

Taroborah Coal Project

Appendix 15a – Additional Air Quality Impact Assessment

MEMORANDUM

To	Dave Thomas
Cc	DThomas@imcmining.com.au
From	Simon Welchman
Job No.	KE1203103
Subject	Taroborah Coal Project – Response to submissions relating to air quality
Date	29 September 2014

Dear Dave,

This memorandum details Katestone's responses to submissions to the EIS for the Taroborah Coal Project relating to air quality.

A summary of the submissions relating to air quality is provided in Table 1. Also included in the table is the section in the attachment that addresses each submission.

Table 1 Submissions to the EIS

Comment Number	Submission Summary	Section addressed in Attachment
Submissions from Government Agencies		
117	Overburden haul is predicted to be the highest impact source and will be highest in Year 6. It is recommended that Year 6 be modelled in addition to Year 5.	Section 1
118, 119	A discussion of the impact of dust deposition on state forest vegetation and woodland was not included in the EIS.	Section 2
120, 121	• Background on the selection of emission factors and certain input parameters was not included in the EIS. • Provide justification for the use of US EPA emission factors for emissions from transfer points with conveyors and wind erosion of exposed areas and stockpiles. • The data source for the moisture content and silt content for both soil and coal were not stated in the EIS.	Section 3
122	Detailed descriptions of model source inputs and justification for the selection of source heights were not included in the EIS.	Section 4
Submissions from Individuals/ Public Entities/ Private Entities		
5, 10	Residents are concerned about coal dust from trains passing through town.	Section 5

If you have any questions please do not hesitate to contact the undersigned.

Yours sincerely,

Simon Welchman

Responses to EIS Submissions

1. SUBMISSION 117 (OVERBURDEN HAUL – YEAR 6)

Overburden haul is predicted to be the highest impact source and will be highest in Year 6. It is recommended that Year 6 be modelled in addition to Year 5.

The emission rates of dust associated with the Taroborah Coal Project were estimated in Section 6 of the technical air quality impact assessment report (Katestone, 2014). Section 6 and the associated appendices describe in detail the methodologies used to calculate emissions and the mine activity data that was used for mining Years 2 and 5.

The emission rates of dust associated with Year 6 have been estimated using the same methodologies as were applied in the technical air quality impact assessment report. Activity data and dust emission rates estimated for Years 5 and 6 are compared below.

The rates of ROM coal, washed coal, total product coal and overburden removal for Year 5 and Year 6 are provided in Table 2.

Table 2 Annual production rates for coal for Year 5 and Year 6.

Coal		**Year 5**	**Year 6**
ROM Coal (t)	Open cut	2,177,615	1,988,289
	Underground	98,460	370,905
	Total	2,276,076,	2,359,194
Coal Washing (t)	Bypassed	1,446,268	1,527,734
	Washed	829,808	831,460
	Rejects	245,728	291,150
Total Product (t)	Open Cut	1,932,892	1,708,827
	Underground	97,456	359,217
	Total	2,030,348	2,068,044
Overburden removal	Total	29,962,033	32,742,873

The emission rates for Year 5 and Year 6 are presented in Table 3.

Table 3 Estimated dust emission rates for the Year 5 and Year 6

Activity	Total dust emission rate (g/s)					
	Year 5			Year 6		
	TSP	PM_{10}	$PM_{2.5}$	TSP	PM_{10}	$PM_{2.5}$
In-Pit Activities including drilling, blasting and truck loading	4.7	2.5	0.4	4.7	2.5	0.4
Haul Roads	79.2	27.9	2.9	86.5	30.5	3.1
Conveyors	1.6	0.4	0.05	1.5	0.4	0.05
CHPP	10.3	1.8	0.2	10.6	1.9	0.2
Wind Erosion of stockpiles	3.4	1.7	0.3	3.4	1.7	0.3
Train loading	2.9	0.5	0.1	3.0	0.5	0.1
Rail line	0.01	0.004	0.001	0.01	0.004	0.001
Total	**102.1**	**34.8**	**3.9**	**109.6**	**37.4**	**4.1**

From the emission rates estimated in Table 3, it can be seen that:

- The overburden tonnage is 9% greater in Year 6 than in Year 5
- The emission rates due to haul roads are estimated to be 9% higher in Year 6 than in Year 5
- Overall project emissions for Year 6 are estimated to be 7 % higher for TSP, 8% higher for PM_{10} and 6% higher for $PM_{2.5}$ than for Year 5

With the change in emission rates from Year 5 to Year 6 and based on the modelling results for Year 5, Katestone has inferred the following for Year 6:

- Concentrations of TSP, PM_{10} and $PM_{2.5}$ as well as dust deposition rate are likely to increase; however, the increase would be not be greater than 9% at any receptor
- The annual average concentrations of TSP would not exceed the objective at any additional receptors
- The 6^{th} high 24-hour average concentrations of PM_{10} would not exceed the objective at any additional receptors
- The maximum 24-hour average concentrations of $PM_{2.5}$ may exceed the objective at one additional receptor in Year 6 compared with Year 5. This receptor is R4, Walther residence. The predicted concentration for Year 5 was predicted to be marginally below the objective of 25 µg/m³ at R4 (24.9 µg/m³). Consequently, the estimated higher dust emission rates for Year 6 would likely result in a predicted exceedance of the objective in Year 6. Predicted PM_{10} concentrations at this receptor were predicted to exceed the objective in Year 5; consequently, the marginally higher prediction at R4 for Year 6 does not alter the outcome of the air quality assessment of the Taroborah Coal Project
- The annual average concentrations of $PM_{2.5}$ would not exceed the objective at any additional receptors
- The maximum monthly and annual average dust deposition rates would not exceed the guidelines at any additional receptors

2. SUBMISSION 118, 119 (DUST DEPOSITION ON STATE FOREST VEGETATION)

A discussion of the impact of dust deposition on state forest vegetation and woodland was not included in the EIS.

There is no statutory limit for the deposition of dust for vegetation protection. EHP provides design guidance for dust deposition for the avoidance of dust nuisance, which is related to human perception. The effect of dusts on vegetation is principally through interception of light by leaves and the consequential effects on the rates of photosynthesis and plant health and growth. However, there are no prescribed assessment criteria for dust loads on vegetation associated with reduced physiological activity.

Fairbairn Forest Reserve is located to the immediate south and east of the Project site and encompasses approximately 10,000 ha of remnant vegetation (Section 4.8 of the Taroborah Coal Project EIS). The EIS did not include a detailed statement of the vegetation species in the Fairbairn Forest Reserve. The EIS did identify several vegetation communities that would extend into the Fairbairn forest. The flora and fauna assessment contained in the EIS details the vegetation of the canopy, scrub and ground layers. The flora type has been identified and the relative dominance of the species. The vegetation communities are:

Community 2 - River Teatree Riparian Woodland

Community 4 - Brigalow Woodland

Community 6 - Silver-leaved Ironbark Open Woodland

Table 4 presents the highest maximum monthly dust deposition rates predicted to occur in Year 2 and Year 5 within the Fairbairn Forest Reserve.

The movement of air and the progressive interception of dust within the vegetation canopy will result in a decrease in concentration and therefore dust deposition rate (Raupach et al., 2011), which is not accounted for in the dispersion modelling. Therefore the modelled dust deposition rates overestimate dust levels beyond the leading edge of the woodland nearest the mine.

Table 4 Highest dust deposition rate predicted within the State Forest

Mine Year	Maximum monthly dust deposition rate ($mg/m^2/day$)	Annual dust deposition rate ($mg/m^2/day$)
Year 2	389	244
Year 5	360	187

A review of literature has found that the most important factor in the assessment of dust effects on vegetation is the dust load on the leaf surface. This is affected by:

- Rate of dust deposition
- Duration of deposition
- Frequency of heavy rain events (e.g. > 100 mm)
- Functional life of the leaf
- Structural features of the plant that may lead to shedding or retention of dust:
  - branching habit of the tree or shrub (erect growth and sparse branching minimise deposition in low winds)
  - foliage density (dense foliage increases particle impaction)
  - leaf orientation (horizontal display maximises dust retention, vertical display minimises retention in a low wind environment)

- stiffness of display of branches and leaves (stiff branches and leaves retain their profile in wind; flexible branches and leaves stream in wind, greatly reducing the surface area presented for deposition)

- Structural features of the leaf that may lead to shedding or retention of dust:
  - smoothness of leaf surface (this may differ between upper and lower surfaces)
  - presence of long, branched or expanded hairs on the leaf surface
  - presence of salt secreting glands on the leaf surface that may increase leaf surface wetness
- Mean particle diameter. The interception of particles is affected by their diameter in relation to the size and density of the leaves (Raupach et al., 2001). Light interception by the dust on plant canopies is also affected by particle diameter (Doley, 2006) and the effects on photosynthesis can be described quantitatively (Doley and Rossato, 2010). It is also important to recognise that the shading effect of dust increases exponentially with decreasing particle diameter.

A detailed study of the potential effects of quarry dust on vegetation communities was prepared by Dr David Doley for Boral's Gold Coast Quarry Project (Doley, D., 2013). The study assessed the potential impact of dust deposition on a *Eucalyptus pilularis* (blackbutt) dominated forest and on an area proposed to be used for ecological offsets. The study considered dust deposition rates of up to 400 mg/m²/day (as a maximum monthly rate), which is similar to the worst-case dust deposition rates predicted for the Taroborah Coal Project and presented in Table 4. The study used conservative assumptions that would likely overestimate the actual impact.

The study of the Gold Coast Quarry found the following:

- The overstorey *Eucalyptus pilularis* would be relatively unaffected by dust deposition at the maximum mean monthly rate
- The understorey layer (small trees and large shrubs) may lose approximately 10% of their dry matter production potential – a reduction that was considered "...not likely to be deleterious for the species within this vegetation layer."
- A greater effect on ground species was predicted, with a possible loss of about one quarter of dry matter production potential in the proposed offset area (*Imperata cylindrica*-dominated cover). Within the *Eucalyptus pilularis* forest, a reduction of dry matter production potential of 50% was estimated, which could be detrimental for small ground cover species with horizontally displayed leaves.

In Communities 2, 4 and 6, it would appear that ground species are dominated by grasses similar to the offsets areas in the Gold Coast Quarry Study. Consequently, the Gold Coast Quarry study would suggest that dust deposition is unlikely to cause a significant impact on the Fairbairn Forest Reserve.

The Gold Coast Quarry study recommended planting a windbreak of *Casuarina* species at the edge of a nearby area of native vegetation to reduce the concentration of dust in air moving laterally into the native vegetation.

3. SUBMISSION 120, 121 (SELECTION OF EMISSION FACTORS)

- ***Background on the selection of emission factors and certain input parameters was not included in the EIS.***
- ***Provide justification for the use of US EPA emission factors for emissions from conveyors and wind erosion.***
- ***The data source for the moisture content and silt content for both soil and coal were not stated in the EIS.***

3.1 Activity data for Year 6

Activity data used in the assessment of Year 2 and Year 5 was included in Appendix B of the Air Quality Impact Assessment for the Taroborah Coal Project. Appendix B has been attached to this memorandum. The activity data for Year 6 is provided in Table 5.

Table 5 Activity data

Activity	Units	Year 6 (2023)
Operation		
Days of operation	days	365
Hours of operation (excluding blasting)	hours/day	24
Hours of operation (blasting)	hours/day	12 (daytime only)
Total hours (bulldozing(	hours/day	60
Area per blast	m^2	4,500
Number of blasts	blast/year	174
Holes drilled/year	#	13,563
Meteorology		
Number of rain days above 0.25 mm	#	52
% of time wind speed > 5.4 m/s at 10m	%	20
Average wind speed at 10m	m/s	3.9
Wind speed corrected for conveyors	m/s	0.057
Rail Line		
Trains per day	#	1.12
Wagons per train	#	90
Length of wagon	m	16
Width of wagon	m	3
Residence time on loop	mins	90
Residence time on straight section of track	mins	15
Material Characteristics		
Overburden density	t/bcm	2.30
Overburden waste swell factor	%	125
Overburden fraction of waste	%	87
Rejects swell factor	%	120
Silt content (ROM/Product Coal)	%	8.6
Silt content (Overburden)	%	6.9
Silt content (haul roads)	%	8.4
Moisture content (ROM Coal)	%	12
Moisture content (Product Coal)	%	15

Activity	Units	Year 6 (2023)
Moisture content (Overburden)	%	7.9
Coal		
ROM Coal	Mtpa	2.36
Open-cut (West Pit)		1.99
Underground		0.371
Product Coal	Mtpa	2.07
Open-cut (West Pit)		1.71
Underground		0.359
ROM Coal Bypassed		1.53
ROM Coal to Wash Plant		0.83
Rejects from CHPP		0.29
Overburden		
Total waste	m^3	32,742,873
Total overburden	bcm	26,054,546
Overburden waste dumped to:		
Overburden in-pit West Pit	loose m^3	28,327,798
Ex-pit Southwest		-
Ex-pit Northwest		-
Interburden waste dumped to:		
In-pit West Pit	loose m^3	4,240,385
Rejects waste dumped to:		
In-pit West Pit	loose m^3	174,690
Ex-pit Northwest		-
Vehicle and Equipment		
Haul truck (overburden)		Cat 789
Number of trucks	#	14
Capacity	t	190
Actual truck load		179.7
Empty operating weight		140.9
Haul truck (Product / Rejects)		Cat 777
Number of trucks	#	3
Capacity	t	90
Actual truck load		88.27
Empty operating weight		74.3
Graders		
Number of graders	#	3
Average speed	km/hr	12.0
Operating hours per grader	hrs/year	4289
Total distance travelled	VKT	168,303

Activity	Units	Year 6 (2023)
Areas		
Active waste stockpile areas		
Ex-pit southeast	m²	-
Ex-pit Northwest		-
Inactive waste stockpile areas		
Ex-pit southeast	m²	367,634
Ex-pit southwest		167,963
Ex-pit Northwest		292.804
Stockpiles		
ROM	m²	3769
UG ROM		7121
CHPP Feed		1523
Product		9632
Topsoil		
Dump 1	m²	39,258
Dump 2		33,012
Dump 3		63,268
Dump 4		34,628
Screen dump area	m²	146,142
Conveyor Lengths		
OC ROM stockpile to CHPP	m	150
secondary sizer to the CHPP bypass/CHPP feed split		138
ROM stockpile (bypassing CHPP) to Product stockpile		306
feeds the CHPP		281
CHPP to Product stockpile		288
Conveyor to rejects bin length		131
Product Stockpile to Train Loadout		181
VKT		
Western Pit – inpit dump of overburden	km	641,446
Western Pit – inpit dump of interburden		27,265
Western Pit – expit waste dump		-
Western Pit to ROM stockpile (ROM)		
Inpit		24,378
Out of pit		94,385
OC ROM stockpile/rejects bin to ex-pit rejects dump	km	-
Ex-pit rejects dump to Mining Cell W1 (one way trip for empty trucks)	km	-
OC ROM stockpile to rejects bin (one way trip for empty trucks)	km	8,793

3.2 Emission factors

The emission factors used in this assessment were provided in Appendix B of the Air Quality Impact Assessment for the Taroborah Coal Project. Appendix B has been attached to this memorandum.

The NPI emission factor for wind erosion from exposed areas has been used for all active stockpiles and other active exposed areas, which is consistent with the NPI recommendations. The AP-42 emission factor has been used to quantify emissions from exposed inactive areas. The NPI wind erosion factor will overestimate dust emissions from inactive areas.

Emissions associated with material transfers to conveyors have been estimated using the AP-42 emission factor because this factor is considered to be the most representative in the circumstances. In this instance, the AP-42 emission factor provides a higher estimate of dust emissions than would be obtained using the equivalent NPI emission factor. However, dust emissions from material transfers are a relatively small component of overall emissions and, hence, the adoption of an alternative factor would not change the outcomes of the assessment.

3.3 Moisture and silt contents

The moisture and silt content for both soil and coal have been summarised in Table 6. The source of the value selected for use in the assessment has been referenced in the table. In summary, project specific data was used where it was available. In the absence of project specific data, the mid point of the range of applicability of the emission factor equations was used.

Table 6 Moisture and silt contents used in the assessment

Material	Silt content (%)	Moisture content (%)
ROM coal	8.6[1]	12[2]
Product	8.6[1]	15[2]
Overburden	6.9[1]	7.9[1]

Table note:

[1] AP-42 Emission factors for Western Surface Coal Mining Chapter 11.9 Table 11.9-3

[2] Pre-feasibility study for the Taroborah Coal Project

4. SUBMISSION 122 (MODEL SOURCE INPUTS)

Detailed descriptions of model source inputs and justification for the selection of source heights were not included in the EIS.

Dispersion modelling was conducted using the model CALPUFF. The sources were represented as a combination of area and volume sources, with a total of 181 area sources and nine volume sources modelled for Year 2 and a total of 147 area sources and 12 volume sources modelled in Year 5.

The source parameters for the modelling of Year 2 are provided in Table 7 and Table 8 for the area and volume sources, respectively. The source parameters for the modelling of Year 5 are provided Table 9 and Table 10 for the area and volume sources, respectively.

An area source is defined by an effective release height (above ground level), an initial vertical spread and a release area. A volume source is defined by an effective release height (above ground level), an initial vertical spread and an initial horizontal spread.

The effective height of an area or volume source is the height at which emissions are likely to occur above ground level. The effective height will dependant on the mining operations, pit depth and type of equipment. The effective heights have been selected by source type considering the following:

- The height of the waste dumps

- The depth of the pits
- The size of the haul trucks
- The height of the coal wagons
- The height of the conveyors
- The height of the CHPP

The vertical spread of an area or volume source has been determined as one-quarter of the height of the emission source in accordance with modeling guidelines (e.g. National Institute of Water and Atmospheric Research, 2004 and Vic EPA, 2000).

The horizontal spread of a volume source has been determined as one-half of the height of the emission source in accordance with modelling guidelines (e.g. the ISC user manual (US EPA, 2004)).

Table 7 Year 2 model configuration parameters for area sources

Description	Number of Sources	Effective Height	Vertical Spread (σ_z)	Area Modelled
		m	*m*	*m^2*
ExPit Waste Dump Northwest	2	8	2.0	292803.8
ExPit Waste Dump Southeast	3	8	2.0	371718.1
ExPit Waste Dump Southwest - Inactive	3	8	2.0	167962.7
Overburden Haul road A	5	11	2.8	26252.4
Overburden Haul road B	15	11	2.8	95034.1
Open-Cut Pit	4	8	2.0	307156.6
Open-Cut Pit - Duplicate for blasting emissions	4	8	2.0	307156.6
InPit Dump West - Active	4	8	2.0	285768.6
InPit Dump - Inactive	4	2	0.5	281532.4
Rail - straight section	38	6	1.5	275372.9
Rail loop	31	6	1.5	69739.8
Rejects haul road from CHPP	14	11	2.8	74255.8
ROM Haul road A	8	11	2.8	47395.5
ROM Haul road B	15	11	2.8	96648.6
Screen Dump	13	8	2.0	154132.7
ROM stockpile	1	8	2.0	3769.4
Topsoil stockpile	5	8	2.0	170316.5
CHPP feed stockpile	1	8	2.0	1420.2
Product stockpile	1	8	2.0	9632.1
Trainloading conveyor	1	10	2.5	5424.9
CHPP bypass conveyor	2	10	2.5	9169.4
CHPP feed conveyor	2	10	2.5	8422.4
Conveyor from CHPP to product stockpile	2	10	2.5	6615.2
Conveyor from open cut ROM SP to secondary sizer	1	10	2.5	4494.0
Conveyor from secondary sizer	1	10	2.5	4139.5
Conveyor from CHPP to rejects SP	1	10	2.5	3922.9

Table 8 Year 2 model configuration parameters for volume sources

Description	Coordinates		Elev (m)	Release ht (m)	Initial σ_y	Initial σ_z
	Easting	Northing				
Open cut mine ROM stockpile (transfer)	594036	7395520	221.5	10	5.00	2.50
Secondary sizing plant	594036	7395368	220.7	10	5.00	2.50
Transfer between conveyor from sizing plant and CHPP feed or bypass conveyors	593899	7395368	221.6	10	5.00	2.50
Transfer to and from CHPP feed stockpile	593899	7395513	222.4	10	5.00	2.50
Transfer on product conveyor from CHPP to product stockpile	593731	7395418	223.4	10	5.00	2.50
Transfer to and from product stockpile	593599	7395459	224.8	10	5.00	2.50
Coal handling and processing plant	593739	7395526	223.9	30	15.00	7.50
Drop into reject bin	593786	7395666	224.3	10	5.00	2.50
Train loading	593622	7395706	226.1	10	5.00	2.50

Table 9 Year 5 model configuration parameters for area sources

Description	Number of Sources	Effective Height	Vertical Spread (Sigma-Z)	Area Modelled
		m	*m*	*m²*
ExPit Waster Dump Southeast	3	8	2.0	371718.1
ExPit Waste Dump Northwest	2	8	2.0	292803.8
ExPit Waste Dump Southwest - Inactive	3	8	2.0	167962.7
Open-Cut Pit	2	8	2.0	285521.4
InPit Dump - Inactive	4	2	0.5	575150.0
InPit Dump - Active	2	8	2.0	156605.0
Open-Cut Pit - Duplicate for blasting emissions	2	8	2.0	285429.2
Rehabbed in-pit dump	2	2	0.5	550673.1
ROM Haul road B	18	11	2.8	104484.1
Rejects haul road from CHPP	1	11	2.8	7973.7
Rail loop	31	6	1.5	69739.8
Rail - straight section	38	6	1.5	275372.9
Screen Dump	13	8	2.0	154132.7
ROM stockpile	1	8	2.0	3769.4
Underground ROM stockpile	1	8	2.0	7120.9
Product stockpile	1	8	2.0	9632.1
Topsoil stockpile	5	8	2.0	170316.5
CHPP feed stockpile	1	8	2.0	1420.2
Conveyor from open cut ROM SP to secondary sizer	1	10	2.5	4494.0
Conveyor from secondary sizer	1	10	2.5	4139.5
Conveyor from CHPP to rejects SP	1	10	2.5	3922.9
CHPP feed conveyor	2	10	2.5	8422.4
CHPP bypass conveyor	2	10	2.5	9169.4
Trainloading conveyor	1	10	2.5	5424.9
Conveyor from CHPP to product stockpile	2	10	2.5	6615.2

Description	Number of Sources	Effective Height	Vertical Spread (Sigma-Z)	Area Modelled
		m	*m*	*m^2*
Conveyor from ROM from underground	7	10	2.5	54542.2

Table 10 Year 5 model configuration parameters for volume sources

Description	Coordinates		Elev (m)	Release ht (m)	Initial σ_y	Initial σ_z
	Easting	Northing				
Open cut mine ROM stockpile (transfer)	594036	7395520	221.5	10	5.0	2.5
Secondary sizing plant	594036	7395368	220.7	10	5.0	2.5
Transfer between conveyor from sizing plant and CHPP feed or bypass conveyors	593899	7395368	221.6	10	5.0	2.5
Transfer to and from CHPP feed stockpile	593899	7395513	222.4	10	5.0	2.5
Transfer on product conveyor from CHPP to product stockpile	593731	7395418	223.4	10	5.0	2.5
Transfer to and from product stockpile	593555	7395482	225.4	10	5.0	2.5
Coal handling and processing plant	593739	7395526	223.9	30	15.0	7.5
Drop into reject bin	593786	7395666	224.3	10	5.0	2.5
Train loading	593622	7395706	226.1	10	5.0	2.5
Transfer of underground ROM at portal	595137	7395833	226.1	10	5.0	2.5
Conveyor transfer for underground ROM	594983	7395055	224.3	10	5.0	2.5
Underground mine ROM stockpile (transfer)	594786	7395195	223.5	10	5.0	2.5

5. SUBMISSION 5, 10 (COAL DUST FROM TRAINS)

Residents are concerned about coal dust from trains passing through town.

The Taroborah Coal Project will mitigate potential dust emissions from coal wagons by profiling wagon loads and applying a treatment to the coal surface (veneering) that ensures that wind erosion of coal dust is minimised. These features have been demonstrated to be effective in minimising emissions of coal dust from rail wagons and will ensure that there are no adverse impacts on residents.

A recent review of dust from coal trains in Queensland presented in a report to the Senate Standing Committee on Community Affairs Inquiry: “The Impacts on health of air quality in Australia (Katestone, 2013) found the following in relation to likely dust levels from trains and dust management measures:

- *A review of studies that have conducted air quality monitoring in the corridor and around rail systems has shown that whilst coal dust and the influence of coal trains on dust levels has been detected, the levels of coal dust were found to be well below the air quality objectives for the protection of human health and amenity impacts. The studies showed that outside of the rail corridor, defined as approximately 10 metres from the tracks, coal dust concentrations were much lower than within the corridor and were below air quality objectives for the protection of human health and amenity.*
- *One of the main actions to date is the implementation of veneering stations at loadout facilities of central Queensland coal mines. Application of a veneer to the coal surface of a loaded wagon ensures coal dust lift-off is reduced. The degree of reduction will depend on a range of conditions, but wind tunnel studies suggest that a reduction in coal dust lift-off of better than 85% is achievable.*

6. REFERENCES

Victoria Environmental Protection Agency, 2000. Auplume Gaussian Plume Dispersion Model Technical User guide

U. S. Environmental Protection Agency, 1995. User's Guide for the Industrial Source Complex (ISC3) Dispersion Models

National Institute of Water and Atmospheric Research, 2004. Good Practise Guide for Air Dispersion Modeling