

Gunnedah Open Cuts 4.1 Mtpa Coal Haulage Increase Modifications

Modification Report

Appendix C - Greenhouse Gas Assessment





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Steve Farrar
Lead Approvals
Whitehaven Coal Limited
Via email: SteveFarrar@whitehavencoal.com.au

RE: Greenhouse Gas Assessment – Gunnedah Open Cut Modifications

Dear Steve,

Todoroski Air Sciences has prepared this Greenhouse Gas (GHG) Assessment for Whitehaven Coal Limited (Whitehaven) to support the proposed Gunnedah Open Cut (GOC) Modifications (hereafter referred to as the Modifications). This GHG assessment has been prepared in consideration of requirements of the New South Wales (NSW) Environment Protection Authority (EPA) document *NSW Guide for Large Emitters (NSW EPA, 2025)*.

Modifications overview

Whitehaven is seeking an increase in the cumulative Run-of-Mine (ROM) coal haulage from the Vickery Extension Project (VEP) and Tarrawonga Coal Mine (TCM) from 3.5 million tonnes per annum (Mtpa) to 4.1 Mtpa for the calendar years 2026 to 2030.

This represents a 0.6 Mtpa increase above the consented maximum haulage limit and would align with the maximum approved ROM coal processing limit of 4.1 Mtpa at the Whitehaven Coal Handling and Preparation Plant (Whitehaven CHPP).

The Modifications do not involve any changes to other approved activities at the VEP or TCM, including mining operations, surface disturbance areas, mine life, haulage hours, type of haulage fleet, ROM coal transport routes, or coal reject transport routes.

This assessment calculates the GHG emissions associated with increased ROM coal road haulage activity from the VEP and TCM to the Whitehaven CHPP, considering the approved activity, the proposed activity and the proposed incremental increase associated with the Modifications for comparison. The assessment also compares GHG emissions associated the alternative transport mode of railing ROM coal from the VEP, which is intended to occur following commissioning of the VEP CHPP and associated rail infrastructure.

Emission scenario

For the purpose of this assessment, emissions generated from the ROM coal road haulage are assessed as Scope 1 emissions. There is no additional consumption of purchased electricity associated with the Modifications and therefore no Scope 2 emissions are generated. Scope 3 emissions, which occur indirectly because of the Modifications, include emissions associated with the manufacture and distribution of diesel required for the ROM coal road haulage.

This assessment scenario assumes that, for the approved activity (3.5 Mtpa), ROM is sourced equally from the VEP and TCM (i.e. a 50:50 split). For the proposed activity (4.1 Mtpa haulage limit), the additional ROM is assumed to originate from the VEP, with the incremental increase of 0.6 Mtpa considered in the assessment.

The travel distances between the VEP and TCM to the Whitehaven CHPP are taken to be 22 kilometres (km) and 39.8km, respectively. Haulage is conducted using 62 tonne (t) trucks, with an average fuel consumption rate of 59.9 litres (L) per 100 km based on current site requirement.

Table 1 presents a summary of the annual diesel requirements for the Modifications.

Table 1: Summary of estimated annual diesel requirements

Scenario	ROM (Mt)			Return distance (km)	Diesel required (kL)
	Total	TCM to CHPP	VEP to CHPP		
Approved	3.5	1.75	1.75	3,488,710	2,090
Proposed	4.1	1.75	2.35	3,914,516	2,345
Incremental change	0.6	0	0.6	425,806	255

Note: kL = kilolitre

Emission factors

To quantify the amount of carbon dioxide equivalent (CO₂-e) material generated, emission factors for diesel use from the *Australian National Greenhouse Accounts Factors* (NGA Factors) document (**Commonwealth Department of Climate Change, Energy, the Environment and Water [Cth DCCEEW, 2025]**) were applied.

Table 2 summarises the emission factors applied.

Table 2: Summary of emission factors

Type	Energy content factor (GJ/kL)	Emission factor			Units	Scope
		CO ₂	CH ₄	N ₂ O		
Transport fuel emissions – Diesel oil Euro iv or higher	38.6	69.9	0.07	0.4	kg CO ₂ -e/GJ	1
		17.3	-	-		3

Note: GJ/kL = gigajoule per kilolitre, CO₂ = carbon dioxide, CH₄ = methane, N₂O = nitrous oxide, kg CO₂-e = kilograms of carbon dioxide equivalent, Mt-km = million tonne kilometre

Estimated GHG emissions

A summary of the estimated GHG emissions for the Modifications is presented in **Table 3**.

The incremental change associated with Modifications (i.e. a 0.6 Mtpa increase above the consented maximum haulage limit) is expected to result in an additional 693 tonnes of carbon dioxide equivalent (t CO₂-e) (Scope 1) under the assessed scenario. This remains below the threshold of 25,000 t CO₂-e specified in the *NSW Guide for Large Emitters* (**NSW EPA, 2025**).

Table 3: Summary of estimated GHG emissions (t CO₂-e)

Scenario	Scope 1	Scope 3
Approved	5,676	1,395
Proposed	6,369	1,566
Incremental change	693	170

A comparison of the GHG emissions for the approved operations at the Whitehaven CHPP, the VEP and TCM with the Modifications is presented in **Table 4**. The total annual average Scope 1 emissions from each operation are compared with the incremental change associated with Modifications. On this basis, the incremental change represents approximately 0.34% of the combined annual average Scope 1 emissions for the Whitehaven CHPP, VEP and TCM for the road haulage increase.

Table 4: Comparison of GHG emissions (t CO₂-e)

	Annual average Scope 1	Change due to the Modifications
Whitehaven CHPP ¹	5,610	-
VEP ²	129,366	-
TCM ³	67,372	-
Total	202,347	-
Maximum incremental change due to coal haulage increase	693	0.34%

¹ Todoroski Air Sciences (2024), ² Ramboll (2018), ³ Ramboll (2019)

It is noted that the Modifications would substitute the approved GHG emissions associated with the transport of ROM coal from the VEP via rail for the approved operations. The additional 0.6 Mtpa of ROM to be transported from the VEP to the Whitehaven CHPP via road haulage until December 2030 has, however, been conservatively treated in this assessment as new emissions. Nevertheless, these additional emissions represent a relatively small proportion of the overall emissions associated with the GOC operations.

GHG mitigation and abatement measures

The Modifications would minimise GHG emissions where practicable through implementation of the following measures:

- ✦ Monitoring payloads and, where required, topping up underloaded trucks to optimise payload;
- ✦ Maintaining fleet capacity to ensure loads are transported efficiently;
- ✦ Avoiding unnecessary idling of equipment, in accordance with standard operating procedures; and,
- ✦ Undertaking scheduled maintenance of plant and equipment.

Summary and conclusions

This study has assessed the potential GHG emissions associated with the Modifications.

The Modifications seek to increase the cumulative ROM coal haulage from the VEP and TCM from 3.5 Mtpa to 4.1 Mtpa for the calendar years 2026 to 2030.

The Modifications are expected to result in an incremental increase of 693 t CO₂-e (Scope 1) associated with the road haulage activities.

This change in GHG emissions represents approximately 0.34% of the annual average Scope 1 emissions for the Whitehaven CHPP, the VEP and TCM combined.

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

Commonwealth Department of Climate Change, Energy, the Environment and Water (2025)

"Australian National Greenhouse Accounts Factors 2025 – For individuals and organisations estimating greenhouse gas emissions", Department of Climate Change, Energy, the Environment and Water [DCCEEW], August 2025.

NSW EPA (2025)

"NSW Guide for Large Emitters", NSW Environmental Protection Authority [EPA], January 2025.

Ramboll (2018)

"Vickery Extension Project Air Quality and Greenhouse Gas Assessment", prepared for Whitehaven Coal Limited by Ramboll, October 2019.

Ramboll (2019)

"Tarrawonga Coal Mine Life of Mine Modification Air Quality and Greenhouse Gas Assessment", prepared for Whitehaven Coal Limited by Ramboll, June 2018.

Todoroski Air Sciences (2024)

"Air Quality and Greenhouse Gas Assessment Whitehaven Coal Handling and Preparation Plant Modification 6", prepared for Whitehaven Coal Mining Pty Ltd by Todoroski Air Sciences, October 2024.