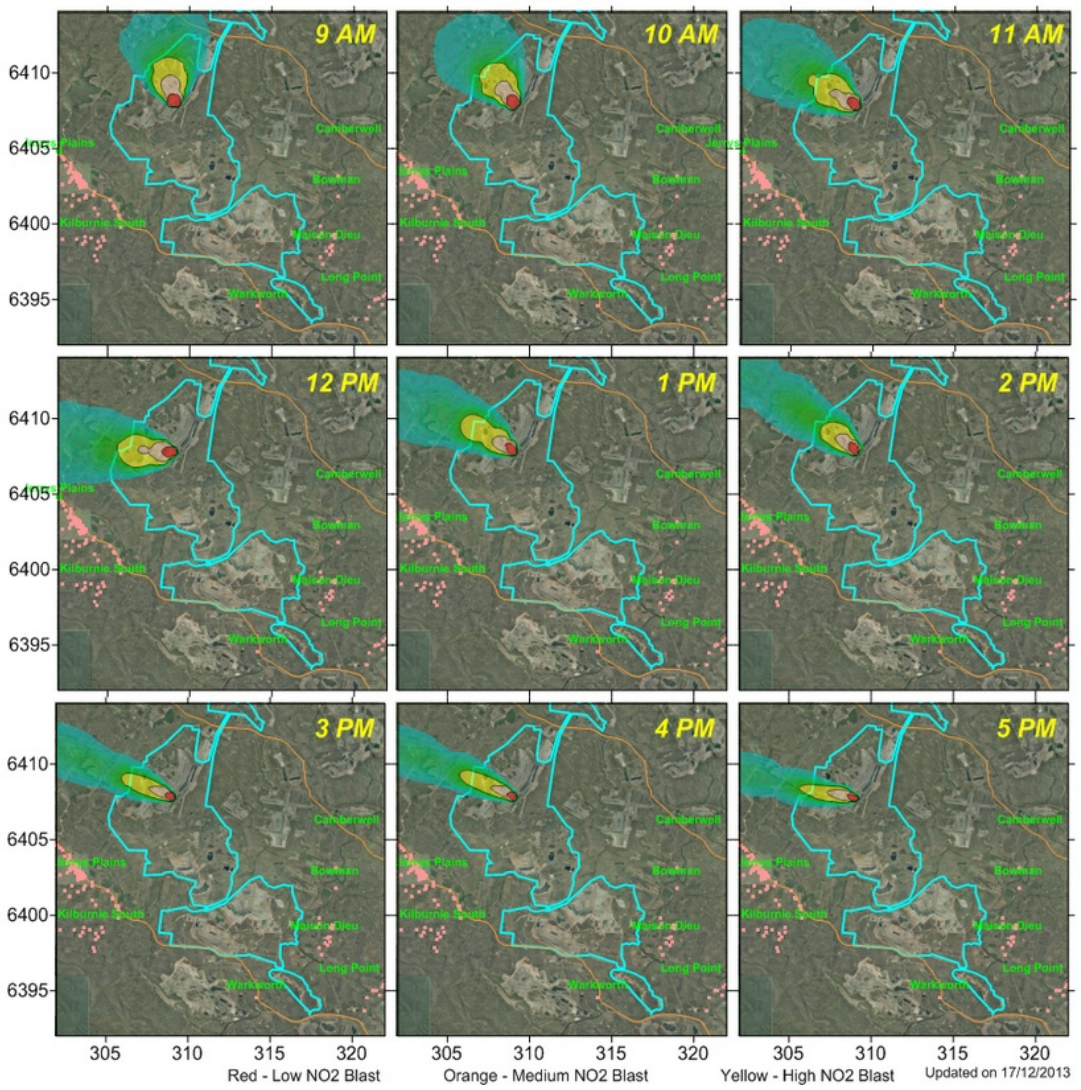
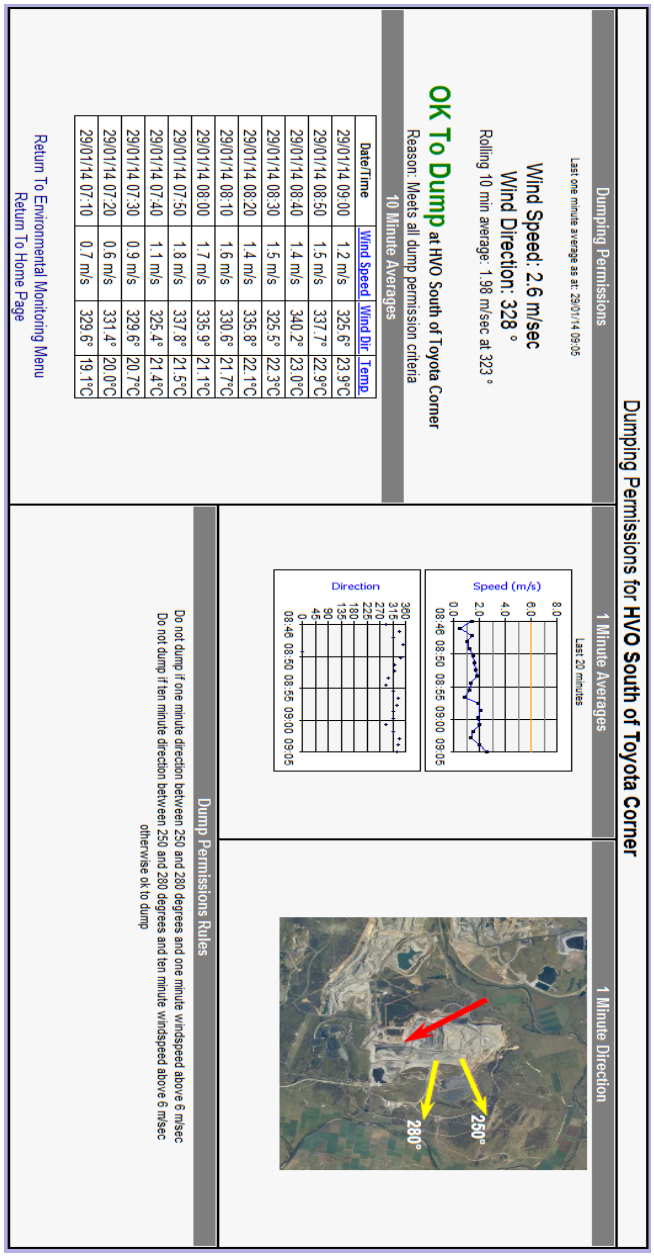


Plate Three – example of a dumping permissions page*



*Note – dumping permissions pages are subject to change, outside of the AQMP review and approval process