18-12 GENERAL RESPONSE TO EIS

Concern:
In general, the EIS does not clearly identify the locations of groundwater users at risk, hence plans to monitor and control risks are premature and vague. The development of a robust Water Management Strategy under a best practice risk management framework should be undertaken before any regulatory approval to enable consideration of a proposal to mine near Lue.

This concern responds to the following SEARs for SSD 5765:

- A description of the existing environment likely to be affected by the development, using sufficient baseline data;
- A description of mitigations and
    - Whether these are best practice and represent a full range of measures
    - Whether they will be effective / key performance indicators
    - Contingency plans for residual risks / monitoring and reporting on environmental performance
- An assessment of the likely impacts of all stages of the development, including any cumulative impacts, taking into consideration any relevant legislation, environmental planning instruments, guidelines, policies, plans and industry codes of practice;
- A summary of commitments
- Part 3: Any interference with an aquifer caused by the development does not exceed the respective water table, water pressure and water quality requirements specified for item 1 in columns 2, 3 and 4 of Table 1 of the *Aquifer Interference Policy 2012* for each relevant water source listed in column 1 of that Table.
- Part 3: impacts to significant water resources or threatened species are minimised to the greatest extent practicable
- Assessment of Lawsons Creek and Price Creek
- Assessment of likely impacts to aquifers; detailed site water balance, management of excess water and reliability
- DRG, Attachment 2A requires rehabilitation methods including
  e) monitoring for rehabilitation
  i) details of triggering intervention
  k) details of post-rehabilitation management
  l)i) assessment of rehabilitation techniques against objectives
  l) ii) assessment of potential acid mine drainage
  l) iii) processes to identify and management geochemical risks throughout mine life
  m) iii) groundwater assessment for final water level in any tailing storage facility void
  o) consideration of controls
- DRE/DPE requires a Water Management Strategy that considers
    - the existing surface and groundwater qualities
    - a robust baseline
    - a description of how groundwater and aquatic ecosystems will be monitored, Trigger Action Response Plan and trend identification

DISCUSSION

The specifics behind this concern are presented in dot form below

- Indicative water qualities of imported water are presented in Table 2.7 of R.W. Corkery & Co (2020), however, the location of the water treatment plant and where the effluent will go is

not stated. If the water treatment plant is located at the Bowdens site, then the toxicity of residue left after mining is likely to include contaminants from the Ulan coal mine.

- In the WRM Water and Environment mine mass balance, the majority of 'outflow' from the site is actually storage in the voids of tailings (1,151 ML/a of 1,857 ML/a in Table 5.5 (page 6-83). There is no discussion on how long the contamination will remain in the voids post mining.
- 'Typical' quality of water in EIS Table 4.44 (R. W. Corkery & Co. Pty. Limited, 2020, pp. 4-152) is drawn from six groundwater bores without justification. Median suspended solids in groundwater of 21 mg/L implies improper purging.
- There are also statistical inconsistencies in the reporting of heavy metals. Averages ignore values less than the limit of laboratory reporting and include outliers.
- The method of intercepting contaminated groundwater leaching from the TSF is not defined. The level of confidence in the proposed approach to capture contaminated groundwater before it travels 40 m beyond the mine site boundary is low.
- Section 4.7.5.5 (R. W. Corkery & Co. Pty. Limited, 2020, pp. 4-161) quotes long term evaporation from the pit lake of 309 ML/a and groundwater inflow of 102 ML/year, yet the Aquifer Interference Assessment submission (Q11 of Jacobs (2020) p 5-197) anticipates a long term take of 200 ML/a.
- Pit lake spill point of 597 mAHD and the operating level of 572.5 mAHD are both higher than the level of Lawsons Creek near Lue Village (~550 mAHD), indicating the potential for re-establishment of the natural groundwater flow carrying evapo-concentrated pit lake water and site contaminants down gradient.
- There is no quantitative risk assessment – likelihood, consequence, risk, mitigation
- Discussion of best practices are not included
- Under the *Aquifer Interference Policy 2012* s.2.1, where uncertainty in predicted mine inflows may have a significant impact on the environment or water users, additional information is required.
    - The uncertainty is acknowledged in Section 7.2, 7.5.1, (Jacobs (Australia), 2020)
    - Sensitive receptors in Hawkins and Lawsons Creeks and associated aquifers are acknowledged in Section 8.2
- There is no assurance that the groundwater model is Class 2. Model Level and suitability for contaminant investigations are not peer reviewed. Inconsistencies in the hydrogeological conceptualisation may require a Class 3 model if significant species are identified and impacted. Inconsistencies include:
    - Misrepresented groundwater quality at Lue Village
    - A lack of hydrostratigraphic interpretation between the site and Lue Village, including outcrop of the Coomber Formation
    - A lack of consideration of the impact of faults, especially around the TSF and leachate management dam
    - The provenance of hydraulic conductivity testing does not extend across the faults, with the current uncertainty range. Considering the uncertainty, the proposed range of between 50-300 years to fill the pit is relatively narrow.

- The use of particle tracking or MODFLOW USG-Transport modelling would enable groundwater contamination risks to be considered during operations and after mining (e.g. 50, 100 and 200 years)

REFERENCES

ANZ Guidelines, 2020. *Guideline values for water/sediment quality.* [Online]
Available at: https://www.waterquality.gov.au/anz-guidelines/guideline-values
[Accessed 26 June 2020].

Bowdens Silver, 2020. *Monitoring.* [Online]
Available at: https://bowdenssilver.com.au/monitoring/
[Accessed 21 June 2020].

Jacobs (Australia), 2020. *Part 5 - Groundwater Assessment,* Sydney: Silver Mines Pty. Limited.

R. W. Corkery & Co. Pty. Limited, 2020. *EIS Bowdens Silver Project,* Sydney: Bowdens Silver Pty Limited.