Appendices

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Appendix 1

Request for Development Consent Modification

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Application to modify a development consent

NSW GOVERNMENT
Department of Planning

Date duly made:____/____/____ DA modification no:_____

1. Before you lodge

You can use this form to apply to modify a development consent given by the Minister of Planning. If the changes you propose mean the development will not be substantially the same as that originally approved, please do not use this form. You will need to submit a new development application.

Disclosure statement

Persons lodging applications are required to declare reportable political donations (including donations of or more than $1,000) made in the previous two years.

For more details, including a disclosure form, go to **www.planning.nsw.gov.au/donations**

Lodgement

To minimise delay in receiving a decision about your application, please ensure you submit all relevant information to us. When your application has been assessed, you will receive a notice of determination.

To complete this form, please place a cross in the boxes ☐ and fill out the white sections as appropriate.

2. Details of the applicant

NAME

Mr ☐ Ms ☐ Mrs ☐ Dr ☐ Other COMPANY

First name | Family name

Company/organisation: Werris Creek Coal Pty Limited

ABN: 69 107 169 103

STREET ADDRESS

Unit/street no. | Street name: Werris Creek - Quirindi Road

Suburb or town: Werris Creek | State: NSW | Postcode: 2341

POSTAL ADDRESS (or mark 'as above')

PO Box 125

Suburb or town: Werris Creek | State: NSW | Postcode: 2341

CONTACT DETAILS

Daytime telephone: 02 6742 4377 | Fax: 02 6742 3607 | Mobile: 0427 424 337

Email: bcullen@whitehaven.net.au

2. Identify the land

Unit/street no. (or lot no. for Kosciuszko ski resorts)
ML 1563

Street or property name
"Narrawolga", "Eurunderee" & "Cintra"

Suburb, town or locality
Werris Creek

Postcode
2341

Local government area
Liverpool Plains

Lot/DP or Lot/Section/DP or Lot/Strata no.
Please ensure that you put a slash (/) between lot, section, DP and strata numbers. If you have more than one piece of land, you will need to separate them with a comma eg 123/579, 162/2.
MINING LEASE 1563-see Land Titles below

(1) Note: You can find the lot, section, DP or strata number on a map of the land or on the title documents for the land, if title was provided after 30 October 1983. If you have documents older than this, you will need to contact Department of Lands for updated details.

(2) Note: If the subject land is located within the Kosciuszko ski resorts area, DP and strata numbers do not apply.

4. Details of the original development consent

Describe what the original consent allows
Development and operation of an open cut coal mine (~80ha), coal crushing and screening facilities and rail load-out facility, producing up to 2 million tonnes of coal annually (average of 1.6 million tonnes).
Up to 50 000t of the coal is approved for transportation by road with the majority to be loaded to trains and transported by rail to Port Newcastle.
The final landform is to be rehabilitated to accommodate both continued agriculture and native vegetation conservation.
The mine is approved conditional to the implementation of a Biodivesity Offset Strategy.

What is the development application no.?
DA 172-7-2004

What is the date of consent?
18 February 2005

What was the original estimated cost of development (including GST)?
$10 000 000

Land Titles
Lots 19, 73-75, 93, 94, 109, 110, 112, 120, 121, 123, 129, 130, 133, 135,
Lot 1/186633, Lots 1-4/1022826, Lots 1-4/1037145, Lot 2/431951
Part Lots 83, 126-128, 217, 225, 131, 132/751017, Part Lot 271/257307

5. Describe the modification you propose to make

Please indicate the type of modification you propose to make by placing a cross in the appropriate box ☐ below.

You need to submit with your application form a full description of the expected impacts of the modifications proposed, including relevant plans, drawings and compliance with relevant controls.

☐ A modification to correct a minor error, misdescription or miscalculation

Describe the error, misdescription or miscalculation
(Refer to section 96(1) of the *Environmental Planning and Assessment 1979* (EP&A) Act)

☐ A modification that will have minimal environmental impact

Describe the modification and its expected impact
(Refer to section 96(1A) of the EP&A Act)

☒ Any other modification

Describe the modification and its expected impact
(Refer to section 96(2) of the EP&A Act)

The proposed modifications comprise the following.

(i) Widening the advancing northern highwall of the open cut area (increasing the area of the open cut by 14ha) involving open cut mining through the underground workings of the former Werris Creek Colliery.

(ii) Dewatering the underground workings with the extracted groundwater to be stored in up to four dams to the southwest of the open cut area (over an area of 13ha).

(iii) Extending the out-of-pit overburden emplacement (by 11ha) to the north along the eastern perimeter of the open cut area.

(iv) Constructing an additional train loading bin at the rail load-out facility to facilitate the separation of product coal for specific markets and therefore increase the efficiency of train loading.

Will the modified development be substantially the same as the development that was originally approved?

No ☐ ➢ Please submit a new development application.

Yes ☒ ➢ Please provide evidence that the development will remain substantially the same. (If you need to attach additional pages, please list below the material attached).

No increase in production is proposed.
No additional activities would be undertaken.
No extension to mine life would occur as a result of the proposed modification.
The proposed modification would not result in any substantial change to environmental impacts associated with the mine.

If your proposal is within Kosciuszko ski resorts area, please attach a copy of the Interim Lease Variation Approval received from the Department of Environment and Climate Change to your application.

6. Number of jobs to be created

Please indicate the number of jobs this will create. This should be expressed as a proportion of full time jobs over a full year. (e.g. a person employed full-time for 6 months would equal 0.5 of a full-time equivalent job; six contractors working on and off over 2 weeks equate to 2 people working full-time for 2 weeks, which equals approximately 0.08 of an FTE job.)

Construction jobs (full-time equivalent)	(4 x 3/12) = 1
Operation jobs (full-time equivalent)	0

7. Application fee

For development that involves a building or other work, the fee for your application is based on the estimated cost of the development.

Clause 258 of the Environmental Planning and Assessment Regulation 2000 and the table attached to that clause set out how to calculate the fee for an application for modification of a consent.

If your development needs to be advertised to the public you may also need to include an advertising fee. Clause 258 of the regulations includes details on these fees.

Note: Advertising fees attract GST, all other fees do not. Contact us if you need help to calculate the fee for your application.

Estimated cost of the development	Total fees lodged
N/A	$2 000 (as per asess_fees_update v1.pdf)

8. Political donation disclosure statement

Persons lodging applications are required to declare reportable political donations (including donations of or more than $1,000) made in the previous two years. Disclosure statements are to be submitted with your application or request.

Have you attached a disclosure statement to this application?

Yes ☒
No ☐

Note: For more details about political donation disclosure requirements, including a disclosure form, go to www.planning.nsw.gov.au/donations.

9. Signatures

The owner(s)* of the land being developed must sign the application.

If you are not the owner of the land, you must ask the owner(s) of the land to sign the application.
If the land is Crown land, an officer of the Department of Planning must sign the application.

As the owner(s)* of the above property, I/we consent to this application:

Signature

Name

Managing Director , ANTHONY JAMES HAGGARTY

Date

06.04.09

Signature

Name

Director ANDREW HENDERSON PLUMMER

Date

06.04.09

* Note For applications within the Kosciuszko ski resorts area, the approval of the lessee rather than owner is required.

The applicant, or the applicant's agent, must sign the application.

Signature

Name, if you are not the applicant

In what capacity are you signing if you are not the applicant?

Date 6/4/2009.

10. Privacy policy

The information you provide in this application will enable us, and any relevant state agency, to assess your application under the *Environmental Planning and Assessment Act 1979* and other applicable state legislation. If the information is not provided, your application may not be accepted. If your application is for designated development or advertised development, it will be available for public inspection and copying during a submission period. Written notification of the application will also be provided to the neighbourhood. You have the right to access and have corrected information provided in your application. Please ensure that the information is accurate and advise us of any changes.

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Appendix 2

Site Water Balance

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1 INTRODUCTION

This site water balance has been prepared in compliance with *Condition 3(31)* of DA-172-7-2004 to account for the additional disturbance associated with the proposed modification to the mining area of the Werris Creek Coal Mine.

This water balance is based on the same methodology used for the water balance within the 2009 Site Water Management Plan prepared for the approved Werris Creek Coal Mine (GSS, in press) and considers water management for dry, average and wet years (10^{th}, 50^{th} and 90^{th} percentile rainfall years) on an annual basis. The water balance provides an indicative assessment of water management on the site which will be refined and enhanced as the development progresses. The balance will be updated each year in the AEMR.

This water balance has been based on the construction and management of the surface water management system included in Section 4.1.4 of SoEE and as the management of water on the mine site is considered based on the water type, ie. clean, dirty and void water, the results of the water balance are presented below as three separate water balances. The only relationship between the three water balances is that the water used for dust suppression (and other uses) can be selectively taken from any of the water streams. The selection of water source is based on the following preferential use of water: void, dirty, clean.

2 WATER INPUTS

2.1 Rainfall Runoff

Rainfall runoff from the void area has been determined using the following Bureau of Meteorology (BOM) annual rainfall statistics measured at the Quirindi post office station (11km south of the mine site).

- Annual 10th percentile (dry year): 463.2 mm
- Annual 50th percentile (average year): 683.7 mm
- Annual 90th percentile (wet year): 917.2 mm

The runoff coefficients referred to below are annual volumetric runoff coefficients, which have been assumed based on:

- site characteristics and anecdotal observations provided by site personnel; and
- generic coefficient values provided by the guideline document "*Managing Urban Stormwater: Soils and Construction, Vol.1 4th eds*.", prepared by Landcom (2004) and referred to hereafter as the Blue Book.

The rainfall runoff from catchments from each of the three water streams is addressed separately below.

Void Catchment

The areas making up the Void water catchment are as follows.

- Active Mining Area. This area, which generally covers an area of approximately 30ha, comprises 60% bare/compacted areas with high runoff (runoff coefficient of 0.5), and 40% loose spoil areas with low runoff potential (runoff coefficient of 0.1).
- Active Overburden Emplacement. The area of the overburden emplacement which diverts water into the open cut void. This area generally covers an area of 35ha and is assumed to be all loose spoil areas with low runoff (runoff coefficient of 0.1)

Dirty Catchment

The areas making up the dirty water catchment of the Mine Site area as follows.

- Northern Area (Rail Load-out Facility). This area of approximately 6.5ha is predominantly of bare/hard compacted areas with high runoff (runoff coefficient of 0.6);
- Middle Area (Rail Load-out Road and Magazine Area). This area of approximately 94ha has some areas of bare/compacted areas with high runoff (runoff coefficient of 0.6), however, the majority of this catchment is relatively undisturbed and assumed to have fairly natural characteristics (runoff coefficient of 0.2); and
- Southern Area (offices, workshops, coal processing operations, overburden emplacements and areas undergoing rehabilitation). This area, which has been increased to 145ha as a result of the proposed modification has a mixture of bare/compacted areas with high runoff potential (runoff coefficient of 0.6), areas of loose unshaped overburden (runoff coefficient of 0.1), areas of shaped overburden and early rehabilitation (runoff coefficient of 0.3 to 0.4), and well vegetated natural and rehabilitated areas assumed to have fairly natural characteristics (runoff coefficient of 0.2).

Clean Catchment

The area making up the Clean water catchment is the large off-site area to the east of the mine. Clean water catchment on the mine site covers an area of approximately 455ha and is assumed to have fairly natural characteristics (runoff coefficient of 0.2).

2.2 Groundwater inflow

Groundwater modelling has estimated that in-flow to the open cut would be at its greatest prior to the dewatering of the underground workings and approximate 580m^3/day (212ML/year). This rate would decrease following the removal of the groundwater from the underground workings to 215m^3/day (79ML/year).

2.3 Groundwater Extraction form Bores

Werris Creek Coal Pty Limited has access to a licensed groundwater extraction bore to enable groundwater to be supplied for various mine purposes as required. The amount of groundwater available is however limited to a 50ML extraction limit. For this reason, water would not generally be sourced from groundwater extraction bores unless the other water sources on site were unavailable. Any use of groundwater from the licensed bore is regularly monitored to validate usage against extraction limits.

3 WATER OUTPUTS

3.1 Evaporation

There will be evaporation losses from the water storages containing the clean, dirty and void water. The assumptions used in calculating evaporative losses are as follows.

- Annual evaporation is estimated to be 1 971mm/yr.
- The average annual evaporation loss has been multiplied by a factor of 0.7, to account for the fact that the ponds are not always full and that BOM data is pan evaporation.
- The estimated surface area of the clean water storages is 2.4ha, dirty water storages 3.7ha, void water dams is 2.4ha and the surface area of the open cut void (below the groundwater table level) is 5ha.

3.2 Dust Suppression and Crushing/Screening Operations

Based on water usage records provided in AEMR's for the mine site, 130ML has been assumed to be the average annual usage of water for Werris Creek, and has been varied by ±10% to account for assumed increases and decreases in water use for dry and wet years, ie. 143 ML dry year and 117 ML wet year.

Further water usage data will be recorded in 2009 and will be incorporated into the water balance update as required as part of the Annual Environmental Management Report.

For the purposes of the water balances, this water will be taken preferentially from the void water, then dirty water and if necessary clean water.

4 WATER BALANCE

4.1 Void Water

The void water balance is provided for dry, average and wet years (10th, 50th and 90th percentile rainfall years) and is presented in the **Table 1**.

Table 1
Void Water Balance

		Avg Yr (ML)		Dry Yr (ML)		Wet Yr (ML)	
		Yr 1*	Yr 3*	Yr 1*	Yr 3*	Yr 1*	Yr 3*
Inputs	Rainfall Runoff	109		74		146	
	Groundwater Inflow	212	79	212	79	212	79
	Total	*321*	*188*	*286*	*153*	*358*	*225*
Outputs	Evaporation (from dams)	33		33		33	
	Evaporation (from open cut)	138		138		138	
	Dust Suppression and Crushing/Screening Operations	128		93		117	
	Total	*299*		*264*		*288*	
	Balance	**+22**	**-111**	**+22**	**-111**	**+70**	**-63**
Note *: Refers to year of operation used for calculating groundwater in-flow							

The void water balance shows that prior to the underground workings being dewatered, there would be an excess of void water of 22ML during a dry or average year and 70ML during a wet year. There is a combined void water storage capacity of 55 ML (VWD1 – 20ML and VWD2 – 35ML) on the mine site providing ample capacity for dry or average rainfall years. Should the first year of the modified operations coincide with a wet year, there may be an excess of void water which may need to be stored within one of the Underground Water Storage Dams to be constructed on the mine site. These Underground Water Storage Dams provide capacity for 350ML of water, which is in excess of the 300ML of water considered to be present within the underground workings. This occurrence is considered unlikely, however, as the groundwater inflow assumes the underground workings remain saturated for the duration of the first year operation. In fact these would be progressively dewatered over the course of the first years operation with the actual daily inflow more likely to approximate 215m^3/day towards the end of the year rather than the higher 580m^3/day on which the annual inflow prediction has been based.

In the unlikely event that void water accumulated beyond the capacity of the mine to use or store void water, it will accumulate in the void.

4.2 Dirty Water

The Dirty water balance is provided for dry, average and wet years (10th, 50th and 90th percentile rainfall years) and is presented in the **Table 2**.

Table 2
Dirty Water Balance

		Avg Yr (ML)	Dry Yr (ML)	Wet Yr (ML)
Inputs	Rainfall Runoff	403	277	541
	Total	*403*	*277*	*541*
Outputs	Evaporation	48	48	48
	Dust Suppression and Crushing/Screening Operations	111*	111*	63*
	Total	*159*	*159*	*111*
	Balance	**+292**	**+166**	**+430**
Note*: The majority of the Dust Suppression and Crushing/Screening Operations requirements are sourced from the void water system (see Table 1).				

The Dirty water balance shows that for all years there would be an excess of dirty water. This water will initially be pumped from sediment basins to the mine site water cart (where access to the structures is available) from which the water will be used for dust suppression. In the event dirty water sites cannot be accessed and used for dust suppression, then water will be treated within the detention basins and discharged through the licensed DECC discharge points, within the requirements of EPL 12290.

4.3 Clean Water Balance

The Clean water balance is provided for dry, average and wet years (10th, 50th and 90th percentile rainfall years) and is presented in the **Table 3**.

Table 3
Clean Water Balance

		Avg Yr (ML)	Dry Yr (ML)	Wet Yr (ML)
Inputs	Rainfall Runoff	608	422	816
	Total	*608*	*422*	*816*
Outputs	Evaporation	33	33	33
	Dust Suppression and Crushing/Screening Operations	0 *	0 *	0 *
	Total	*33*	*33*	*33*
	Balance	**+575**	**+389**	**+783**

Note:* The Dust Suppression and Crushing/Screening Operations requirements are sourced from the Void and Dirty water system. A maximum of 52.62ML can be sourced from the Clean water, in accordance with the calculated Maximum Harvestable Right.

The Clean water balance shows that for all rainfall years there is an excess of clean water. This water would be discharged from the mine site and as this water does not interact with disturbed surfaces of the mining operation, there is no requirement to further capture and/or treat this water prior to it discharging off site.

4.4 Summary

A summary of the excess/deficit for each of the water streams is presented in the **Table 4**.

Table 4
Total Mine Site Water Balance

	Avg Yr (ML)		Dry Yr (ML)		Wet Yr (ML)	
	Yr 1*	**Yr 3***	**Yr 1***	**Yr 3***	**Yr 1***	**Yr 3***
Void Water Balance	+22	0	+22	0	+70	0
Dirty Water Balance	+355	+292	+229	+166	+493	+430
Clean Water Balance	+575		+389		+783	
Total Mine Water Balance	**+952**	**+930**	**+640**	**+618**	**+1346**	**+1276**

Note *: Refers to year of operation used for calculating groundwater in-flow

The total mine site water balance demonstrates the following.

- With combined void water dam capacity of at least 55ML, it is likely that sufficient capacity is present to store void water during all but the wettest years. Additional capacity is present on the mine site in the form of the Underground

Water Storage Dams should greater than 55ML of void water require dewatering from the open cut void.

- There is a large excess of dirty water, which is predominantly used for dust suppression or treated and discharged off-site in accordance with the requirements of EPL 12290. Sediment basins have been designed and would be constructed to ensure an adequate storage and settlement zone is provided for a 90th percentile 5 day rainfall event (in accordance with Blue Book standards) to ensure adequate settlement of sediment prior to discharge.
- No clean water is required for use on the mine site and as such Werris Creek Coal Pty Ltd will not utilise its Maximum Harvestable Right for the mine site.

The data used to prepare the water balance, ie. rainfall evaporation, groundwater in-flow is likely to be variable, however, it is considered that the water balances prepared are conservative, ie. and as such there is a high level of confidence that sufficient water will be available for the modified operations of the Werris Creek Coal Mine.

Appendix 3

Seasonal Stability Class Frequency Distribution

Source: Heggies (2009)

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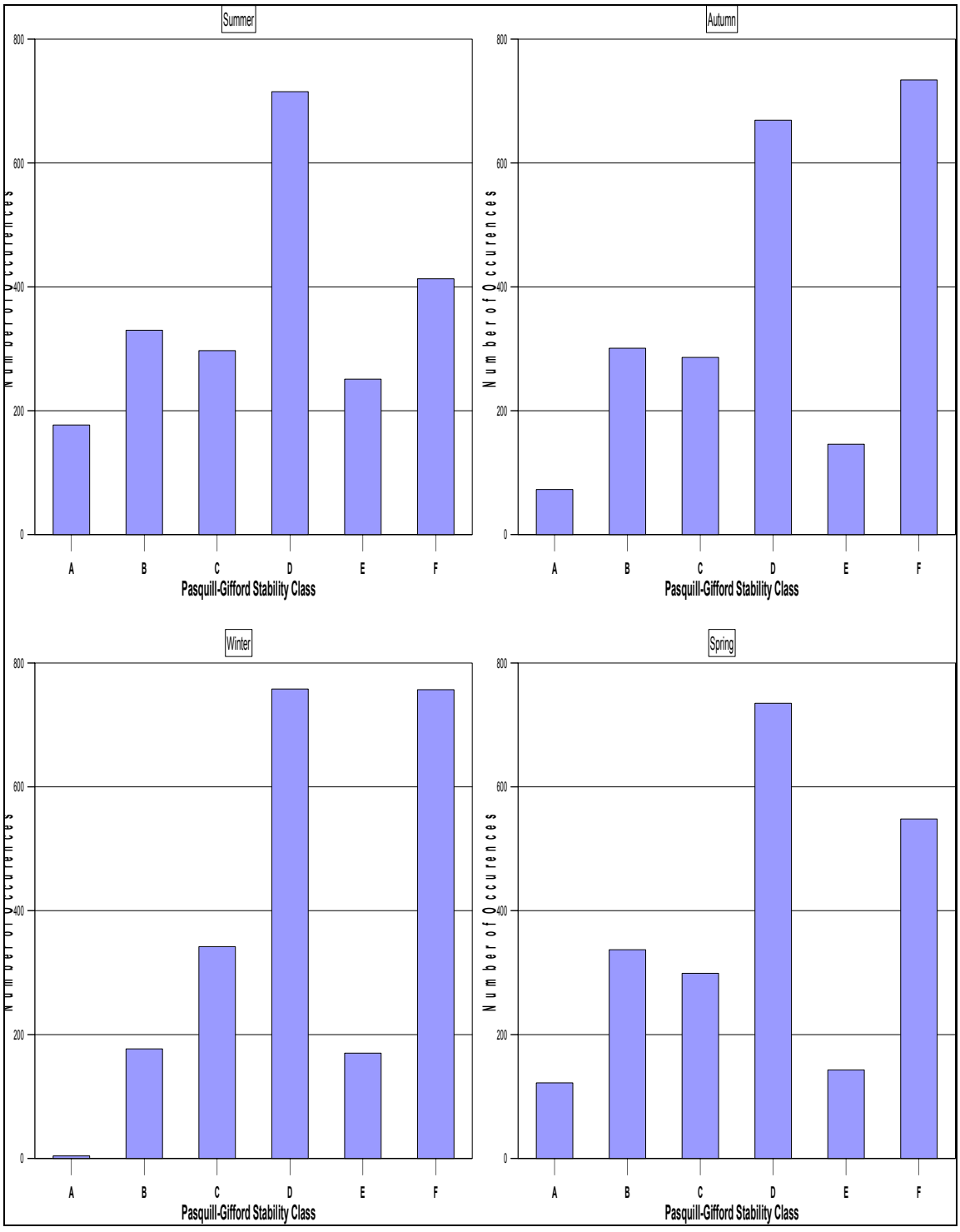
Summer
Autumn
Winter
Spring
Number of Occurences
Pasquill-Gifford Stability Class
A
B
C
D
E
F
0
200
400
600
800

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Appendix 4

Emissions Inventory

Source: Heggies (2009)

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	Moisture Content (%)	Silt Content (%)	TSP Emission Factor	PM10 Emission Factor	Emission Factor Unit	Notes/Contols	Emissions Reduction From Controls	Variable		Mine Working Days	Modelled Working hours	TSP Emission Rate (mg/s)	PM10 Emission Rate (mg/s)	TSP Emission Flux (mg/s/m²)	PM_{10} Emission Flux (mg/s/m²)
Coal Extraction															
Dozer pit	6	7	29.93	9.54	kg/hr	Pit Retention (50% TSP and 5% PM10)	55%/12%	22.0	hours/day	305	22	4157.4	2518.0	N/A	N/A
Excavator (Coal) pit	6	7	0.01854	0.01	kg/t	Pit Retention (55% TSP and 12% PM10)	55%/12%	223.55	t/hr	305	22	575.5	525.7	N/A	N/A
Excavator (OB) pit	5.5	10	0.0006	0.0002	kg/t	Pit Retention (55% TSP and 12% PM10)	55%/12%	1795.9	t/hr	305	22	144.1	73.4	N/A	N/A
Haulage (3 sources) ROM	1.1	6	4.18	1.11	kg/VKT	87% reduction for watering of haul roads (Flocchini, 1994), Pit Retention (50% TSP and 5% PM10)	87%	2.2	VKT/hour	305	22	56.3	28.5	N/A	N/A
Drilling	5.5	10	0.59	0.31	kg/hole	70% reduction for water sprays, Pit Retention (55% TSP and 12% PM10)	70%, 55%/12%	2.7	holes/hour	305	22	67.0	66.9	N/A	N/A
Blasting	5.5	10	43.26	22.50	kg/blast	Pit Retention (55% TSP and 12% PM10)	55%/12%	1.0	blast/day	305	22	6008.5	5936.4	1.001416102	0.989399109
Scraper on Topsoil (3 sources)	4	10	3.40	0.90	kg/VKT	50% reduction for watering during topsoil removal	50%	1.5	VKT/hour	305	22	236.3	62.3	N/A	N/A
Overburden Dump															
Dozer Dump	5.5	10	4.49	0.99	kg/hr			22.0	hours/day	305	22	1248.0	274.6	N/A	N/A
Haulage (5 sources) OB	1.1	6	4.18	1.11	kg/VKT	87% reduction for watering of haul roads (Flocchini, 1994), Pit Retention (50% TSP and 5% PM10)	87%	23.9	VKT/hour	305	22	361.6	183.1	N/A	N/A
Unloading OB	5.5	10	0.0006	0.0002	kg/t			1795.9	t/hr	305	22	288.3	77.3	N/A	N/A
Processing Plant										305					
Paved Haulage (9 sources)	N/A	N/A	0.71	0.14	kg/VKT	75% reduction for sprays	75%	2.7	VKT/hour	305	12	15.0	2.9	N/A	N/A
Hopper Loading	6	7	0.02	0.01	kg/t	50% reduction for water sprays	50%	500.0	t/hr	305	10	1287.3	618.9	N/A	N/A
Primary Crushing	6	7	0.010	0.004	kg/t	50% reduction for water sprays	50%	500.0	t/hr	305	10	694.4	277.8	N/A	N/A
Secondary Crushing	6	7	0.03	0.01	kg/t	50% reduction for water sprays	50%	500.0	t/hr	305	10	2083.3	833.3	N/A	N/A
Coal Bin Transfer	6	7	0.0005	0.0001	kg/t	50% reduction for water sprays	50%	500.0	t/hr	305	10	35.5	9.5	N/A	N/A
Product SP Loading	6	7	0.0040	0.0017	kg/t	50% reduction for water sprays	50%	500.0	t/hr	305	10	277.8	118.1	N/A	N/A
Unloading ROM coal	6	7	0.010	0.004	kg/t			223.5	t/hr	305	22	621.0	260.8	N/A	N/A
Road Truck Loading	6	7	0.02	0.01	kg/t			13.7	t/hr	305	12	70.3	33.8	N/A	N/A
Rail Truck Loading	6	7	0.02	0.01	kg/t			272.7	t/hr	305	22	1404.3	675.1	N/A	N/A
Rail Loadout															
Paved Haulage (11 sources) rail	1.1	6	0.71	0.14	kg/VKT	75% reduction for sprays	75%	49.1	VKT/hour	305	22	220.6	42.3	N/A	N/A
Dozer rail	6	7	29.93	9.54	kg/hr			4.0	hours/day	305	4	8314.8	2650.6	N/A	N/A
Loading Train	6	7	0.0004	0.0002	kg/t	50% reduction for water sprays	50%	1600.0	t/hr	305	4	88.9	37.8	N/A	N/A
Unloading Trucks Rail	6	7	0.0100	0.0042	kg/t			272.7	t/hr	305	22	757.6	318.2	N/A	N/A
Wind Erosion															
Rail Stockpile	6	7	0.39	0.19	kg/ha/hr	Assume 10% of total area is active		1.4	Hectares	366	24	N/A	N/A	Variable by each hour of year	
ROM Stockpile	6	7	0.39	0.19	kg/ha/hr	Assume 10% of total area is active		0.6	Hectares	366	24	N/A	N/A		
Product Stockpile	6	7	0.39	0.19	kg/ha/hr	Assume 10% of total area is active		0.1	Hectares	366	24	N/A	N/A		
OB Dump	5.5	10	0.39	0.19	kg/ha/hr	Assume 10% of total area is active		6.4	Hectares	366	24	N/A	N/A		

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Appendix 5

Greenhouse Gas Protocol Initiative

Source: Heggies (2009)

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1. The Greenhouse Gas Protocol Initiative

The Greenhouse Gas Protocol Initiative (hereafter, "the greenhouse gas Protocol") is a multi-stakeholder partnership of businesses, non-governmental organizations (NGOs), governments, and others convened by the World Resources Institute (WRI), a U.S.-based environmental NGO, and the World Business Council for Sustainable Development (WBCSD), a Geneva-based coalition of 170 international companies. Launched in 1998, the Initiative's mission is to develop internationally accepted greenhouse gas (greenhouse gas) accounting and reporting standards for business and to promote their broad adoption. (WBCSD, 2005)

The greenhouse gas Protocol comprises two separate but linked standards:

- *greenhouse gas Protocol Corporate Accounting and Reporting Standard* (this document, which provides a step-by-step guide for companies to use in quantifying and reporting their greenhouse gas emissions).

- *greenhouse gas Protocol Project Quantification Standard* (forthcoming; a guide for quantifying reductions from greenhouse gas mitigation projects).

There are three scopes of emissions that are established for greenhouse gas accounting and reporting purposes, defined as follows.

1.1 Scope 1 Emissions – Direct greenhouse gas Emissions

The greenhouse gas Protocol defines Scope 1 emissions as those which result from activities under the company's control or from sources which they own. They are principally a result of the following activities:

- generation of electricity, heat or steam. These emissions result from the combustion of fuels in stationary sources, e.g. boilers, furnaces or turbines;

- physical or chemical processing. The majority of these emissions result from the manufacture or processing of chemicals and materials e.g. the manufacture of cement, aluminium, adipic acid and ammonia, or waste processing;

- transportation of materials, products, waste, and employees. These emissions result from the combustion of fuels in company owned/controlled mobile combustion sources (e.g., trucks, trains, ships, airplanes, buses, and cars)

- fugitive emissions. These emissions result from intentional or unintentional releases, e.g., equipment leaks from joints, seals, packing, and gaskets; methane emissions from coal mines and venting; hydrofluorocarbon (HFC) emissions during the use of refrigeration and air conditioning equipment; and methane leakages from gas transport.

1.2 Scope 2 Emissions – Electricity indirect greenhouse gas Emissions

Scope 2 emissions are those which relate to the generation of purchased electricity consumed in its owned or controlled equipment or operations. For many companies, purchased electricity represents one of the largest sources of greenhouse gas emissions and the most significant opportunity to reduce these emissions.

1.3 Scope 3 Emissions – Other indirect greenhouse gas Emissions

The greenhouse gas protocol states that Scope 3 reporting is optional and covers all other indirect greenhouse gas emissions. Scope 3 emissions are defined as those which do not result from the activities of a company although arise from sources not owned or controlled by the company. Examples of Scope 3 emissions include the extraction and production of purchased materials, transportation of purchased fuels and the use of sold products and services.

In the case of the coal mining industry, Scope 3 emissions may include the transportation of sold coal and the use of this coal, either at home or overseas.

The greenhouse gas protocol flags the issue that the reporting of Scope 3 emissions may result in the double counting of emissions. A second problem is that as their reporting is optional, comparisons between countries and / or projects may become difficult. The greenhouse gas protocol also states that compliance regimes are more likely to focus on the "point of release" of emissions (direct emissions) and / or indirect emissions from the use of electricity. However, for greenhouse gas risk management and voluntary reporting, double counting is less important.

2. National Greenhouse Accounts (NGA) Factors

The National Greenhouse Accounts (NGA) Factors document, issued by the Department of Climate Change (DCC) in January 2008 and revised in February 2008, updates and replaces the Australian Greenhouse Office (AGO) Factors and Methods Workbook published in December 2006.

The NGA Factors are generally taken from the *Technical Guidelines for the Estimation of Greenhouse Emissions and Energy at Facility Level*, published by the DCC in December 2007. The NGA Factors have bee designed to support reporting under the *National Greenhouse and Energy Reporting Act 2007*, once the first reporting period under the Act commences on 1 July 2008.

The NGA Factors however have a general application to a broader range of greenhouse emissions inventories, and their use is not intended to be restricted to reporting under the Act. Further information on the emission estimation methods employed in the National Greenhouse Accounts is available in the *Australian Methodology for the Estimation of Greenhouse Gas Emissions and Sinks* series.

NGA Factors are consistent with international guidelines and are to be subject to international expert review each year.

2.1 Direct Emissions

Direct emissions are defined in the NGA Workbook as those which are produced from sources within the boundary of an organisation and as a direct result of that organisation's activities and arise from the following activities:

- generation of energy, heat steam and electricity, including carbon dioxide (CO_2) and the products of incomplete combustion (methane and nitrous oxide);

- manufacturing processes, which produce emissions (for example, cement, aluminium and ammonia production);

- transportation of materials, products, waste and people; for example, use of vehicles owned and operated by the reporting organisation;

- fugitive emissions – intentional or unintentional greenhouse gas releases (such as methane emissions from coal mines, natural gas leaks from joints and seals); and

- on-site waste management, such as emissions from company owned and operated landfill sites.

The NGA 2008 document gives several examples of direct emissions; a company with a vehicle fleet would report the greenhouse gas emissions from the combustion of petrol or diesel in these vehicles as direct emissions. A mining company would report methane escaping from a coal seam during mining (fugitive emissions) as direct emissions and a cement manufacturer would report carbon dioxide released during cement production as direct emissions.

2.2 Indirect Emissions

Indirect emissions as those which are defined as being generated in the wider economy as a consequence of an organisation's activities (particularly from its demand for goods and services), but which are physically produced by the activities of another organisation. The most important category of indirect emissions is from the consumption of electricity. Other examples of indirect emissions from an organisation's activities include upstream emissions generated in the extraction and production of fossil fuels, downstream emissions from transport of an organisation's product to customers, and emissions from contracted / outsourced activities. The appropriate emissions factor for these activities depends on the parts of the upstream production and downstream use considered in calculating emissions associated with the activity.

For purposes of harmonisation, the NGA emission factors for indirect emissions have been subdivided into Scope 2 and Scope 3 emissions (adopted by the greenhouse gas Protocol).

Broadly, the NGA Workbook defines Scope 3 emissions as including:

- disposal of waste generated (e.g. if the waste is transported outside the organisation and disposed of);

- use of products manufactured and sold;

- disposal (end of life) of products sold;

- employee business travel (in vehicles or aircraft not owned or operated by the reporting organisation);

- employees commuting to and from work;

- extraction, production and transport of purchased fuels consumed;

- extraction, production and transport of other purchased good and materials;
- purchase of electricity that is sold to an end user (reported by electricity retailer);
- generation of electricity that is consumed in a transport and distribution system (reported by end user);
- out-sourced activities; and
- transportation of products, materials and waste.

3. Draft Guidelines for Energy and Greenhouse in EIA

The Draft NSW EIA Guidelines were prepared in August 2002 by the NSW Sustainable Energy Development Authority (SEDA) and Planning NSW (now the Department of Planning (DOP)). The guidelines state that they are an advisory document and should principally be applied to projects which require an EIS under Part 4 and Part 5 of the Environmental Planning and Assessment Act 1979 (NSW) but can also be used for the assessment of other projects.

The Draft NSW EIA Guidelines define four scopes of emissions, the first three being adopted along the lines of the greenhouse gas Protocol with the fourth relating to emission abatement.

3.1 Scope 1: Direct Energy Use or greenhouse gas Emissions

Scope 1 considers energy use and greenhouse gas emissions that occur on site or are under a proponent's direct and immediate control. Scope 1 emissions broadly consist of the energy use and greenhouse gas emissions produced by the following activities:

- production of electricity, heat or steam;
- combustion of fossil fuels for any other purpose;
- physical or chemical processing on site;
- transportation of materials, products, waste and employees by proponent controlled vehicles;
- fugitive emissions occurring on site;
- on site landfill wastes or wastewater treatment;
- animal husbandry; and
- on site vegetation or soil disturbance.

3.2 Scope 2: Indirect Energy Use or greenhouse gas Emissions from Imports and Exports of Electricity, Heat or Steam

Scope 2 broadly focuses on the indirect emissions associated with the generation of purchased and imported electricity, heat or steam.

3.3 Scope 3: Other Indirect Energy Use or greenhouse gas Emissions

Scope 3 considers the indirect energy use or greenhouse gas emissions that are a consequence of the Project but do not occur on site or those emissions which are removed from the proponent's direct control. Examples of Scope 3 emissions as described in the Draft NSW EIA Guidelines include the following:

- off site waste management (e.g. land filled waste or waste water treatment);
- transportation of products, materials and waste by vehicles not controlled by the proponent;
- employee related business or commuter travel;
- outsourced activities;
- production of imported materials, plant and equipment; and
- use of products or services produced by the Project (and end of life phases of products).

3.4 Scope 4: greenhouse gas Emission Abatement from Offset Opportunities

Scope 4 reporting under the Draft NSW EIA Guidelines allows the reporting of any carbon offsets which have occurred as a direct result of the Project. Proponents may report the following if applicable:

- carbon sequestration performed by the proponents;
- community based energy use or emissions reduction initiatives;
- the use of government endorsed Kyoto Protocol flexibility mechanisms such as Clean Development Mechanism (CDM) and Joint Implementation (JI) (refer **Section 3.4.1** below).

3.4.1 Kyoto Protocol Flexibility Mechanisms

The greenhouse gas offset mechanisms contained within the Kyoto Protocol (KP) can be used as instruments for carbon reduction and can be reported in Scope 4 of the Draft NSW EIA Guidelines. The following mechanisms are relevant for reporting under Scope 4:

- Clean Development Mechanism (CDM) – Developed countries can invest in greenhouse gas emission reduction projects in developing countries;
- Joint Implementation (JI) – Developed countries can invest in greenhouse gas reduction projects in other developed countries.

4. Policy Instruments

4.1 The NSW Greenhouse Plan

Published in November 2005, the NSW Greenhouse Plan is a strategic document which sets out the NSW Government's aims and initiatives in terms of greenhouse gas emissions abatement over the next 20 to 45 years. The NSW Government state that it would like to meet the following criteria:

- a 60% reduction in greenhouse gas emissions by 2050; and
- cutting greenhouse gas emissions to year 2000 levels by 2025.

The NSW Greenhouse Plan does not set out a methodology for reporting greenhouse gas emissions, rather seeks to:

- increase awareness among those expected to be most affected by the impacts of climate change;
- begin to develop adaptation strategies to those unavoidable climate change impacts; and
- put NSW on track to meeting the targets set out above.

5. References

- Commonwealth of Australia (2006), AGO Factors and Methods Workbook, December 2006.
- Department of Climate Change (2008). National Greenhouse Accounts (NGA) Factors, Updating and Replacing the AGO Factors and Methods Workbook, Commonwealth Government of Australia, February 2008.
- NSW Government (2005), NSW Greenhouse Plan.
- Sustainable Energy Development Authority and Planning NSW (2002), Draft NSW Energy and Greenhouse Guidelines for Environmental Impact Assessment.
- World Business Council for Sustainable Development and World Resources Institute (2005), The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard.