Appendix C

Surface water responses

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16 February 2021

Associate Director
EMM Consulting
Ground floor, 20 Chandos Street
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Attention: Paul Freeman

Paul,

Re: Cowal Gold Operations Underground Mine Project Hydrological Assessment – Response to DPIE Water and NRAR Comments

Further to your email of 28 January 2021 and subsequent correspondence, we have prepared the following responses to the detailed comments provided to the NSW Department of Planning, Industry and Environment (DPIE) – Planning & Assessment by DPIE Water and the Natural Resources Access Regulator (NRAR) on 22 January 2021[1] in relation to the *Cowal Gold Operations Underground Mine Project Hydrological Assessment* (HEC, 2020)[2].

Comment

"90th percentile rainfall sequence (Dry) annual demand from the Bland Creek Paleochannel Bores to be approximately 3,700 ML/year (in year 2022). The proponent currently holds a licence with an entitlement of 3,650 ML/year" (DPIE Water and NRAR, 2021).

Response

Figure 10.5 of the *Cowal Gold Operations Underground Development Environmental Impact Statement – Main Report* (EMM, 2020)[3], referred to as the EIS Main Report herein, references Figure 19 of the *Cowal Gold Operation Underground Mine Project Hydrological Assessment* (HEC, 2020) which is included as Appendix G of the EIS. However, Figure 10.5 of the EIS Main Report was copied from a draft version of the *Cowal Gold Operation Underground Mine Project Hydrological Assessment* and is inconsistent with Figure 19 of the final *Cowal Gold Operation Underground Mine Project Hydrological Assessment* included as Appendix G of the EIS.

[1] DPIE Water and NRAR (2021). "Cowal Gold Operations Underground Development (SSD 10367) & Cowal Gold Mine (DA 14/98) Modification 16 EIS & Modification Report". Letter provided to DPIE – Planning & Assessment, OUT20/14674, 22 January 2021.

[2] HEC (2020). "Cowal Gold Operations Underground Mine Project Hydrological Assessment". Hydro Engineering & Consulting Pty Ltd report prepared for Evolution Mining (Cowal) Pty Limited, J1006-12.r1e, 24 September.

[3] EMM (2020). "Cowal Gold Operations Underground Development Environmental Impact Statement – Main Report". Prepared for Evolution Mining (Cowal) Pty Limited, October.

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Figure 19 of Appendix G of the EIS (refer Figure 1 below) presents the water balance simulated 10th percentile, median and 90th percentile annual water demand / usage from the Bland Creek Paleochannel Bores. The 90th percentile annual volume is the demand / usage that was predicted not to be exceeded in 90% of the simulated 131 climatic sequences and the 10th percentile annual volume is the demand / usage that was predicted not to be exceeded in 10% of the simulated 131 climatic sequences. The percentile plots indicate predicted annual volume ranges between the 10th and 90th percentile risk or confidence limits / levels within which the predicted annual volumes could vary. The 90th percentile annual demand does not represent the annual demand / usage for the 90th percentile rainfall sequence, rather the 90th percentile annual demand / usage based on all 131 climatic sequences (model realizations) simulated. This is stated in the second paragraph of Section 6.2.2 of Appendix G of the EIS.

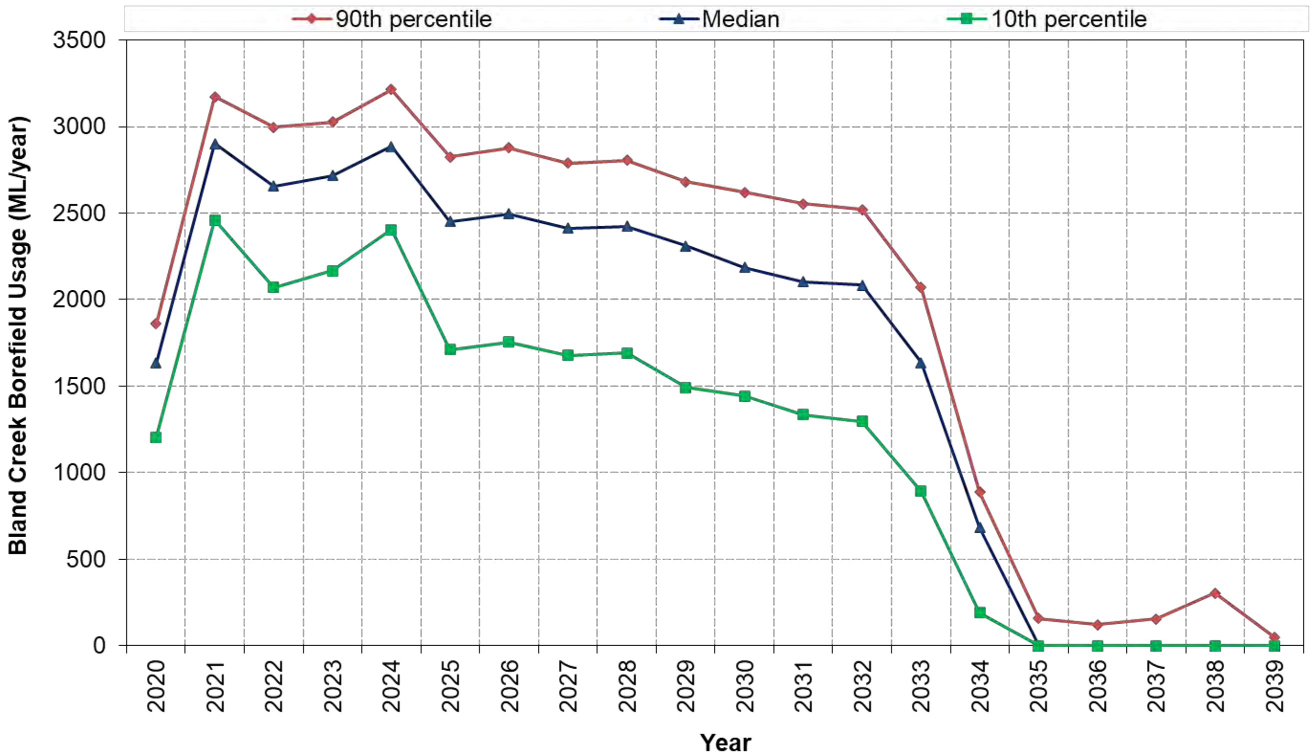

Figure 1 Predicted Annual Bland Creek Palaeochannel Borefield Usage (refer Figure 19 of Appendix G of the EIS)

Figure 1 (Figure 19 of Appendix G of the EIS) illustrates that the annual demand from the Bland Creek Paleochannel Borefield is predicted to peak at 3,215 ML in 2024 based on the 90th percentile model results (calculated from all 131 simulated climatic sequences) and at 2,901 ML/year in 2024 based on the median model results (calculated from all 131 simulated climatic sequences). These annual volumes do not exceed the 3,650 ML/y held by the proponent.

Additional points of note:

- The results presented in the plots included in Section 6.2 of Appendix G of the EIS are not to be confused with the water balance model results (averaged over the remaining mine life) presented in Table 17 of Appendix G. The results presented in Table 17 of Appendix G of the EIS are from the model realization representing the 10th percentile rainfall sequence (representative of low 19-year rainfall conditions – totalled over the full model simulation period of 7,061 days), median rainfall sequence (representative of median 19-year rainfall conditions – totalled over the full model simulation period of 7,061 days) and the 90th percentile rainfall sequence (representative of high 19-year rainfall conditions – totalled over the full model simulation period of 7,061 days).

- Table 17 presents the water balance model results averaged over the proposed remaining mine life based on 19-year low, median and high rainfall conditions while the plots in Section 6.2.2 of Appendix G of the EIS present the 10th percentile, median and 90th percentile statistical model results calculated from all 131 climatic sequences simulated and are therefore a more conservative estimate of demand / usage in each year.
- The water balance model has been developed such that the maximum annual simulated supply from the Bland Creek Paleochannel Borefield cannot exceed 3,650 ML i.e. an annual supply from the Bland Creek Palaeochannel Borefield of 3,700 ML cannot be simulated by the model.

Comment

"A difference (shortfall) of 109 ML/year between inflow and outflow for the dry rainfall sequence (90th percentile) shown in EIS Appendix G is without any explanation" (DPIE Water, 2021).

Response

Table 17 of Appendix G of the EIS presents a simulated total inflow of 7,399 ML/year and total outflow of 7,290 ML/year, averaged over the remaining mine life, for the 10th percentile rainfall sequence (representative of low 19-year rainfall conditions – totalled over the full model simulation period of 7,061 days). This equates to an increase in simulated total site stored water volume of approximately 2,107 ML over the full simulation period or 109 ML/year on average. Note that as the 2,107 ML volume has been calculated from an average annual volume assuming 365.25 days per year on average, the actual simulated volume over the full simulation period may be slightly higher or lower than 2,107 ML.

For the model realization which equates to the 10th percentile rainfall sequence (representative of low 19-year rainfall conditions – totalled over the full model simulation period of 7,061 days), the initial total site stored water volume was set at 961 ML on 30 April 2020 (commencement of model simulation) based on data supplied by Evolution (refer first paragraph of Section 6.2 of Appendix G of the EIS). The simulated total site stored water volume on the last date of the model simulation (30 August 2039) was 3,200 ML equating to a simulated increase in total site stored water volume of 2,239 ML (approximately equal to the estimated 2,107 ML volume calculated based on an average increase of 109 ML/year).

The increase in simulated total site stored water volume over the model simulation period is due to 'rules' that are simulated in the model for each site water storage regarding storage operating volumes, particularly for storage D9 / D10. For storage D9 / D10, the model rules specify that water is to be supplied to storage D9 / D10 to retain the stored water volume at 97.5% of the storage capacity in order to ensure supply reliability. Note that the model was simulated for two scenarios:

1. with storage D10 simulated as operational from January 2024 providing an increase in capacity of 1,500 ML; and
2. without simulation of storage D10.

Without simulation of D10, the predicted total inflows average 7,232 ML/year while total outflows average 7,209 ML/year, for the median rainfall sequence – refer last paragraph of Section 6.2.1 of Appendix G of the EIS. The reduction in total inflow is largely due to a reduction in external water supply requirements necessary to maintain a high water storage volume in D10. The reduction in total outflow is largely due to a reduction in water surface evaporation associated with water storage D10. This equates to a simulated increase in total site water storage of 23 ML/year (approximately 445 ML over the full model simulation period).

It should be noted that the estimated increase in total site stored water volume is based on the rules that are simulated in the model. In actuality, the management of total site water storage will vary on a day-to-day or year-to-year basis, particularly towards the end of the mine life when the stored water volume may be drawn down.

Comment

"Use the dry rainfall sequence (90th percentile) instead of median sequence for prediction of the project water requirements throughout the EIS Report and appendices where water requirements are mentioned" (DPIE Water, 2021).

Response

As stated above, Appendix G of the EIS presents model results for water requirements as either:

1. simulated average annual volume over the remaining mine life based on 19-year low (10th percentile), median and high (90th percentile) rainfall conditions; or
2. the 10th percentile, median and 90th percentile model results calculated from all 131 simulated climatic sequences.

For all model results, the simulated volumes predicted based on both of these two approaches are presented in Appendix G of the EIS.

Please contact the undersigned if you have any queries.

Yours faithfully,

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Director