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31 May 2018

Garry Bailey
General Manager of Mining Development
The Bloomfield Group
Via email: gBailey@bloomcoll.com.au

RE: Rix's Creek Continuation of Mining Project –outline of assessment of $PM_{2.5}$ impacts, and key aspects of agency submissions

Dear Garry,
The following summaries the assessment of $PM_{2.5}$ impacts for the Rix's Creek Continuation of Mining Project (the Project) as presented in the Air Quality and Greenhouse Gas Assessment (AQIA) (**Todoroski Air Sciences, 2015**).

At the time of writing the AQIA, the New South Wales (NSW) Environment Protection Authority (EPA) did not have any impact assessment criteria for $PM_{2.5}$concentrations. The assessment however considered the goals in National Environment Protection Measure (NEPM) advisory reporting standards for $PM_{2.5}$.

We note that since the time of the assessment the new NSW EPA impact assessment criteria for $PM_{2.5}$ concentrations have been published, and are numerically the same as the goals applied in the AQIA. It needs to be noted that current NSW EPA impact assessment criteria were published in January 2017, do not apply retrospectively, and thus do not apply to this project. Nevertheless, given that annual average $PM_{2.5}$ has most bearing on potential health impacts, such impacts were considered.

It is also noted that the Department of Planning and Environment published a Draft Voluntary Land Acquisition Policy (Draft VLAMP) in November 2017. The Draft VLAMP does not apply retrospectively and this is not applicable to this Project, but in any case it is noted the draft VLAMP acquisition criteria for 24 hour average$PM_{2.5}$ apply to impacts from the project alone, whereas the EPA impact assessment criteria relate to cumulative impacts. Both the incremental and cumulative effects were assessed in the original AQIA, and in the update for the reduced production 2023 scenario set out in a 17 June 2016 letter from Todoroski Air Sciences (TAS).

OUTLINE OF THE PROVIDED ASSESSMENT OF $PM_{2.5}$IMPACTS
The AQIA assessed $PM_{2.5}$ impacts using a similar methodology as applied for the other dust metrics. Short-term (24-hour average) and long-term (annual average) periods were assessed with consideration of existing background levels. The NSW EPA contemporaneous assessment was applied to assess 24-hour average levels and to assess cumulative levels, all nearby mines were modelled and an unmodelled source/ background contribution of 5.2 $\mu g/m^3$ was added.

Ambient $PM_{2.5}$ concentrations in the area surrounding the Project were obtained from the NSW Office of Environment and Heritage (OEH) monitoring stations at Camberwell and Singleton (refer to Section 4.3.3 of the AQIA). The recorded 24-hour average $PM_{2.5}$ concentrations from the Section of the AQIA presented in

Figure 1. The graph illustrates the increase $PM_{2.5}$ levels during the winter period arising largely due to residential wood heater emissions.

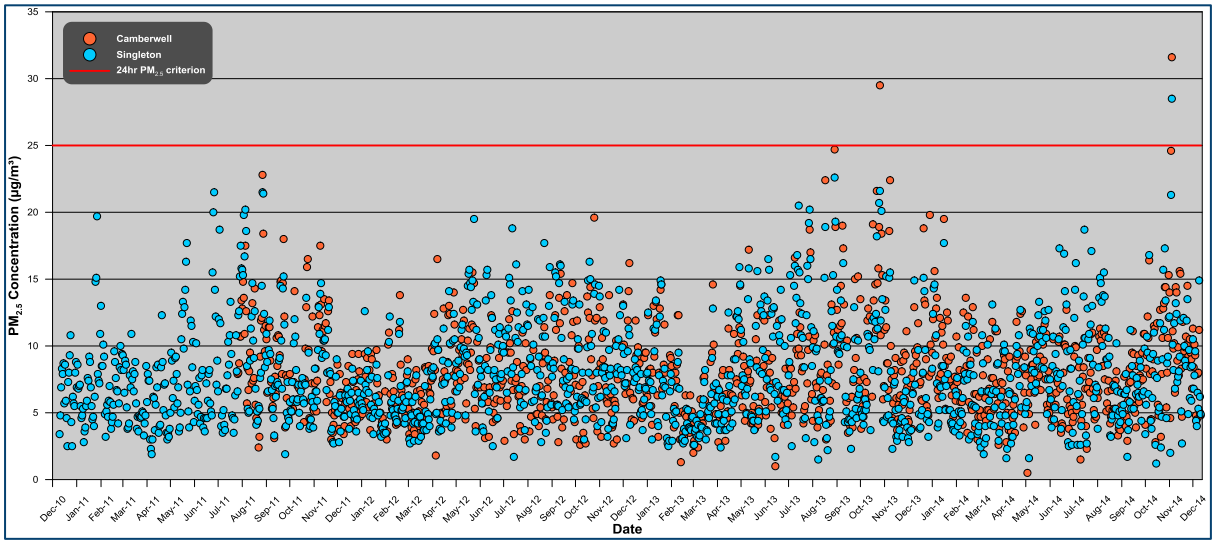

Figure 1: 24-hour average $PM_{2.5}$ concentrations at Camberwell and Singleton

Summary of Cumulative annual average $PM_{2.5}$ impacts

The assessment predicted that for the most critical health related aspect, cumulative annual average $PM_{2.5}$ concentrations would be below the criterion of 8µg/m³ at all privately-owned receptors in the vicinity of the project, with the exception of six receptors, Receptors 170, 172, 173, 174, 176 and 177. These receptors are already identified in the acquisition zone for other mine operations and are impacted regardless of the Project. The results are summarised in Section 9.5 of the AQIA.

Summary of cumulative 24-hour average $PM_{2.5}$results

The results of the assessment of cumulative 24-hour $PM_{2.5}$ impacts due to the Project is presented in **Table 1,** (refer to Section 9.6 of the AQIA, and the detailed tables in Appendix F of the AQIA).

The results indicate that there is no likely potential for cumulative 24-hour average $PM_{2.5}$ impacts to occur.

Table 1: NSW EPA Contemporaneous assessment – maximum number of additional days above criteria

Receptor ID	$PM_{2.5}$ analysis			
	2017	2020	2023	2026
1	0	0	0	0
19	0	0	0	0
61	0	0	0	0
140	0	0	0	0
151	0	0	0	0
163	0	0	0	0
164	0	0	0	0
170	0	0	0	0
171	0	0	0	0
173	0	0	0	0

Overall the assessment of $PM_{2.5}$ impacts suggests the Project is unlikely to cause any significant adverse impact above the applicable criteria.

Outline of $PM_{2.5}$ impact assessment in the original AQIA

The **original AQIA**, dated August 2015 contains an assessment of $PM_{2.5}$ effects arising due to the project, as follows:

- Section 2.2.2 – National Environmental Protection (Ambient Air Quality) Measure

Outlines the NEPM criteria for PM2.5 as adopted and applied in the assessment.

Section 4.3.3 – PM2.5 Monitoring

Presents ambient PM2.5 monitoring data recorded at Singleton and Camberwell.

- Section 8 – Accounting for background dust levels

Describes the estimated background levels used in the report, including PM2.5 levels.

- Section 9 – Dispersion modelling results

Presents the predicted modelling results for each assessed scenario, including incremental and cumulative PM2.5 levels. The various part of Section 9 relevant to $PM_{2.5}$ include:

  - Section 9.5 – Summary of results
  - Section 9.6 – Assessment of total (cumulative) 24-hour average PM2.5 and PM10 concentrations
  - Figure 9-2 to Figure 9-5 – presents graphs of predicted 24-hour average time series results for PM2.5 at selected receptors

- Appendix E – Isopleth diagrams

Present modelled contour plots including incremental and cumulative $PM_{2.5}$. Note that valid cumulative 24-hour plots cannot be generated/ presented and such effects are assessed in detail in Appendix F.

- Appendix F – Further detail regarding 24-hour PM2.5 and PM10 analysis

Presents the details of the cumulative 24-hour $PM_{2.5}$ impact assessment per the EPA contemporaneous assessment approach.

Note that the maximum case scenario for 2023 is revised due to scaled back production, as set out below.

OUTLINE OF KEY ASPECTS OF AGENCY SUBMISSIONS AND RESPONSES

The response to agency submissions, **TAS letter dated 17 June 2016**, responds to issues related to the AQIA raised by EPA, Singleton Council and NSW Health.

In the 17 June 2016 letter:

- Part 2 of the response to the NSW EPA submission contains a revised assessment of the maximum 2023 scenario, as there was a significant scaling back of production. It is noted that this part shows the incremental and cumulative $PM_{2.5}$ (and all other dust metric)impacts in Table 3.
- The response to the NSW Health submission notes that NSW Health's submission relates to only the summary of the air assessment in the main body of the EIS, and that the AQIA contains all of the information/ clarification sought by NSW Health. This also outlines that the WHO health based particulate criteria are for annual average $PM_{2.5}$ levels but in the absence of $PM_{2.5}$ data, a defactoPM_{10} annual average criterion of 20 $\mu g/m^3$ can apply (based on a typical 50% $PM_{2.5}$ fraction in the PM_{10} in urban air sheds of large cities), or a site specific annual average PM_{10} defacto health criteria can be applied where the $PM_{2.5}$ to PM_{10} ratio is

known. In the Hunter Valley, this translates to a health based default PM_{10} criterion of 29µg/m^3, and 31µg/m^3 in areas outside of towns, either of which is close to the applicable EPA criterion of 30 µg/m^3 for annual average PM_{10}.

In its **letter dated 8 December 2016, NSW Health** provides further a submission acknowledging that the NEPM criteria are not applicable to an impact assessment of a project (but should be considered nevertheless), that the AQIA contains an assessment of $PM_{2.5}$ impacts, and that health impacts are predominantly driven by annual average $PM_{2.5}$. (For context we add that in general >98% of the health impact is driven by $PM_{2.5}$ annual average exposure, the NEPM goals are considered in the assessment, and/ or information is provided to enable any such consideration).

In this letter NSW Health also notes an emerging issue of potential PM_{10} effects on respiratory health, unfortunately however to illustrate the issue NSW Health refers to the redundant PM_{10} contour plot for the maximum 2023 scenario, (Figure E26) from the original AQIA, instead of referring to the updated assessment in the TAS letter dated 17 June 2016, (which the NSW Health letter is responding to). In this regard NSW Health also refers to new NEPM goals for PM_{10}which are 25 µg/m^3, and are not applicable to the assessment, especially retrospectively.

Nevertheless, we note that Table 3 in the updated assessment in the TAS letter dated 17 June 2016 shows that there are no new cumulative PM_{10} impacts above 25 µg/m (or the applicable criterion of 30 µg/m^3) due to the project at any private receptors. Please observe that Receptor 1 has a negotiated agreement with the mine, and would continue to be impacted by Rix's Creek activities, and six other more distant receptors that are already impacted by other unrelated projects would remain impacted irrespective of the Rix's Creek project.

The NSW Health letter dated 8 December was received after issuing a **TAS letter dated 9 December 2016 responding to EPA issues** related to the number/ identification of locations considered in the cumulative 24-hour assessments, wind erosion areas and diesel particulate emissions. The TAS letter notes that double counting the diesel emissions is not valid, but in any case would at most increase the maximum predicted $PM_{2.5}$ level due to the project by 0.08µg/m^3, which is insignificant.

The TAS letter notes that all receptors (hundreds) in the vicinity of the project are identified and assessed, the most impacted receptors are specifically identified, and there are no unidentified other receptors impacted, (despite the EPA assertion otherwise). The letter points out that if no additional impacts arise in the vicinity of the project, no other more distant receptors can be impacted to a greater level.

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

Yours faithfully,
Todoroski Air Sciences

Aleks Todoroski

Philip Henschke

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