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Steve O'Donoghue  
Director Energy and Resource Assessment  
Department of Planning and Environment

*(via Major Projects Planning Portal)*

Attention: Tegan Cole

**Mt Arthur Coal - Modification 2 - Pathway to 2030 (MP09\_0062-Mod-2)  
EPA recommended Conditions**

I refer to your request for advice, dated 20 October 2023, seeking the Environment Protection Authority's (EPA) assessment of the Mt Arthur Coal - Modification 2 - Pathway to 2030 proposal. The proposal is detailed in the report 'Mt Arthur Coal Mine - Modification 2 - Modification Report (MP09\_0062-Mod-2)' (**Modification Report**) dated September 2023.

Summary of proposal

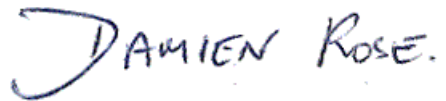
The key aspects of the proposal are:

- Four-year extension of mining activities to 30 June 2030;
- Reduction in the approved open cut mining rate from 32 million tonnes per annum (Mtpa) of ROM coal to a maximum of 25 Mtpa ROM coal (similar to current actual ROM coal production). ROM and product coal rates would progressively drop from 2027 to closure.
- Reduction in the cumulative open cut and underground ROM coal handling rate from 36 Mtpa to 29 Mtpa;
- Reduction in maximum total (open cut and underground) coal rail transportation from 27 Mtpa of product coal to 20 Mtpa, and a reduction in train movements from 30 to 20 movements per day;
- Extension (25 hectare) of the approved disturbance area in the north-west corner of the operation predominantly to allow for access and ancillary infrastructure;
- An overall reduction (387 hectare) in approved disturbance, as some previously approved disturbance areas are no longer intended to be disturbed; and
- Revised final landform and final void configuration, including an overall reduction in the approved height of the northern overburden emplacement areas and the final landform (to reflect the current actual height).

The EPA has reviewed the proposal and requires further information regarding the greenhouse gas assessment. The EPA's comments and recommendations are in Attachment A.

Should you require clarification of any of the above please contact Stuart Gibson on 9995 6193 or email [environmentprotection.planning@epa.nsw.gov.au](mailto:environmentprotection.planning@epa.nsw.gov.au).

Yours sincerely

A handwritten signature in black ink that reads "DAMIEN ROSE." The letters are slightly slanted and connected in a cursive-like style.

**DAMIEN ROSE**  
**Unit Head – Environment Protection Planning**

## **Attachment A: EPA Comment and Recommendations**

### **Greenhouse gas scope 1, 2 and 3 emissions**

DPE Science, Economics and Insights Net Zero Modelling team (NZEM) have provided advice to the EPA on the predicted greenhouse gas emissions assessment for the proposal.

NZEM's analysis and the EPA's recommendations are summarised below. Detailed description of these is provided in Attachment B.

#### **Technical review of estimated greenhouse gas Scope 1, 2 and 3 emission calculations**

The Todoroski Air Sciences GHG assessment (final version September 2023) has addressed the relevant emission sources and scopes. Emission estimates were consistent with contemporary practice and the emission factors appear to be adequate for the calculations. However, the assessment should be updated to include the following recommendations.

#### **Recommendation:**

- i. The gas content of the target seam(s) needs to be provided as well as the methane and carbon dioxide contents of the seam gas. This data will support the small, reported fugitive emissions factor of 0.0022 t CO<sub>2</sub>-e/t ROM.
- ii. The assessment must address the possible future changes in the fugitive emission factor. The future pit depth and how that will affect the fugitive emission factor needs to be addressed.
- iii. The forecast scope 2 and 3 electricity emissions during FYs 2027 to 2030 and the decommissioning phase need to be revised, using, for example, DCCEEW's Australia's Emissions Projections 2022 forecasts. These forecasts account for the expected decarbonisation of the NSW electricity grid.
- iv. More information is required on the specific areas of each type of vegetation to be cleared on an annual basis.
- v. Check, and revise if required, the scope 3 emissions for rail and sea transport of the coal and the combustion of the coal. Provide the saleable coal figures with the same accuracy as the ROM coal figures.
- vi. The impact of the Project should be assessed against the future projections as given by the NSW Government's Net Zero Emissions dashboard for the relevant years.

#### **Consistency with NZEM modelling for Net Zero Stage:1 2020:2030 Implementation Update**

The currently approved Mt Arthur Coal (MAC) mine operations are accounted for in NZEM's 2022 projections. The Mining, Exploration and Geoscience (MEG) group within the Department of Regional NSW (DRNSW) prepared a set of most likely ROM coal production forecasts for the MAC mine covering FY27-29. Total ROM forecast by MEG was 22 million tonnes (Mt) for that period. NZEM used this as the basis for the GHG emissions projections, giving an annual average scope 1 and 2 emissions of approximately 0.2 Mt CO<sub>2</sub>-e.

The 2022 projections for the MAC mine were developed prior to lodgement of the Modification 2 Project. The MEG ROM coal forecast used in the projections was dated September 2022. The GHG assessment provides a total forecast ROM coal figure for the Project over the FY27-30 period of 90 Mt. The GHG emissions for the Project are strongly correlated with ROM coal volumes, hence the GHG assessment reports substantially higher GHG emissions. The annual average scope 1 and 2 emissions from the Project are 0.67 Mt CO<sub>2</sub>-e.

NZEM's emissions projections will be updated upon receipt of approved Project run-of-mine (ROM) coal volume projections from MEG.

#### **Review of the Proposed GHG Mitigation Measures**

NZEM has considered the measures to minimise the Scope 1 and 2 emissions from the Project and any additional measures that could be implemented to mitigate Scope 1 and 2 emissions to the greatest extent practicable over the life of the Project. This consideration is detailed at Attachment B.

The reduction measures described by the Proponent for reducing emissions from diesel-powered equipment (the largest source of scope 1 emissions for the Project) include:

- minimising haul distances.
- optimise haul road design.
- minimise re-handling materials.
- regular equipment maintenance.
- turn off unnecessary lighting.

These measures are unlikely to substantially reduce the greenhouse gas footprint of the MAC mine facility.

It is agreed that electrification of the mine fleet within the Project lifetime is not feasible due to capital cost and the lack of battery electric equipment currently available at the required scale.

### **Recommendation:**

The Proponent should consider a trial of the use battery electric equipment and hydrogen fuel-cell vehicles or substituting diesel with biodiesel.

### **Noise**

The EPA notes that there are 15 receivers for which pro-active mitigation strategies are available to use under certain met conditions, in line with the Mount Arthur Coal Noise Management Plan (Section 6.3.2 and 6.7). Of those 15 receivers, there are 3 receivers predicted to have a night-time noise level that is 3-5 dBA above the criteria after pro-active mitigation is applied, and for which the provisions of the *Voluntary Land Acquisition and Mitigation Policy* (VLAMP) will apply. It is noted in the NIA that one of these receivers is already afforded acquisition rights for air quality impacts under the consent; and two are already afforded mitigation for air quality impacts and will be offered noise mitigation if the mod is approved. It should be noted that VLAMP is implemented by DPE.

Section 7.5.2 references both the *Noise Policy for Industry* (NPfI) and the *Road Noise Policy* (RNP) in a paragraph about the significance of the exceedance of the road traffic noise criteria. It is misleading to use terminology such as 'negligible' from the NPfI to describe a road traffic noise impact, especially as the terminology referenced in the NPfI is for residual noise impacts after all feasible and reasonable mitigation has been implemented. While the EPA notes that this may not change the outcome in terms of regulating road traffic noise from the proposed mod, the proponent should implement all feasible and reasonable measures to address impacts where criteria are exceeded. For road traffic noise, this might take the form of preparing a traffic noise management plan that specifies how impacts will be mitigated/managed.

**Recommendation:** the EPA recommends that the existing noise conditions are applied to the proposed Mod if it is approved and on the assumption that the 3-receivers that have night-time noise exceedance of 3 to 5 dB are treated under the VLAMP.

### **Air**

The EPA has reviewed the Air Quality Impact Assessment (Todoroski Air Sciences, September 2023). The AQIA predicts exceedances of the 24-hour PM<sub>2.5</sub> and PM<sub>10</sub> criterion at one and two (of the chosen subset for analysis) receptors, respectively, without reactive mitigation measures. The AQIA has modelled the reactive measures based on the existing TARP described in the Air

Quality Management Plan in order to achieve compliance with the 24-hour PM<sub>2.5</sub> and PM<sub>10</sub> criteria. These receptors (200, 226) have acquisition rights available under the consent. An exceedance of annual average PM<sub>10</sub> is predicted at receptor 264 which also has acquisition rights.

Monitoring data from 2015 was chosen for background air quality. Mt Arthur was operating during 2015 and therefore would contribute to the recorded ambient concentrations. For the 24-hour analysis of PM<sub>2.5</sub> and PM<sub>10</sub> impacts the AQIA has attempted to remove the contribution of the mine from the monitoring data used for background. However, as a result predicted incremental impacts include negative values (Appendices F and G), which is not possible. This approach of modifying background air quality data is not in accordance with the Approved Methods.

The EPA notes the methodological deficiencies resulting in negative incremental impacts. The use of reactive measures to achieve compliance poses a higher risk than engineering controls as they require the proponents to keep on top of throughout implementation. However, the EPA considers that the Modification proposal is predicted to generally have lower emissions and impacts than the currently approved operations and is proposing to cease mining operations in 2030.

**Recommendation:** No further information is required. The EPA considers current conditions to be adequate.

## **Surface Water**

### Site water management system

There are only minor proposed changes to the site surface water management system.

All forecast storage wet weather overflows occur from sediment dams. Overflows are only forecast to occur from Gully A, Gully B and Gully C sediment dams (to the Hunter River) and Saddlers Sediment Dam (to Saddlers Creek). No overflows are forecast from other storages including the Environmental Dam and Export Coal Loader Dam. The sediment dams in non-mining and processing areas have been designed in accordance with *Managing Urban Stormwater: Soils & Construction Volume 1*, 4th edition, 2004. Landcom (Landcom, 2004) and *Managing Urban Stormwater: Soils & Construction Volume 2E Mines and Quarries*. Department of Environment & Climate Change NSW (DECC, 2008).

Landcom (2004) and DECC (2008) would also apply to erosion and sediment controls associated with the proposed new ancillary infrastructure area. There is a proposed reduction in approved disturbance of 387 ha which would likely reduce sediment and other potential pollutant losses over the extended mine lifetime proposed in the Modification compared to the unmodified situation. The total catchment area reporting to the mine water management system over the life of the Modification would be less than that currently approved.

### Tailings

The embankment wall of the West Cut Void is approved to be raised to provide sufficient capacity for the quantities of tailings predicted to be produced under the Modification. The EIS states that there is little direct reclaim of water from the tailings storage, with tailings water understood to either be retained within the tailings, percolate into surrounding spoil or seep to the nearby Drayton Void where it is managed within the MAC mine water management system. Any potential environmental issues therefore appear to be primarily groundwater related.

### Overburden Dams

Due to the predicted elemental enrichment identified within selected overburden, pH, electrical conductivity (EC), total suspended solids (TSS), total alkalinity/acidity, sulphate, arsenic, mercury, antimony, selenium, and molybdenum are proposed to be included in the suite of water quality parameters monitored in dams containing runoff from overburden areas. It is assumed this monitoring and any responses are managed via the site Water Management Plan as there are no licensed discharge points for any on-site storages that are managing areas in accordance with

Landcom (2004) and DECC (2008) (noting some overburden areas report to adjacent active open cut mining areas).

### Final Voids

There is a proposed reduction in the number of final voids from three to two, comprising the Northern Open Cut Void and McDonalds Void. The currently approved Belmont Void would be backfilled. As part of the Modification, the Northern Open Cut Void would be re-positioned further north-west to reflect mining to 2030. The potential impacts of this appear to be mostly related to groundwater risk and therefore would be assessed by relevant groundwater experts.

A final void water balance model predicted that the final water level would be more than 130 m below the spill level at the Northern final void, and 24 m below the spill level at the McDonalds final void respectively. There is unlikely to be risks of overflows to surface waters, based on this modelling.

The salinity of void waters would slowly increase with time, as a result of ongoing slow migration of saline groundwater and flushing of residual salts from the overburden (Appendix G). The ongoing management of this increasingly saline void water would need to be considered where it may be reused or discharged to locations where it could drain to surface water and it is recommended that this is accounted for in closure plans.

Following completion of mining, the EIS states that Whites Creek would be re-established to drain off-site in accordance with existing conceptual design principles.

### Post mining water management system

Post-mining, runoff from rehabilitated and revegetated areas of the mine, other than that directed to the final voids, would be directed to the local drainage network. There will also be reestablishment of local creeks. Closure Plans should incorporate appropriate monitoring of these areas to detect and manage any surface water quality risks.

**Recommendations** - Overall, the proposed modification could be managed via existing Consent conditions, the EPL and by implementing the measures set out in Modification 2 EIS and Appendix G documents.

It is recommended that:

- the Water Management Plan is reviewed and updated to incorporate the Modification
- the ongoing management of any increasingly saline void water, where it may be discharged to surface water or reused in catchments that could drain to surface waters, should be accounted for in closure plans
- closure plans should incorporate appropriate monitoring of water courses and post-mining runoff associated with rehabilitated and revegetated areas of the mine that are directed to the local drainage, to detect and manage any surface water quality risks.

### Hydrogeology

There are minimal additional groundwater impacts from the proposal related to the *Protection of Environment Operations Act 1997* in this setting. Impacts from licenced groundwater extraction as a result of the modification are administered by DPE-Water under the Water Management Act 2000 and Aquifer Interference Policy 2012.

Proposed mining impacts on groundwater quality as a result of the modification relate to rainfall infiltration into new waste rock emplacements, but mitigation measures proposed include surface run-off collection and any leaking into the subsurface would flow towards the mining voids and not towards any outside receptors. The significant inward hydraulic flow gradients from the waste emplacement areas to the active open cut void would inhibit any outwards seepage to surrounding

groundwater environment, including to the alluvium and regolith and therefore no water quality related impacts to receptors are anticipated.

Post closure, the remaining mining voids are to become a groundwater sink. As the groundwater flow direction is towards the voids there are no anticipated impacts to receptors in terms of potential for deterioration of water quality.

To manage the potential for alluvial groundwater to migrate towards the mine as a result of drawdown and depressurisation, the mine constructed a cut off wall, keyed into the underlying regolith to minimise the movement of groundwater from the Hunter River alluvium into the active mining area.

The EPL for existing mining operations does not have any current groundwater monitoring requirements. The mine does have a groundwater quality bore network consisting of thirty-seven monitoring bores, with good spatial distribution into the three most productive groundwater units around the Mine. As part of the regular groundwater monitoring undertaken at the Mine, field chemistry parameters have been monitored since 2009 whilst both major and metal ions have been monitored since 2015.

Though no groundwater quality requirements are conditioned on the EPL, the mine has an approved groundwater monitoring program (GWMP) and is to continue through the life of the mine modification. The GWMP is proposed to be revised for the continuation of monitoring both levels quality post-mining.

**Recommendations** – no additional conditions of approval for groundwaters are required, should the modification be approved.

## **Attachment B: Overview of Greenhouse Gas Assessment documents**

### **Air Quality Impact and Greenhouse Gas assessment - Mt Arthur Coal Mine Modification 2 in Appendix B prepared by Todoroski Air Sciences – final version September 2023**

The Mount Arthur Coal (MAC) mine is situated 5 km south-west of Muswellbrook in the Upper Hunter Valley in New South Wales (NSW). The open cut operations at the MAC mine are currently approved until 30 June 2026. The currently approved extraction rate is 32 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal.

The MAC Modification 2 Project (or ‘the Project’) seeks to extend open cut mining operations to 30 June 2030 and reduce the maximum annual open cut ROM extraction rate down to 25 Mtpa. Approval is also sought for the extraction of 4 Mtpa from underground operations at MAC, even though the operator, Hunter Valley Energy Coal Pty Ltd (HVEC) has no current intention of commencing underground mining. Fugitive emissions associated with underground mining have not been considered in this assessment.

The Project will also reduce the maximum coal handling and preparation rate down to 29 Mtpa from 36 Mtpa, reduce coal train movements from 30 to 20 per day, and extend the disturbance area in the north-west corner of the mine by 25 ha while decreasing net total disturbance.

Approval for the Modification is sought under section 4.55(2) of the NSW Environmental Planning and Assessment Act, 1979 (EP&A Act).

#### **Scope of emissions**

The Greenhouse Gas (GHG) assessment covers scope 1 direct emissions from:

- fugitive methane emissions from open cut coal mining.
- consumption of fuels, oils and greases in stationary (e.g., generation of electricity and non-road machinery) and mobile transport sources.
- use of explosives (assumed ANFO).
- vegetation clearing.

It also covers scope 2 emissions from the consumption of purchased electricity by the Project.

Scope 3 indirect emissions include:

- extraction, production and transport of fuels, oils and greases consumed at the Project.
- purchased grid electricity used by the Project.
- transportation of product coal to port by rail and shipping to overseas consumers.
- combustion of product thermal coal by end users.

#### **Activity Data**

Table 9-1 in the GHG assessment gives the annual fuels, oils, greases, explosives, and electricity requirements for the Project as a function of ROM coal production. Quantities are given for each year covering FY27 to FY30 based on the anticipated volumes of ROM coal. The following 5 years cover the decommissioning phase of the Project (2031-2035 assuming these works commence at the end of FY30), where diesel is consumed by plant and equipment for rehabilitation works on the site.



A check was performed on the data in Table 9-1 against data reported by the MAC facility under the [National Greenhouse and Energy Reporting Scheme \(NGERS\)](#) up to 2021-22. The reported GHG scope 1 and 2 emissions data for the most part appeared to be consistent with historical NGERS data.

Approximately 9 ha of land-clearing is required for the Project annually – however the areas of each type of vegetation to be cleared was not specified (i.e., forest versus grassland).

### GHG emission factors and calculations

Section 9 of the GHG assessment indicates that the National Greenhouse Accounts Factors (NGAF 2023)<sup>1</sup> was the source for most of the scope 1, 2 and 3 emission factors (excluding explosives, land clearance, and product coal transport by rail and ship). They are therefore consistent with the International Panel on Climate Change (IPCC) Fifth Assessment Report (AR5). The NGA factors shown in Table 9-2 were checked and they accounted for emissions of the key GHGs carbon dioxide, methane and nitrous oxide.

The explosives emission factors were identical to those in the 2004 AGO Factors and Methods workbook.

The scope 2 electricity emission factor was also identical to that in the February NGAF 2023 of 0.73 kg CO<sub>2</sub>-e/kWh. NZEM notes that the August 2023 update to the NGAF gives the scope 2 emission factor as 0.68 kg CO<sub>2</sub>-e/kWh with a slight decrease in the scope 3 emission factor (0.06 down to 0.05 kg CO<sub>2</sub>-e/kWh).

However, the Proponent needs to revise the *forecast* scope 2 and 3 electricity emissions from 2027 to 2030 and for the decommissioning phase, depending on what year that phase starts. The Commonwealth Department of Climate Change, Energy, Environment and Water (DCCEEW) has developed projections for the scope 2 and 2/3 emission factor for the NSW grid out to 2035<sup>2</sup>. Table 36 in ref. 5 gives the projected scope 2 electricity grid emission factor in 2030 as 0.18 kg CO<sub>2</sub>-e/kWh. The scope 2 and 3 factor in 2030 (ref. 5, Table 37) is 0.19 kg CO<sub>2</sub>-e/kWh.

The scope 3 emission factors for rail and ship transport of the product coal were checked against the UK Government source<sup>3</sup>. Neither of the factors reported in Table 9-2 match the source document and they should be checked and the calculations corrected as required. The emission factors reported in the GHG assessment for bulk carrier shipping were approximately a factor of 4.5 lower than reported by the UK Government (2022). The GHG assessment states that the approximate rail distance is 240 km return, but no value was provided for product coal shipping. The distance assumed for shipping in the calculations should be provided.

The scope 3 emission factor for combustion of product coal (assumed bituminous) was also identical to the factors in NGAF 2022 and 2023.

The scope 1 emission factors for land clearing are consistent with those in the Greenhouse Gas Assessment Workbook for Road Projects.<sup>4</sup> However, the areas of forest and grassland to be

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<sup>1</sup> Department of Climate Change, Energy, the Environment and Water (DCCEEW, 2023). National Greenhouse Accounts Factors. Australian National Greenhouse Accounts Feb 2023 <https://www.dcceew.gov.au/sites/default/files/documents/national-greenhouse-accounts-factors-2022.pdf>

<sup>2</sup> Australia's Emissions Projections 2021, Department of Climate Change, Energy, Environment and Water (DCCEEW), October 2021. <https://www.dcceew.gov.au/sites/default/files/documents/australias-emissions-projections-2022.pdf>.

<sup>3</sup> UK Government (2022) greenhouse gas reporting: conversion factors. [Greenhouse gas reporting: conversion factors 2022](#).

<sup>4</sup> Transport Authorities Greenhouse Group (TAGHGG) (2013) Greenhouse Gas Assessment Workbook for Road Projects, prepared by the Transport Authorities Greenhouse Group, February 2013. [Greenhouse Gas Assessment Workbook for Road Projects \(nsw.gov.au\)](#).

cleared was not provided therefore the Proponent's land clearing emissions calculation could not be checked.

The scope 1 emission factor for fugitive emissions is a site-specific factor (0.0022 t CO<sub>2</sub>-e/t ROM) based on NGERs Method 2. The Proponent should give details as to how the factor was derived (e.g. what sampling and analysis was done). Additionally, as the Project extends MAC mine operations to 2030, the Proponent should provide whether the fugitive emission factor will remain the same or increase as deeper, and potentially more methane rich, coal seams are accessed. Greater detail on fugitive emissions should be provided.

The Proponent should also provide indicative values for the gas contents of the relevant coal seams and the methane and carbon dioxide contents of the seam gas. Further discussion should be provided as to whether these parameters will change markedly over the next seven years. This would provide more confidence that the quoted fugitive emission factor remains constant to the end of the Project.

### GHG emissions for the Project and Verification of Calculations

The vegetation clearing emissions could not be verified – two emission factors are provided for clearance of forests and grassland but only a single emission figure for vegetation clearing. The Proponent should specify the areas of each type of vegetation to be cleared annually to support the GHG emissions of 1,700 t CO<sub>2</sub>-e per year reported in Table 9-3.

In section 9.1 of the GHG assessment, the Proponent writes “some land clearing will take place, however as waste emplacement landforms are rehabilitated this would act to offset any previous GHG emissions associated with land clearing”. The Proponent needs to provide the assumptions and calculations to support the claim otherwise it should be removed.

A verification of the scope 3 emissions associated with the rail and shipping was not possible due to problems with the emission factors described previously. The reported scope 3 emissions from burning the product bituminous coal were 10-15% higher in the EIS compared to the EPA's estimates using the same emission factor and annual product coal estimates from Table 3-2 of the Modification Report<sup>5</sup>. The Proponent should provide the same annual product coal volumes in the GHG assessment (in Table 9-1) as used in calculations.

The figures in Table 9-4 have been verified, this being the annual average scope 1 and 2 emissions of 0.582 and 0.083 Mt CO<sub>2</sub>-e. However, the scope 2 emissions need to be reviewed in light of the declining NSW electricity grid GHG emissions intensity. The scope 3 annual average emissions could not be verified.

The Proponent estimates the annual average scope 1 and 2 GHG emissions for the Project contribute 0.5% of the NSW total and 0.13% of the Australian total in the year 2020. The impact of the scope 1 and 2 emissions from the Project should be compared against projected NSW emissions. DPE has developed a [Net Zero Emissions Dashboard](#) that shows base case and current policy GHG projections out to 2050. The Proponent should compare the maximum of the annual GHG emissions with the emissions in the corresponding year from the Dashboard. The Proponent can consider the impact of the Project in relation to the base case and current policy GHG emissions trajectories for NSW.

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<sup>5</sup> BHP Mount Arthur Coal Mine Modification 2, Modification Report, Table 3-2, p. 22, [https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=MP09\\_0062-MOD-2%2120230927T065309.967%20GMT](https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=MP09_0062-MOD-2%2120230927T065309.967%20GMT)

Under the Commonwealth Safeguard Mechanism, the approved MAC mine has a scope 1 GHG emissions baseline of approximately 0.50 Mt CO<sub>2</sub>-e for FY21-22. Under the emissions forecasts for the Project, there is a risk that the emissions cap will be breached for FYs 27 to 29. The Proponent has indicated in the Modification Report (ref. 8, p. 46) that they will not undertake major GHG mitigation activities to comply with the Safeguard Mechanism but will purchase and surrender ACCUs.

### GHG abatement measures

Section 9-5 of the GHG assessment lists a few relatively minor GHG mitigation actions. The most significant source of emissions for the Project is from diesel consumption for non-road vehicles. The reported mitigation measures include scheduled maintenance of equipment, turning off unnecessary lighting, optimising haul road design, and minimise re-handling of materials. These measures will be unlikely to reduce emissions to any significant extent. Evidence should be provided as to the significance of these reductions.

Apart from the above measures, BHP states that “given the relatively short duration remaining for operations, abatement measures involving large capital expenditure are not considered feasible by BHP.”

The EPA agrees that wide-scale availability of battery electric or perhaps hydrogen fuel-cell non-road vehicles by 2030 is unlikely. However, the Proponent should consider trialling a small number of these diesel alternatives or consider trialling biodiesel. This would lower the required capital expenditure and the industry could benefit from the learnings. BHP is looking to trial battery electric trucks in its Pilbara iron ore operations<sup>6</sup> and the EPA suggests a similar trial could be introduced at MAC.

It is noted that the participation in the Federal Government’s Energy Efficiency Opportunities (EEO) program is not possible as the EEO program was ended in 2014. The tangible abatement outcomes that would have been derived from participation in the EEO should be described.

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<sup>6</sup> [Electric vehicles: BHP tests heavy-haul trucks with electric motors charged by renewable power \(smh.com.au\)](https://www.smh.com.au)