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Gwen Wilson
Group Manager – Safety Health Environment Community
CBH Resources Ltd

Via email: gwenwilson@cbhresources.com.au

26 June 2019

Reference: 0476778

Dear Gwen,

Subject: MOD7 Proposed additional crushing and screening activities from BHP Pit.

1 Introduction

Broken Hill Operations Pty Ltd (BHOP) [a wholly owned subsidiary of CBH Resources Limited (CBH)] owns and operates the Rasp Mine (the Mine), located centrally within the City of Broken Hill on Consolidated Mine Lease 7 (CML7).

ERM (formerly Pacific Environment) has provided technical air quality input to the BHOP Rasp mine since its original development application and through all subsequent modifications (MODs), up to the current MOD7.

It is understood that BHOP seeks a change to MOD4 to use rock fill material for the construction of three embankments (E1, E2 and E3 respectively) currently stored in BHP Pit and to conduct crushing and screening activities within BHP Pit.

Currently these activities are listed to occur only in Kintore Pit (as stated in MOD4 Environment Assessment, April 2017) and BHOP propose to utilise either Kintore Pit or BHP Pit for these activities.

Following consultation with the NSW Department for Planning (the Department), it was requested that BHOP address the following within their Modification Report:

- Demonstration that there is minimal incremental impacts compared to the approved project, particularly in relation to…air from the relocation of the crusher, and that the operating conditions and relevant noise and air criteria would continue to be met.

ERM has been requested to provide some commentary as to the potential air quality impacts associated with this proposed relocation.

2 Changes to Traffic Movements associated with Proposed Change

Table 1 summarises the truck movements and distances associated with sourcing rock-fill material from either the Kintore Pit or the BHP Pit.

Table 1: Predicted vehicle kilometres travelled – Kintore Pit versus BHP Pit

Material	E1	E2	E3	TOTAL
Rock fill required (m^3) to 200mm	14,300	29,000	20,500	63,800
Rock fill required (m^3) to 50mm	750	2,000	2,000	4,750
Return trips required for rock fill (max size 200m) – assuming 13 m^3 per truck load (50 t truck)	1100	2231	1577	4,908
Return trips required for rock fill (max size 50m) – assuming 13 m^3 per truck load (50 t truck)	177	154	154	485
Total return trips	1,277	2,385	1,731	5,393
Total trips to and from the Pit to construction site	2,554	4,770	3,462	10,786
Travel distance (km) from Kintore Pit	2.5	2.9	2.3	-
Total distance travelled from Kintore Pit (km)	**6,385**	**13,833**	**7,963**	**28,181**
Travel distance (km) from BHP Pit	1.2	1.6	1.0	-
Total distance travelled from BHP Pit (km)	3,065	7,632	3,463	14,160
Total reduction in distance travelled (km)	**3,320**	**6,201**	**4,500**	**14,021**

Source: Pers. Comm. CBH 24/6/19

It can be seen from Table 1 that the distance between the embankment emplacement areas and the BHP Pit is almost half that of the distance between the embankment emplacement area and the Kintore Pit. As such, it is anticipated that this would result in a decrease in the predicted emissions associated with transporting the rock fill material.

3 Air Quality Impacts of Proposed Change

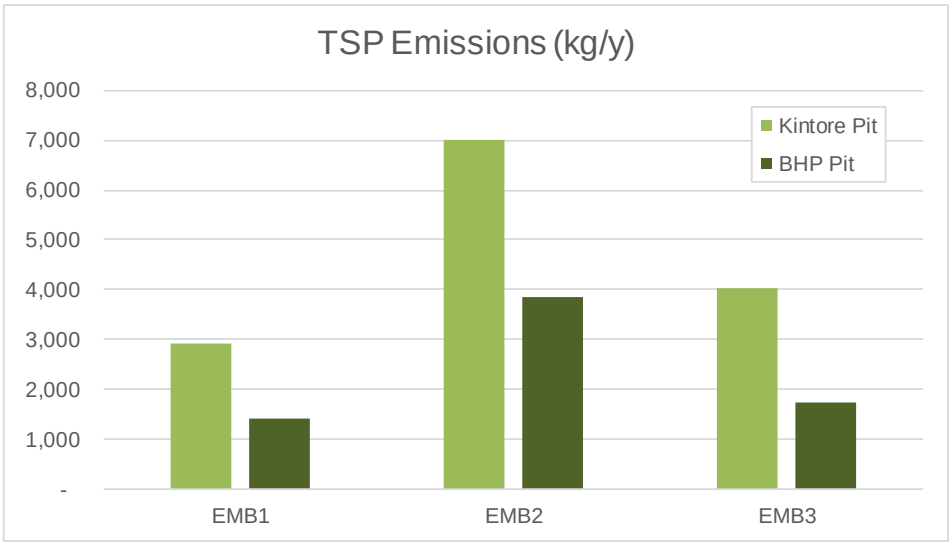
Table 2 and Figure 1 provide an estimation of the annual emissions and worst-case 24-hour emissions for TSP, PM_{10} and $PM_{2.5}$ respectively associated with truck movements carrying rock fill material from either the Kintore Pit or the BHP Pit to the embankment emplacement areas.

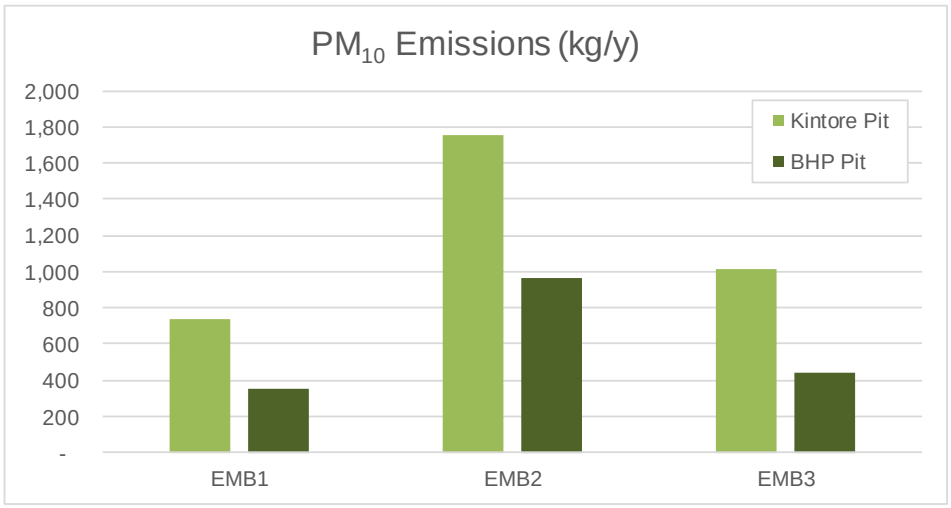
The emissions inventory used follows the same calculations and assumptions as those used for the dispersion modelling previously conducted by Pacific Environment (now ERM) for the Air Quality assessment conducted for MOD4 of the Mine.

Table 2: Emission estimates for rock fill truck movements from different source pits

	Annual Emissions (kg/annum)			Worst case 24-hour emissions (kg/day)*	
	TSP Emissions	PM_{10} Emissions	$PM_{2.5}$ Emissions	PM_{10} Emissions	$PM_{2.5}$ Emissions
Source - Kintore Pit					
Waste Rock – haul to E1	2,936	735	74	8,916	892
Waste Rock – haul to E2	7,014	1,757	176	10,342	1,034
Waste Rock – haul to E3	4,038	1,011	101	8,202	820
Total	**13,987**	**3,503**	**350**	**27,461**	**2,746**
Source - BHP					
Waste Rock – haul to EMB1	1,409	353	35	4,280	428
Waste Rock – haul to EMB2	3,870	969	97	5,706	571
Waste Rock – haul to EMB3	1,755	440	44	3,566	357
Total	**7,034**	**1,762**	**176**	**13,552**	**1,355**

Note: **Annualised worst case 24-hour* emission estimates are reflective of the emission quantity applied in the model for the estimation of peak-24 hour impacts [i.e. assuming short-term peak operations occur on a continuous basis]. These quantities are not reflective of annual emission estimates.





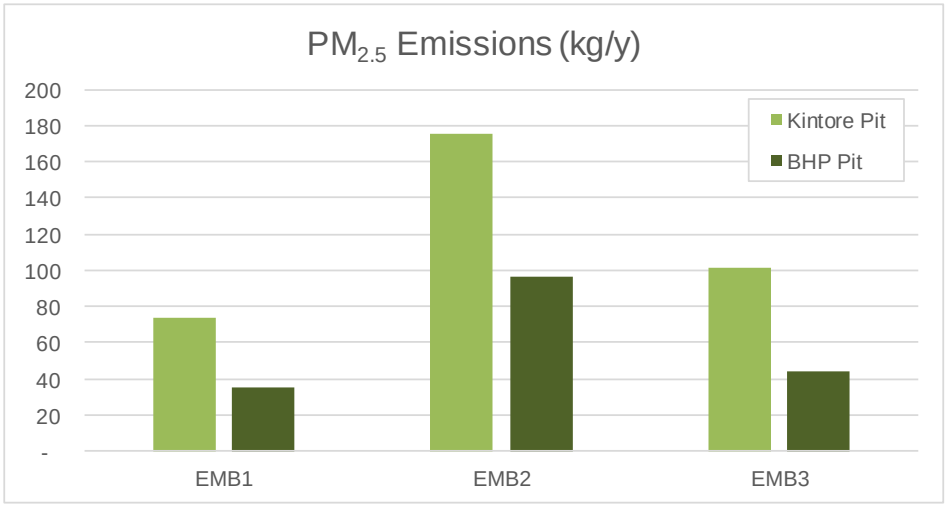


Figure 1: Emission estimates for rock fill truck movements from different source pits

As shown in Table 2 and Figure 1, it is anticipated that the proposed change of sourcing rock-fill material from the BHP Pit rather than the Kintore Pit will have positive impacts in terms of the ongoing air quality management, with the following reasons cited:

- BHP Pit is located closer to the embankment works and relocating these activities to BHP Pit would reduce travel distances by up to half, resulting in a reduction of dust generation from traffic movements on both sealed and unsealed road sections.
- In addition the use of BHP pit will minimise double-handling on feed waste rock and product stockpiles (dedicated stockpiles) thus minimising handling and the potential for dust generation.
- Finally, the use of BHP pit as opposed to Kintore pit for crushing and screening means that these potentially dust generating activities would be contained more centrally within the site boundary (i.e. at an additional separation distance from the site boundary compared with the scenario anticipated within the original MOD4 application.

The hauling of rock fill to the three Embankments forms a material contribution to the total Mine particulate emission inventory.

As such, dependent upon the Embankment being serviced (and the particle size fraction being evaluated), the total Mine particulate emission inventory is anticipated to be reduced by between 6% and 16% through the use of the BHP Pit as an alternative to Kintore Pit.

4 Closure

ERM has reviewed the proposed changes and confirms that the above listed benefits are anticipated to reduce the particulate matter emission inventory compared with that estimated within the original MOD4 air assessment.

It is therefore anticipated that the potential for off-site air quality impacts will be reduced compared to the status quo.

Please do not hesitate to contact the undersigned if you need to discuss (or require clarification on) any aspect of the above.

Yours sincerely,

Damon Roddis
Partner – Air Quality and Greenhouse