WAMBO COAL PTY LIMITED



WAMBO COAL MINE
LONGWALL 24 TO 26 MODIFICATION

MODIFICATION REPORT

For the Modification of DA 305-7-2003 (MOD 19)
Optimisation and Continued Operation
of the Approved South Bates Extension Underground Mine

APPENDIX I

Greenhouse Gas Assessment

Peabody

TODOROSKI AIR SCIENCES
Suite 2B, 14 Glen Street Eastwood, NSW 2122
Phone: 02 9874 2123
Fax: 02 9874 2125
Email: info@airsciences.com.au
Web: www.airsciences.com.au
ACN: 151 202 765 | ABN: 74 955 076 914

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Nicole Dobbins
Wambo Coal Pty Ltd
Via email: NDobbins@peabodyenergy.com

RE: Greenhouse Gas Assessment – Wambo Coal Mine Longwalls 24-26 Modification

Dear Nicole,

Todoroski Air Sciences has assessed the potential change in greenhouse gas (GHG) emissions associated with the proposed Wambo Coal Mine Longwalls 24-26 Modification (hereafter referred to as the Modification).

Overview of the Wambo Coal Mine

The Wambo Coal Mine is situated approximately 15 kilometres west of Singleton, near the village of Warkworth, New South Wales (NSW), and is operated in accordance with Development Consent (DA 305-7-2003). The Wambo Coal Mine is owned and operated by Wambo Coal Pty Limited (WCPL), a subsidiary of Peabody Energy Australia Pty Limited.

DA 305-7-2003 (as modified) covers the following mining operations at the Wambo Coal Mine:

- Underground mining operations in the approved North Wambo Underground Mine (completed).
- Underground mining operations in the approved South Bates Underground Mine (completed).
- Underground mining operations in the approved South Bates Extension Underground Mine (in progress).
- Underground mining operations in the approved South Wambo Underground Mine (future operation).
- Ongoing operation of the coal handling and preparation plant (CHPP) and processing of coal from the underground mining operation and the United Wambo Open Cut Coal Mine, with up to 14.7 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal processed at the CHPP in any calendar year.

The South Bates Extension Underground Mine comprises Longwall 17 to Longwall 25 in the Whybrow Seam. The South Bates Extension Underground Mine was approved in December 2017 (as part of DA 305-7-2003 Modification 17) and operations commenced in Longwall 17 in 2018. WCPL is currently mining Longwall 22 and is developing first workings of Longwalls 23 and 24.

Mining at the approved South Wambo (Arrowfield and Woodlands Hills Seams) Underground Mine will commence after completion of mining the South Bates Extension Underground Mine.

Modification Description

WCPL is seeking to modify Development Consent (DA 305-7-2003) under section 4.55(2) of the NSW *Environmental Planning & Assessment Act 1979* to allow for the Modification.

The Modification involves a reorientation of Longwalls 24 and 25 and the addition of Longwall 26.

The Modification would not extend the approved overall life of the Wambo Coal Mine, but would allow for continued operations at the South Bates Extension Underground Mine for a further three years (as the approved Longwalls 24 and 25 would not be mined in their current arrangement and mining operations would cease in 2023).

The ROM coal production for the approved South Bates Extension Underground Mine as outlined in MOD 17 (i.e. including the mining of Longwalls 24 and 25), the approved South Bates Extension Underground Mine (excluding the mining of Longwalls 24 and 25), and the modified South Bates Extension Underground Mine from 2022 is presented graphically in **Figure 1**.

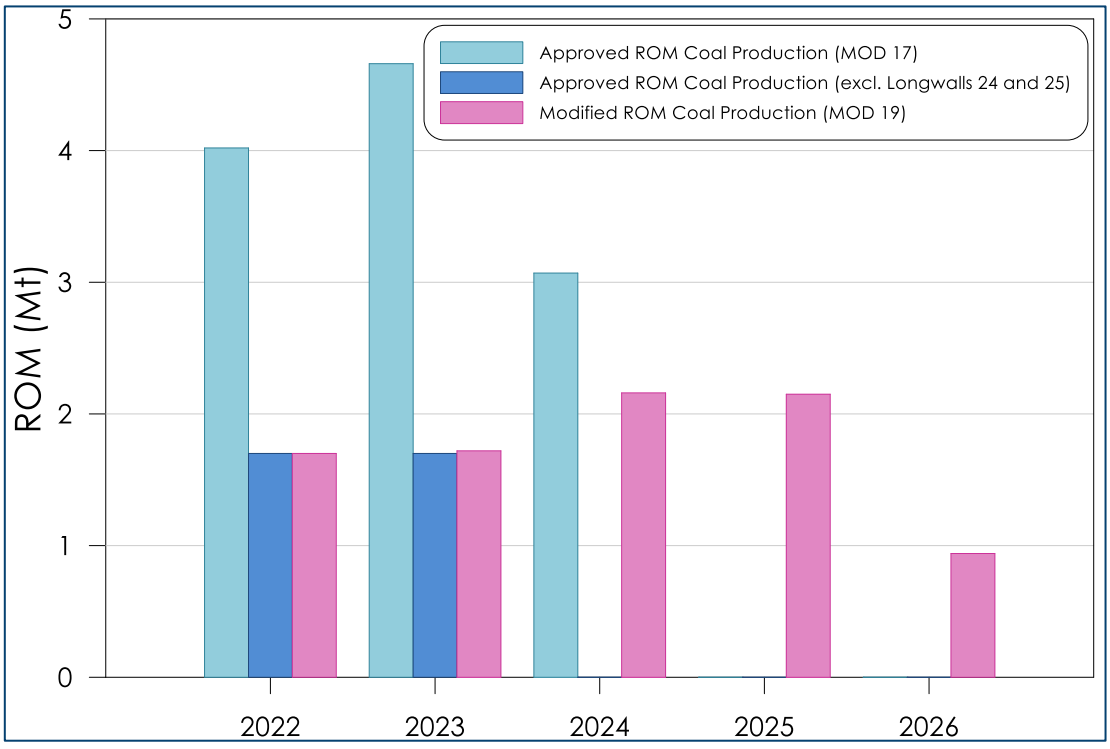


Figure 1: Comparison of the Approved and Modified South Bates Extension Underground Mine ROM Coal Production

Figure 1 indicates that the Modification would continue for longer at a reduced ROM coal production rate. The total ROM generated in the period (i.e. 2022 to 2026) is approximately 8.7 million tonnes (Mt) for the Modification compared with 11.8 Mt for the approved South Bates Extension Underground Mine (MOD 17) and 3.4 Mt for the approved South Bates Extension Underground Mine (excluding the mining of Longwalls 24 and 25).

No other changes to the approved Wambo Coal Mine (including maximum ROM coal production rate) would be required for the Modification.

Existing Assessment of GHG Emissions

An assessment of the potential GHG emissions associated with the approved South Bates Extension Underground Mine operations was presented in the *Air Quality and Greenhouse Gas Review – South Bates Extension Modification* (**Todoroski Air Sciences, 2016**) prepared for MOD 17.

The key Scope 1 and 2 GHG emission sources for the approved South Bates Extension Underground Mine were identified as the fugitive emissions from exposed coal, on-site combustion of diesel and on-site consumption of electricity. The total Scope 1 and 2 GHG emissions associated with the approved South Bates Extension Underground Mine was predicted to be 1.07 million tonnes of carbon dioxide equivalent (Mt CO_2-e). The estimated annual Scope 1 and 2 GHG emissions ranged from 0.01 to 0.28 Mt CO_2-e.

Assessment of Modified GHG Emissions

The key Scope 1 and 2 GHG emission sources for the modified South Bates Extension Underground Mine would be the same as the approved South Bates Extension Underground Mine (i.e. fugitive emissions from exposed coal, on-site combustion of diesel and on-site consumption of electricity).

For fugitive emissions from the exposed coal, a site-specific factor of 0.065 tonnes of carbon dioxide equivalent (t CO_2-e) per tonne of ROM coal (**Advitech Environmental, 2021**) was applied. This site-specific factor was developed based on gas monitoring conducted at the South Bates Extension Underground Mine. This comparatively low emission factor reflects the low gas content and low methane levels present in the target Whybrow seam at the South Bates Extension Underground Mine (**GeoGas, 2022**).

Estimated diesel and electricity consumption has been calculated from the actual usage of diesel and electricity associated with the South Bates Extension Underground Mine operations based on the last six months of available data. The following usage rates for diesel and electricity are applied; 0.32 litres of diesel per tonne of ROM and 17.9 kilowatt hours of electricity per tonne of ROM, respectively.

To provide a direct comparison of the change in Scope 1 and 2 GHG emissions associated with the Modification, Scope 1 and 2 GHG emission estimates have been calculated for both the approved (MOD 17) and modified South Bates Extension Underground Mine operations. In addition, as the approved Longwalls 24 and 25 would not be mined in their current arrangement if the Modification does not proceed, a comparison against the approved South Bates Extension Underground Mine (excluding Longwalls 24 and 25) has also been completed.

Table 1 summarises the estimated annual amount of Scope 1 and 2 GHG emissions generated for each of these scenarios.

Table 1: Estimated Scope 1 and 2 GHG emissions for the approved and modified South Bates Underground Mine

Year	UG ROM	Fugitive	Diesel	Electricity	Total
	Mt	Mt CO_2-e			
Approved South Bates Extension Underground Mine (MOD 17)					
2022	4.0	0.26	0.003	0.06	0.32
2023	4.7	0.30	0.004	0.07	0.37
2024	3.1	0.20	0.003	0.04	0.25
2025	0.0	-	-	-	-
2026	0.0	-	-	-	-
Total	**11.8**	**0.76**	**0.01**	**0.17**	**0.94**
Approved South Bates Extension Underground Mine (excluding Longwalls 24 and 25)					
2022	1.7	0.11	0.001	0.02	0.14
2023	1.7	0.11	0.001	0.02	0.14
2024	0.0	-	-	-	-
2025	0.0	-	-	-	-
2026	0.0	-	-	-	-
Total	**3.4**	**0.22**	**0.003**	**0.05**	**0.27**
Modified South Bates Extension Underground Mine					
2022	1.7	0.11	0.001	0.02	0.14
2023	1.7	0.11	0.001	0.02	0.14
2024	2.2	0.14	0.002	0.03	0.17
2025	2.2	0.14	0.002	0.03	0.17
2026	0.9	0.06	0.001	0.01	0.08
Total	**8.7**	**0.56**	**0.007**	**0.11**	**0.70**

Note values have been rounded.

The estimated annual Scope 1 and 2 GHG emissions for the modified South Bates Extension Underground Mine (ranging from 0.08 to 0.17 Mt CO_2-e) are lower than the annual emissions estimated for the approved South Bates Extension Underground Mine (MOD 17) (0.25 to 0.37 Mt CO_2-e) and similar to the approved South Bates Extension Underground Mine (excluding Longwalls 24 and 25) (0.14 Mt CO_2-e) (see **Table 1**).

The total Scope 1 and 2 GHG emissions generated for the period assessed is lower for the modified South Bates Extension Underground Mine with a level of 0.70 Mt CO_2-e compared to 0.94 Mt CO_2-e compared to the approved South Bates Extension Underground Mine (MOD 17). The Modification would however result in the generation of an additional 0.43 Mt CO_2-e of total GHG emission relative to the approved South Bates Extension Underground Mine (excluding Longwalls 24 and 25).

The annual GHG emissions estimated in **Todoroski Air Sciences (2016)** for MOD 17 indicated levels ranging up to 0.28 Mt CO_2-e which is also greater than the maximum annual emissions estimated for the Modification (0.17 Mt CO_2-e). We note that the approach to estimating GHG emissions in this report and in **Todoroski Air Sciences (2016)** are different due to refinements in the emission estimation approach and mitigation measures applied at the Wambo Coal Mine.

Overall, the Modification is not expected to significantly change the existing amount of GHG emissions generated from the Wambo Coal Mine.

GHG Emissions Management

WCPL apply various mitigation measures to minimise the overall generation of GHG emissions at the Wambo Coal Mine. These measures include developing a basis for identifying and implementing energy efficiency opportunities and mitigation measures for various activities. Some examples of various GHG management practices employed at Wambo include (**WCPL, 2020**):

- Consider ways to reduce energy consumption during project planning phases and consider practicality of more energy efficient alternatives;
- Participation in the Federal Government's Energy Efficiency Opportunities program which included a review of energy usage and identified areas for potential energy efficiency improvement;
- Regular scheduled maintenance of equipment and plant;
- Completed longwall panels will be sealed, to reduce methane emissions from the goaf;
- Ensure maintenance, calibration and record keeping is undertaken on the main ventilation shaft and fans to allow calculation of GHG emissions;
- Maintain records of monthly electricity use and monthly ROM coal production to allow calculation of GHG emissions;
- Avoid idle running of conveyor; and,
- Turn off unnecessary lighting around the mine site.

WCPL has indicated that the low gas content and low methane levels present in the target Whybrow seam at the South Bates Extension Underground Mine make the re-use of ventilation gas (e.g. flaring, power generation) unfeasible.

WCPL would account for the GHG emissions associated with the Modification in its annual emissions reporting in accordance with the Commonwealth *Nation Greenhouse and Energy Reporting Act 2007*.

Summary and Conclusions

This assessment has examined the likely change to Scope 1 and 2 GHG emissions resulting from the Modification.

As the approved annual quantity of coal produced at the Wambo Coal Mine is not proposed to change, the estimated total GHG emissions generated from the Modification would be of a similar scale to that previously assessed.

Overall, the Modification is not expected to significantly change the existing amount of GHG emissions generated from the Wambo Coal Mine.

Please feel free to contact us if you would like to clarify any aspect of this report.

Yours faithfully,
Todoroski Air Sciences



Philip Henschke

References

Advitech Environmental (2021)
Transitional Calculated Baseline Wambo Underground Coal Mine

GeoGas (2022)
"Memorandum – Wambo, B/H: DDH1235. Report No. WPR-0487", prepared for Wambo Mine by GeoGas, February 2022.

Todoroski Air Sciences (2016)
"Air Quality and Greenhouse Gas Review – South Bates Extension Modification", prepared for Wambo Coal Pty Limited by Todoroski Air Sciences, December 2016.

WCPL (2020)
"Wambo Coal Air Quality & Greenhouse Gas Management Plan", prepared by WCPL, November 2020.