

MANGOOLA OPEN CUT

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11 March 2021

Commissioner Prof. Snow Barlow
Commissioner Peter Cochrane
Office of the Independent Planning Commission
201 Elizabeth Street
Sydney NSW 2001
Via email to: ipcn@ipcn.nsw.gov.au

Dear Commissioners,

Re: Response to IPC questions during site inspection and locality tour (SSD8642) – Potential for voids to spill in a rainfall event and void water quality

The Independent Planning Commission (IPC) completed a site inspection and locality tour on 2 March 2021 in relation to Mangoola Coal Continued Operations Project (the Project). During the tour, the IPC asked two questions in relation to the final voids proposed under SSD 8642. It is understood that the questions related to:

1. In a rainfall event of greater than a 1:100 Annual Exceedance Probability (AEP) would the proposed final voids spill?
2. Work undertaken in regards to final void water quality?

Mangoola sets out below its response to the questions raised.

1. Would the final voids spill during a rainfall event of greater than a 1:100 Annual Exceedance Probability (AEP)?

Mangoola has considered the question and in consultation with the water specialist Hydro Engineering and Consulting (HEC), who completed the Surface Water Impact Assessment (HEC 2019) for the Environmental Impact Statement (EIS), provides the following information:

- As noted in the Project's EIS (Section 6.7.3.2 Final Void Water and Salinity Balance), the final void modelling results indicate that both of the proposed final pit lakes would reach an equilibrium level more than 30m below their respective spill levels (i.e. the lakes are contained, and act as hydraulic sinks)
- Using the EIS findings as a starting point, the Probable Maximum Precipitation (PMP) rainfall event has been modelled with a conservatively high runoff rate of 100% applied (i.e. assuming that all rainfall becomes runoff that drains into the void)

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- With a probable maximum rainfall event of 120 hours (five day) duration, with 100% runoff, it is estimated inflow volumes to the Northern Extension Void, when superimposed on the previous final void maximum water levels, would result in freeboards to spill of 24m
- With a probable maximum rainfall event of 120 hours (five day) duration, with 100% runoff, it is estimated inflow volumes to the Mangoola Mine Void, when superimposed on the previous final void maximum water levels, would result in freeboards to spill of 20m

The five day PMP rainfall event total is estimated as 1480mm of rainfall (with average annual rainfall at Denman BoM station 061016 approximately 591mm (HEC 2019)). The PMP usually equates to approximately a 0.0001% (1:10⁶) AEP event. This is well in excess of the 0.1% (1:1000) AEP event mentioned by the IPC Panel on the site inspection and locality tour.

This very conservative theoretical calculation shows that the void will retain significant freeboard and is not predicted to spill in extreme rainfall events.

2. Long term water quality with the voids

As noted in the Response to Submissions, final void water and salt balance modelling was undertaken as part of the EIS (Appendix 11 Surface Water Assessment) to simulate the behaviour of the pit lake that would form in each of the final voids. Based on the EIS (Appendix 21 Geochemical Assessment), runoff and seepage from overburden is not expected to be acidic and is not expected to contain significant metals concentrations. Therefore, long term salinity is the key consideration for pit lake water quality.

The scope of the Geochemical Assessment included assessment of the mine materials (overburden, rejects and tailings) in order to identify any geochemical issues and provide recommendations for materials management. Groundwater quality is considered and assessed in the EIS (Appendix 12 Groundwater Impact Assessment (GWIA)). The findings from the Geochemical Assessment are an input to the GWIA and the Surface Water Assessment (as relevant to spoil seepage water quality).

The Geochemical Assessment found that, following testing of materials from the current operations and the MCCO Additional Project Area, overburden and coarse reject materials are likely to be non-acid forming and non-saline. The MCCO Project is proposing to mine within the same seams and geology as the existing Mangoola Coal Mine. Current experience has found pit water to be neutral to slightly alkaline (pH 8 to 8.5) and of relatively low salinity (EC of 3,500 to 5000us/cm).

Post mining, the majority of the two mining areas will have been backfilled with overburden, with the remaining areas forming pit lakes in the final voids. Over time, the spoil would re-saturate until water levels reach equilibrium with the surrounding bedrock groundwater.

The MCCO Proposed Additional Mining Area will remain a strong groundwater sink, and no significant outflow to bedrock from the mining area is predicted. Any water quality change will therefore remain within the mining footprint.

In the Response to Submissions (RTS) report (Dec 20202) Section 3.8.11, Mangoola provided a response to Muswellbrook Shire Councils submission query " *Water management is an oblique activity and not an end use.*

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What is the end use of the proposed pit lakes?" The following is an extract from the RTS that addressed this question.

"As outlined in Section 6.7 of the EIS, a groundwater assessment of the final landform (at closure) indicates that the proposed final voids (non-back filled mine areas) will form long-term hydraulic sinks and will be comprised of two open water pit lakes. The final void water balance modelling found that these pit lakes will not spill as the predicted water level will reach equilibrium well below the spill point of the voids. Equilibrium levels would be reached slowly over a period of more than two hundred years. Final pit lake salinity levels would increase slowly as a result of evapo-concentration. After approximately 300 years the salinity of the final voids will have an EC of less than 10,000 $\mu\text{S/cm}$ (or less than approximately 6400 mg/L assuming a factor of 0.64 to convert from $\mu\text{S/cm}$ to mg/L). At this water quality the voids would be available for a range of uses including recreational uses and potentially aquaculture (if desired in the post mining landscape) as is discussed further in Section 6.17.5 of the EIS.

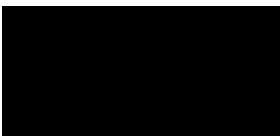
At this salinity, the final void pit lakes could support a range of fish species. Certain fish and other aquatic species can tolerate a broad range of water quality including the salinity values predicted for the final voids, including Silver Perch and Australian bass. The ANZECC Guidelines for Silver Perch identify a salinity of less than 3000 mg/L for freshwater and between 3000 and 35,000 mg/L for saltwater (Australian and New Zealand Environment and Conservation Council). Australian bass can tolerate 12,000 to 15,000 mg/L (Victorian Fisheries Authority). The proposed voids are therefore predicted to have salinity levels after 300 years that would cater for both of these species.

As discussed in Section 6.17.5 of the EIS, with regard to the proposed final voids, they are proposed to be water bodies in a conservation landscape. While alternative uses are not proposed as part of the EIS, the availability of waterbodies in the post mining landscape combined with the predicted water quality within the final voids provides the opportunity for a range of uses. Should such uses be proposed, they would require further detailed consideration at that time subject to the individual water quality needs of each land use, with the following discussion based on the outcomes of the final void salinity assessment completed as part of the Surface Water Assessment.

Table 6.34 in the EIS provides further analysis of potential alternative post mining land uses for the Mangoola Coal Mine, including the final voids."

We welcome the opportunity to discuss any aspects in this letter with you further, should you require.

Yours sincerely



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