

9 February 2023

NSW Independent Planning Commission  
Suite 15.02, 135 King Street  
SYDNEY NSW 2000

Dear Commissioners

**Re: Bowdens Silver Project (SSD 5765): Additional static geochemistry testing in the northern section of the proposed open cut pit**

The following presents a brief background and rationale for additional static geochemical testing of 60 waste rock samples sourced from the northern section of the proposed open cut pit for the Bowdens Silver Project (the Project). The draft conditions of consent for the Project include a condition requiring the completion of a Materials Classification Verification Program. Bowdens Silver were consulted on this condition and have accepted this requirement formally in its response to the Department of Planning and Environment (DPE). Draft Conditions B34 and B35 of SSD 5765 are reproduced below. The rationale for these conditions is described in Paragraph 153 of the DPE Assessment Report. In summary, as there was professional disagreement regarding AMD risks between experts commissioned by Bowdens Silver and the DPE commissioned expert, DPE has taken a conservative approach and requested the above program be undertaken prior to commencement of the Project.

**Materials Classification Verification Program**

*B34. The Applicant must prepare a Materials Classification Verification Program to validate the acid mine drainage risk classification system to the satisfaction of the Planning Secretary. This program must:*

- (a) be prepared by a suitably qualified expert(s);*
- (b) be based on a sampling and testing program that has been approved by the Planning Secretary, that includes:*
  - (i) static geochemical testing to verify the proposed classification of waste rock material as non-acid forming (NAF) or potentially acid forming (PAF); and*
  - (ii) kinetic geochemical testing to quantify acid generation and duration rates (including lag time and longevity) from PAF waste rock; and*
- (c) include a final report on the results and analysis of the testing program that:*
  - (i) identifies and verifies the suitability of the adopted sulphur cut-off value(s) for classifying waste rock materials as NAF; and*
  - (ii) demonstrates that there is sufficient NAF material available for construction of the mine and to successfully rehabilitate the site, including full encapsulation of PAF materials.*

*B35. The Applicant must not commence construction of the development until the Materials Classification Verification Program is approved by the Planning Secretary.*

The Materials Characterisation Assessment for the Project was completed by Graeme Campbell & Associates (GCA). GCA's approach to establishing a waste classification strategy was to use the detailed geological and geochemical data available and focus on outcomes that would guide risk-based decisions in relation to waste rock management strategies. Preliminary design of the key components to manage waste rock, including liners, encapsulation and capping methods for closure and rehabilitation was then undertaken based on geochemical risk.

A summary of the outcomes of the peer review commissioned by DPE and undertaken by Earth Systems is provided in Paragraph 151 of the DPE Assessment Report. Earth Systems' review noted that, in their opinion, the sampling and analysis program was not broad enough to rule out unexpected outcomes and that this brought into question the conclusions drawn from the analysis, particularly with regards to the northern section of the proposed open cut pit. This conclusion was not accepted by GCA, and Bowdens Silver identified and provided to DPE a range of additional information to support the proposed waste classification strategy. Hence the final disagreement on the outcomes of the peer review. Condition B34 is intended to address the comments from Earth Systems directly and provide confidence in the materials classification and waste management strategies proposed for the Project. It is notable that this review process also identified there would be more non-acid forming (NAF) waste rock than previously expected, thereby supporting the materials balance for the Project.

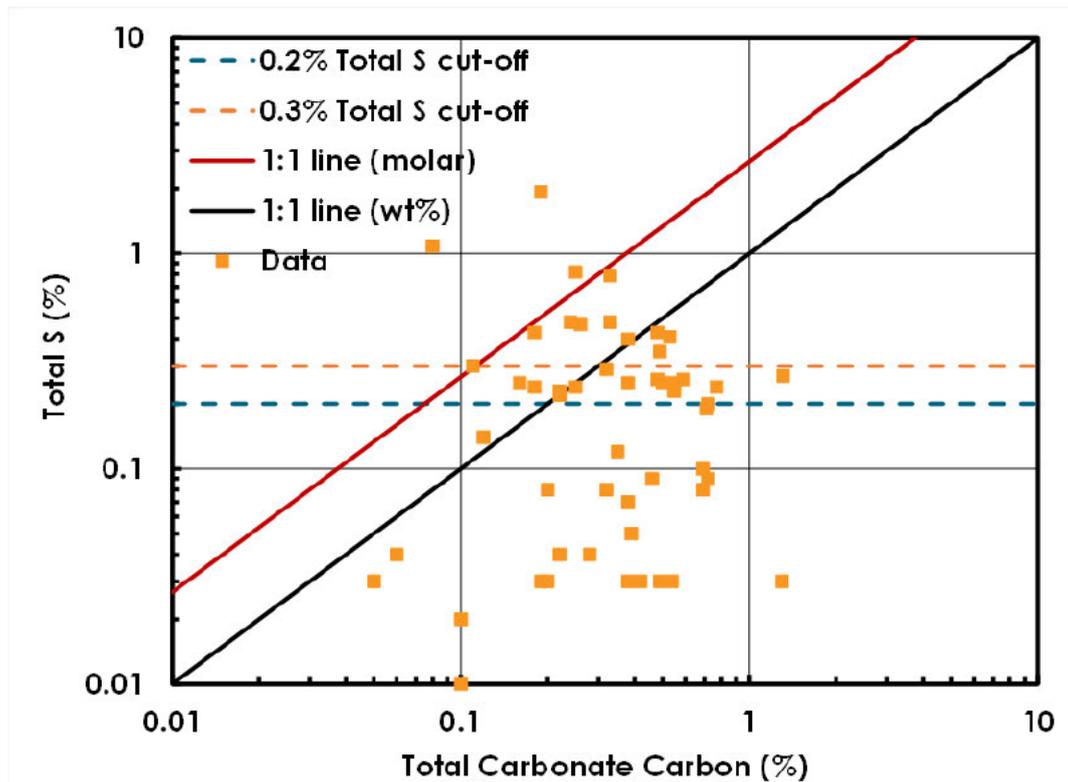
A further peer review by Okane Consultants was commissioned by Bowdens Silver to provide the Company certainty in planning for AMD management at the Mine. Okane Consultants agreed with GCA that the level of sampling and analysis was suitable for this stage of the Project; that is for planning and approvals and prior to detailed design. Okane Consultants considered publicly available guidance on sampling<sup>1</sup> to quantify AMD risks and noted that an additional 20 samples would satisfy that guidance. This may be compared to the several hundred samples recommended by Earth Systems, which is clearly a very conservative approach. Regardless, Bowdens Silver has agreed to complete, and has commenced, the Material Classification Verification Program. It is also recognised that ongoing consultation with DPE on the sampling approach and outcomes will be required.

To assist the Independent Planning Commission in the final determination process, additional static analysis has been undertaken on samples of rock from the northern section of the open cut pit, which was the subject of commentary from Earth Systems. Presently, the results from 60 samples are available from this additional work, with a further 49 samples currently undergoing analysis. The sampling strategy was guided by Okane Consultants to ensure sample locations, and the number of samples chosen, were suitable. These samples were selected from locations across the boundary of the identified hydrothermal alteration zone to demonstrate the conservatism of initial sampling, as well as robustness of the strategy to use hydrothermal alteration zoning in the classification approach.

A summary of Okane Consultants' initial interpretation of test results on the 60 samples is presented in **Figure 1**. The intention of the sampling was principally to broaden the geochemical data supporting the waste classification strategy. However, initial review of results provided in **Figure 1** has focused on the presence of sulphur and carbonates that are at the core of any waste classification strategy. In very broad terms, the sulphur is the source of acid, and the carbonates provide acid neutralising capacity.

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<sup>1</sup> Price, W. A., 2009. Prediction Manual for Drainage Chemistry from Sulphidic Geology Materials, MEND Report 1.20.1. Mine Environment Neutral Drainage (MEND) Program. December 2009.



**Figure 1** Total carbonate Carbon versus total Sulphur for 60 samples selected from locations across the boundary of the identified hydrothermal alteration zone

The outcomes of the additional sampling and analysis are consistent with those of GCA. It is clear that carbonates present in the northern section of the open cut pit would provide sufficient buffering capacity to counter any potential acid generation from the waste rock material, as shown in **Figure 1** where total sulphur and total carbonates are compared. Importantly, Figure 1 demonstrates that all material that would be classified as NAF using the proposed 0.3% Total S cut-off would satisfy net acid neutralising capacity requirements for reliance on this strategy. These are initial results and the review of this data would be expanded in reporting on any Material Classification Verification Program.

Bowdens Silver recognize that outcomes at the scale of a single sample do not reflect mining processes, material handling or management; this perspective is consistent with that communicated during previous sampling and testing. Current best practice guidance requires that kinetic leach column tests follow any static testing program. This kinetic program is then used to quantify acid generation and neutralisation capacity over time, and under laboratory-controlled conditions. Kinetic leaching tests were undertaken by GCA over a period of 12 months, and in some cases three years. This program identified that acid generation slows within a short period (10 to 12 weeks) with pH levels then stabilising.

Earth Systems stated that additional kinetic leaching tests are required to rule out any unexpected outcome and have recommended testing of a broader scale in both sample number and analytes. This recommendation has been accepted by Bowdens Silver and this work will commence under laboratory and site conditions following an approval of the Project and once the sampling program has been agreed to with DPE (as required by Condition B34).

Earth Systems recommended that additional sampling be undertaken in the northern section of the open cut pit to justify the proposed waste classification strategy. In addition, a 0.2% Total S cut-off

was recommended for classifying potentially acid forming (PAF) waste rock for the remainder of the open cut pit until such time as a 0.3% Total S cut off can be further justified. Okane Consultants agreed with this approach.

Bowdens Silver further note that DPE has taken a conservative option to make the Material Classification Verification Program a requirement prior to commencing mining. Both peer reviews commented that the use of a 0.2% Total S cut-off was suitable for the commencement of mining. Bowdens Silver has determined that the 0.2% Total S cut-off would result in only a 1% reduction in material available for construction activities. This means that should DPE and its experts remain concerned about the proposed 0.3% Total S cut-off recommended by GCA, applying the 0.2% Total S cut-off recommended by Earth Systems would not impact the ability of Bowdens Silver to construct and rehabilitate the Mine.

It is also noted that kinetic leaching tests have already been undertaken (but not reported) for the non-acid forming waste rock that would be used to construct the Southern Barrier and the cover on the Waste Rock Emplacement. As part of the development of the AMD Management Plan required by Condition B34, this work would be reviewed and potentially enhanced, so that DPE and its experts have confidence in the approach proposed by Bowdens Silver.

In summary, Bowdens Silver remains confident that there is sufficient evidence to support the proposed cut-off of 0.3% Total S for the waste classification strategy in the northern section of the open cut pit. Regardless, the condition proposed by DPE is fully accepted as it is acknowledged that Earth Systems have a more conservative view. Should there remain a concern regarding the proposed cut off value of 0.3% Total S, the use of the cut off value of 0.2% Total S recommended by Earth Systems would not have a substantial effect on the material balance of the Project. Following an approval of the Project, Bowdens Silver would commission a gap analysis of current sampling and analysis, which would inform development of a program of static and kinetic leaching tests. This program would be provided to DPE for review and approval before it is commenced. The outcomes of that program would be used to justify the final waste classification strategy and approach to AMD risk management that would be described in an AMD Management Plan and implemented during Mine development.

With regards to comments from Earth Systems on the design and management of the waste rock emplacement and the tailings storage facility, Bowdens Silver has commissioned a review of the proposed approach by Okane Consultants who specialise in mine closure and rehabilitation. Okane Consultants support the approach of Advisian in the preliminary design of the waste rock emplacement and that of the closure capping of both that and the tailings storage facility. Okane Consultants has also highlighted the importance of procedure in managing AMD risks during mine development and support the waste rock emplacement development approach proposed by Bowdens Silver. This approach, consistent with best practice management, would progressively develop the emplacement by paddock dumping PAF material in 2m thick layers and then compacting it. This would sequentially occur up to a 10m high lift. This repeated trafficking and compaction of material at 2m intervals would in turn reduce pore space and pathways for advective gas transport and limit oxygen ingress. This approach, whilst consistent with best practice, was not commented on in the peer review by Earth Systems. Management, planning and design of the Mine for closure would be informed by an ongoing program of analysis and testing over the life of the Project. The information gained would be used to validate predicted outcomes and continually refine waste rock management and mine closure strategies. This is now standard practice in the mining industry and represents a key management task rather than a residual risk to the development.

We trust the above provides a sufficient overview of the outcomes of the additional sampling and conclusions regarding AMD risks and proposed management.

Yours sincerely



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