

7 October 2025

Shagofta Ali
Director Policy and Strategy
NSW Environment Protection Authority
Locked Bag 5022
Parramatta NSW 2124

Dear Ms Ali,

Response to Proposed Greenhouse Gas Mitigation Guide for NSW Coal Mines Consultation Draft

Gear M Illawarra Met Coal Pty Ltd (trading as GM³) appreciates the opportunity to provide comment on the Proposed Greenhouse Gas Mitigation Guide for NSW Coal Mines Consultation Draft dated July 2025 (the Guide).

Both of GM³'s mines have gas drainage infrastructure. Appin Mine exports gas to a power station operated by Energy Developments Limited (EDL) and excess gas not directed to the power station is flared. Dendrobium Mine has a flare, however this is currently not able to be utilised due to the low methane concentration of the drained gas.

Both of GM³'s mines have initiatives to minimise leaks of methane from mined areas.

In summary, GM³ notes that:

- The timeframes for implementation of Ventilation Air Methane (VAM) abatement technologies (e.g. Regenerative Thermal Oxidizers – RTOs) are ambitious and the technology has not been proven to be safe and effective at operational coal mines in Australia. The EPA acknowledges that other VAM abatement technologies considered in the Guide *are not likely to be practical without many more years of research*.
- It is not well understood at what methane concentrations RTOs can effectively operate, and this is critical information that will be obtained from the Appin Mine Ventilation Shaft 6 trial. Commitments for full scale installations cannot be made until the outcomes of the trial are known. NSW coal mines are regulated quite differently from other jurisdictions and this leads to lower methane concentrations in upcast shafts.
- It is not reasonable to prescribe a technology (i.e. RTO) to be implemented within the nominated timeframe and then rely on an exemption process.

- The proposed approach of outlining prescriptive requirements then requiring mines to apply for exemptions is not supported, particularly for technologies that are unproven and are not suited at many mining operations. If the EPA persists with this approach a range of changes would be needed to reflect realistic implementation timeframes and minimise unnecessary feasibility studies.
- The focus for greenhouse gas (including methane) abatement needs to be consistently applied across all sources and industries.
- Most coal mines in NSW, and all coal mines that contribute significantly to NSW's carbon footprint, are subject to the Safeguard Mechanism (SGM). The SGM is outcome-based legislation. It requires industry to achieve emission reductions and enables industry to find the most effective way to achieve this outcome. NSW DCCEEW modelling indicates that the SGM will lead to a 50% reduction in coal mine emissions by 2030 – which is greater than the general federal target of 43% and in line with the NSW target of 50%¹.
- It is suggested that a specific technology (e.g. RTO) should not be prescribed, as this technology has not yet been proven to be able to be implemented and operated safely at an underground coal mine in NSW and may suppress research and development in other potentially more effective technologies.

GM³'s Illawarra assets have abated millions of tonnes of emissions through fugitive emission reduction measures. Significant resources have been directed towards improving gas drainage efficiency to abate additional methane through the Appin power station and flares, together with long-term investigations into the potential for VAM abatement.

GM³'s mines are regulated under the Commonwealth's SGM. The SGM has major financial implications for the business, and this is driving GM³ to investigate further emissions reductions opportunities.

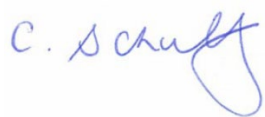
GM³ has significant concerns about the EPA proposing a range of NSW emissions-related requirements across the proposed Climate Change Licensee Requirements, the proposed Climate Change, Mitigation and Adaptation Plan (CCMAP) requirements and Coal Mine Mitigation Guide that are inconsistent with our existing SGM obligations. This will significantly complicate GM³'s regulatory obligations and it is not clear what benefits it will provide given our baseline decline rate and the demonstrated focus the business has on directly reducing emissions.

A detailed submission has been provided in Attachment 1.

Please do not hesitate to contact me on [REDACTED] if there are any questions.

¹ Refer to [NSW greenhouse gas emissions projections 2024](#).

Regards,

A handwritten signature in blue ink, appearing to read "C. Schultz". The signature is fluid and cursive, with a large loop at the end of the last name.

Chris Schultz

Superintendent Environment and Community

Attachment 1

Section 1.5

The Guide states that the agriculture sector is the largest source of methane emissions in NSW, yet due to the difficulty in regulating these emissions the focus of emissions reductions will be the coal mining industry. Emission reductions should be applied across all emitters equally rather than focusing on one industry that is regulated by the EPA to achieve the required overall emission reductions.

The Guide notes that reducing methane emissions will significantly contribute to NSW achieving its target of net zero emissions by 2050. It is noted that while methane is a greater contributor to climate change than some other greenhouse gases, it should not be the sole focus of emission reductions.

Section 2.1

The Guide notes that methane is explosive in air from 5% and poses a serious safety risk. This is of relevance to the significant amount of research and development that is still required to successfully implement methane abatement measures at underground coal mines. This significant safety risk is regulated by the Resources Regulator under Work Health and Safety (WHS) legislation and any abatement technology attached to an underground coal mine must be managed to protect the safety of underground personnel.

Section 2.2

It is noted that achieving a reduction in methane emissions will not necessarily achieve Net Zero by 2050, as there are other GHG gases emitted for which emission reductions are not in place.

The Guide states: *The most effective approach is to make a comprehensive plan at the mine design phase for the management of all sources of mine gas from the premises over the life of the mine.* The available technology is the limiting factor across the life of the mine as opposed to the mine plan. If the concentration of methane in emissions from gas drainage or ventilation air is too low for current technologies to treat (e.g. flaring, RTO), regardless of how the mine is planned, this will continue to be the case. Requiring these technologies to be implemented without consideration of the cost, practicalities and effectiveness is a significant concern and will negatively impact the industry.

It is stated that: *The gas management plan may include justification for prioritising methane capture and destruction at one phase of the mining process over another.* It is imperative that abatement plans can be phased during the mine life to account for research and development of new technologies to be implemented and for variable methane emissions generated at the mine, acknowledging that emissions treatment technologies are not yet available for lower methane concentrations.

Section 2.2.1

The methane concentrations required for VAM abatement or flaring stated in the Guide for gassy mines of >25–30% will be unable to be achieved for many underground coal mines without enriching the emission stream. This has the potential to increase emissions and utilise finite resources that are able to be used for beneficial purposes (e.g. the use of mains gas supplies that would otherwise be available for cooking and heating).

The installation of gas capture systems at mine closure to enable gas to be flared or utilised may be difficult. The concentration of methane emitted post closure will decline and will be subject to pressure differentials leading to ebbs and flows in emissions. The majority of methane will be liberated during the coal extraction process. If the concentration of methane during the operation of the mine is too low for treatment, it will not be high enough for treatment at mine closure. The installation of gas capture systems at mine closure may jeopardise the primary safety feature to prevent explosions in old coal mines, which is the creation of fuel rich inert atmospheres within the old mine workings.

Sealing of old areas of the mine (once extraction has ceased and critical mine infrastructure in these areas is no longer required), in addition to other actions that reduce methane emissions into VAM, will further reduce methane emissions in VAM to concentrations below the technically oxidisable limit of RTOs.

While flaring technologies are a viable technology for the destruction of methane, this technology will only be suitable at some underground coal mines where the methane concentration is sufficiently high.

Section 2.2.2

The Guide states: *underground mines must inject sufficient fresh air to dilute methane concentrations to provide safe working conditions and to reduce the risk of explosions*. It is considered that this wording could be improved as it implies that a risk of explosion is accepted. This is not the case.

The mine must provide sufficient fresh air to make sure the concentration of methane anywhere in the mine doesn't reach 40% of the lower explosive limit (i.e. 2%). This is explicit within WHS legislation. This directly leads to a situation where methane is so dilute that VAM may not be viable.

The Guide confirms that *VAM is exhausted from ventilation shafts at low concentrations, typically in the range of 0.1% to 1.0%.² Methane destruction methods such as flaring and methane utilisation are not possible at these low concentrations*. On this basis it is concerning that these technologies are being promoted as solutions, where there is no viable

² It is unlikely that any NSW coal mine would be exhausting 1% methane, due to dilution from ventilation and requirement to maintain methane below a potentially explosive concentration.

existing technology available that is able to effectively treat methane emissions at these concentrations. It needs to be acknowledged by the EPA that for some coal mines there are no reasonable and feasible technologies available to treat low concentration methane emissions. While applications for exemptions may be available, the requirement for VAM abatement for emissions below a specified methane concentration should automatically be exempt.

The Guide states that *the only existing method for destroying VAM includes regenerative thermal oxidation*. While this process has been proven to work at the research and development scale, this technology has not been proven to work within the current NSW WHS regulatory environment. This technology should not be recommended for implementation until it has been proven to work safely when integrated into the ventilation system at an operational coal mine.

The Guide also states *that emerging methods include regenerative catalytic oxidation (RCO), and VAM enrichment with utilisation, however the EPA's expert panel noted that these emerging VAM mitigation measures are not likely to be practical without many more years of research*. The EPA has acknowledged that these technologies require many more years of research before they could be reasonably or feasibly utilised at an underground coal mine, yet in Table 11 it states that the implementation of these technologies is required to be installed on all mine shafts (noting that the emissions from some mine shafts will not be emitting methane concentrations on which these technologies will be effective) and expected to commence by July 2030. This timeframe is not realistic, particularly where many years of research is required, that will then require additional years of trials to ensure that they can be implemented safely.

In addition, where large scale VAM abatement facilities are feasible for implementation and execution, it is likely that these facilities will be subject to the requirements of the *Environmental Planning and Assessment Act 1979*, whereby a Development Consent is required. It is our experience that the preparation of an Environmental Assessment and the determination of a Development Consent application can take several years. As such, the proposed timeframes for implementation of VAM abatement facilities appears unrealistic.

The Appin Mine Ventilation Shaft 6 Project for a trial plant is the most advanced application for the installation of VAM abatement technology in NSW. This application has not yet been approved. Pending approval, construction of the trial plant will commence, and once complete, at least six (6) months of operational data will be required if the trial plant is successful. This data will be used in the Environmental Assessment for the full-scale plant. An application will be required to be submitted, reviewed (subject to public consultation) and approved. Construction will commence after all engineering and other approvals have been received, with construction anticipated to take at least two (2) years. It is not expected that the Ventilation Shaft 6 VAM abatement installation will commence operating before CY31.

Table 7

While RTO plants have been trialled at a number of coal mines around the world, there is no information available that indicates the suitability for use in substantial abatement at Australian coal mines. The Factor of Safety under which RTO plants are operated around the world has not been disclosed, noting that the mining industry in NSW is regulated from a WHS perspective and this needs to be considered to determine viability.

The trial being planned at Appin Mine No 6 Ventilation Shaft is investigating what methane concentration the RTO will actually operate at as well as verifying that the plant can operate safely and meet the WHS requirements of the Resources Regulator.

The Guide states that there are two (2) RTO installations at Appin Mine. This is incorrect. WestVAMP, located at Appin North (formerly West Cliff Mine), was decommissioned in 2016, and the Appin Mine Ventilation Shaft No 6 installation, for which an application has been submitted to the Department of Planning, Housing and Infrastructure for assessment, is yet to be approved. A lab scale unit was installed at Ventilation Shaft 2 in 2002. It is noted that the regulatory requirements have become more stringent since this time and the small scale of the plant did not address all safety and technical issues associated with a large-scale plant.

The figures that are quoted to the EPA by suppliers for the treatment of VAM at 0.2% methane concentration are untested. RTO units need to be trialled and proven under Australian conditions with NSW Work Health and Safety Regulations before these figures are able to be relied on.

Safety systems have not yet been scaled to operate on a system sized to take all the mine exhaust. A component of the Appin Mine No 6 Ventilation Shaft trial is to test safe duct systems, and until this has been completed, design of a full-scale plant is not possible. The project will also be testing the effectiveness of the RTOs to address other components of VAM emissions.

Table 8

It is noted that following a pilot scale trial, additional research and testing will be required to determine the suitability of the technology for large scale operational use. As acknowledged by the EPA in the Guide, these technologies *are not likely to be practical without many more years of research*.

Table 9

It is noted that gas drainage with flaring is commercial and mature, however it needs to be clear that this is reliant on reasonably high gas concentrations to operate effectively and is not applicable to a number of mines in NSW.

VAM destruction using RTO plant is considered to be mature and commercial in the Guide, however this is not the case for this technology in underground coal mines in Australia,

notwithstanding the outstanding concerns around RTO safety that need to be resolved. This technology must be proven to be able to be safely operated in NSW before it is considered to be mature and commercial. In particular, it needs to be determined at what methane concentration an RTO can practically operate at and what safety systems are required to be installed. Each shaft will have a different inherent level of safety.

Table 11

GM³ does not support the approach of requiring mines to apply for exemptions from implementing a technology that is not yet proven and, even if it is, will not be suitable for many mines. It needs to be clear how the EPA will determine whether a technology is not reasonable and feasible for the granting of an exemption.

If the EPA must apply this approach, several changes would be required to better reflect realistic timeframes and minimise unnecessary burden on the industry.

The timeframe of July 2030 for the installation of VAM abatement on all mine shafts is not achievable. The technology may be close to being verified/tested by this point but to then implement a large-scale abatement facility will take an additional 18-months to 2-years to implement. It is suggested that the EPA review date is amended to at least July 2030. This is more aligned to the recently released Resources Sector Plan by the Commonwealth Government.

Additionally, not all VAM will have methane concentrations that are able to be treated by VAM abatement technology. There is no benefit in installing expensive technology on all shafts, with additional potential environmental impacts of large industrial facilities (e.g. vegetation clearing, noise, visual amenity) if the technology will not be effective.

With the timeframes associated with the closure of some mines, it is suggested that a financial payback consideration is incorporated into any decision-making process around which mines and which shafts are required to have VAM abatement installed.

It is noted that there are long timeframes for approvals, and VAM abatement proposals will be required to submit modification applications. The EPA should consider approval processes outside of the *Environmental Planning and Assessment Act* to facilitate implementation e.g. a special condition under the EPL or an Environmental Protection Notice.

In addition, there are limited suppliers of the VAM abatement technology, and with the roll out of this plan across NSW mining operations, it is expected that the timeframes for implementation will be extended due to the availability of specialist personnel and manufacturing facilities for the VAM abatement plant.

Table 13

Milestone targets should be provided for VAM abatement e.g. focus on sites with more significant emissions or longer remaining life first.

Q3.2

It is noted that underground coal mines should be able to transition to low emissions large mining machinery and low carbon alternatives however this is dependent on supply capabilities and advancements in engine technology that are difficult to predict with accuracy. There are a limited number of mining equipment suppliers and long lead times for equipment supply. In addition, due to the intrinsic safety requirements for underground coal mining equipment, and the relatively low number of suppliers, the lead time for implementation is extended. Trials and health assessments must be undertaken before new equipment is able to be used operationally.

The feasibility of implementing full electrification of an underground mining fleet would need to be carefully considered against the gross carbon emissions deficit resulting from installing the system to support this fleet against the relatively low emissions from continued diesel usage.

Q4.1

Implementing mitigation measures for minor Scope 1 emissions should be considered on a cost benefit basis. These emissions would need to be quantified and benchmarked across other operations and industries, with mitigation to be considered where the emissions are not within benchmarks. The quantum of these emissions against other site Scope 1 emissions should be considered, in addition to the remaining life of the mine.

The EPA should consider allowing the prioritisation of abatement spend across facilities according to emission intensity. Spend should be focussed on where the largest gains in emission reductions will be achieved, as opposed to requiring implementation of abatement technology at each facility with limited emission reduction returns.

Section 7.1.1

The need to provide a pre-feasibility level assessment to confirm a VAM abatement measure is not cost effective will place a burden on mining companies to produce a relatively in-depth study, when it may be readily apparent that a technology is not viable. For example, if a mine runs well below operating thresholds for VAM treatment, a significant spend on a pre-feasibility study (typically >\$100k) is clearly not required.

The EPA needs to be explicit in the Guide around how financial feasibility is to be assessed. If the EPA will prevent operators from pursuing least cost abatement, the impact on the productivity of the NSW mining industry needs to be accounted for in the regulatory impact statement (noting industry has not yet seen a regulatory impact statement). If the EPA intends to set a cost of carbon higher than the market value of Australian Carbon Credit Units (ACCUs) or market caps set for ACCUs, the EPA needs to transparently state the mechanism to determine financial feasibility within the Guide.

The EPA needs to consider the ability of a mining operation to publicly commit to mitigation measures. Operations will conduct work to reduce emissions however typically will not be able to commit to an ongoing implementation until technology is proven. This is likely to see companies seeking exemption to areas where the EPA has selected technologies that are not yet proven (for example RTO installation on all ventilation shafts). Regardless of the company's plans to implement VAM abatement, until the technology is proven, most companies will be unable to publicly commit to installation, as it would be misleading to the market (e.g. implying a level of emission direct abatement that may not result). If exemptions are not available based on a transparent process, companies will be unable to comply with both the EPA's requirements and their market obligations.

The development of a CCMAP is likely to require a company to either commit to abatement that is not yet proven and expose the company to litigation based on 'greenwashing', or take a publicly defensible approach relying heavily on offsetting. It is noted that the SGM legislates a required outcome, and modelling by the NSW government's Net Zero Commission indicates that by meeting safeguard obligations, the NSW coal mining industry will reduce emission by 50% by 2030 which meets the NSW government's more ambitious emission reduction target.

Q7.2

It is considered that the exemptions process should outline the circumstances in which an exemption does not need to be sought on specific technical feasibility grounds. This will streamline the process and reduce delays for approval.

Q7.3

It is not considered that information from a pre-feasibility assessment should be made publicly available as they are likely to contain business sensitive or proprietary information.

Q7.4

It is not considered that public input should be provided into the exemptions process. An exemption should be issued on the basis of technical assessment by subject matter experts. The public (in general) does not have the knowledge to provide technical input.

7 October 2025

Shagofta Ali
Director Policy and Strategy
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Locked Bag 5022
Parramatta NSW 2124
Dear Ms Ali,

Response to Climate Change Mitigation and Adaptation Plans: Proposed Mitigation Requirements Draft

The following comments relate to the EPA's consultation draft of 'Climate Change Mitigation and Adaptation Plans: Proposed Mitigation Requirements' released for comment in July 2025.

Requirement to Disclose planned emissions for next 10 years

The proposed requirement for operations to publicly disclose expected emissions for the next 10 years in the context of a plan for mitigation and adaptation will require a company to take a position on the likely impact of technologies that are currently still in development. To avoid claims of 'greenwashing' most companies will necessarily take a conservative approach which will lead to over-estimation of expected emissions. The Safeguard Mechanism sets a clear and transparent trajectory for emissions, and it is up to each company to determine how to achieve these emission reductions within their own financial and technological environment. It is suggested that publicly disclosing the operational details associated with this over a significant time frame is not possible as it requires assumptions around the success (or otherwise) of technology currently in development. It is suggested that the timeframe requiring operational details around on-site emission reduction be significantly reduced.

Requirement to Identify and Commit to Mitigation Measures

The EPA proposes licence holders 'identify and commit to mitigation measures', and that this plan should 'include mitigation measures over the next ten years'. Many technologies required to decarbonise underground coal mines are not yet mature. Industry is working through the trialling and implementation of abatement technologies, but practical experience operating and managing the safety aspects of some technologies is in the early stages of development. As such, operations are unable to commit to implementation with certainty, as it is not yet clear if the required technologies can be safely and practically applied, and the timeframe required to do so. To avoid litigation based on allegations of 'greenwashing', mines will be unable to commit to mitigation measures over the proposed timeframe. It is proposed that the timeframe where operations are required to commit to mitigation measures be reduced.

Proposal to Regulate Emissions through Environment Protection Licences (EPLs)

The proposal to regulate emissions through EPLs will mean a transition from the development consent to EPL as the means of regulating emissions in NSW. It is unclear how this transition will be managed, and under what legal mechanism this will be implemented. Conditions within an EPL can be unilaterally varied by the EPA (with notice to the licence holder), whereas conditions within a development consent cannot. It is noted that an EPL cannot be refused, and must be consistent with planning approvals, if it is necessary for carrying out development defined as State Significant Development or State Significant Infrastructure.¹ As such, clarity is required around the process intended to manage this transition.

Reporting of Scope 3 Emissions

It is noted that 'a CCMAP *may* include a description of the current Scope 3 greenhouse-gas emissions sources, and quantify those emissions, for the most recently concluded financial year', implying a voluntary application. However, given that the majority of Scope 3 emissions will either occur outside the NSW EPA's jurisdiction or be reported by safeguard facilities (and so already be readily available), there is little value in this requirement.

Use of Offsets

The draft guidance material indicates a preference for the use of offsets generated within NSW. This represents interference in the market for Australian Carbon Credit Units (ACCUs) by a government agency and risks distorting the market. The guidance material should be explicit that the use of offsets that meet the requirements of the Safeguard Mechanism (including those generated outside NSW) will be fully recognised in a licence holder's net emissions position.

The guidance material indicates that 'any use of Safeguard Mechanism Credits (SMCs) should be short-term arrangements only'. This indicates that the EPA intends to restrict the use of SMCs. This position may undermine the operation of the Safeguard Mechanism. It is suggested that this requirement be reconsidered.

Emission Goals

The draft guidance material indicates that 'the CCMAP must include a description of long-term (to 2050) and interim (years where there is a legislated NSW emission-reduction target e.g. 2030 to 2035) Scope 1 and 2 greenhouse gas emissions goals for the premises and how those goals will be achieved'. Further, the draft guidance material indicates 'emissions reduction goals should be in terms of absolute net emissions'. This is fundamentally inconsistent with the Safeguard Mechanism which is based on emissions intensity. It is suggested that for Safeguard facilities, the guidance material should state that emission reduction goals should align with the operation's Safeguard obligations.

Please do not hesitate to contact me on [REDACTED] if there are any questions.

¹ *Environmental Planning and Assessment Act 1979* (NSW) ss 4.42, 5.24.

Regards,

A handwritten signature in blue ink, appearing to read "C. Schultz". The signature is fluid and cursive, with a large loop at the end of the last name.

Chris Schultz

Superintendent Environment and Community