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Mining, Exploration & Geoscience

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Bowdens Silver Project (SSD-5765)

Resource & Economic Assessment

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More information

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Determination

Regional NSW – Mining, Exploration and Geoscience (MEG) assessed the Bowdens Silver Project (the Project or Proposal). MEG has concluded the Project will:

- develop and operate an open cut silver mine approximately 26 kilometres east of Mudgee until 2043.
- ensure an appropriate return to the NSW Government including;
  - $2 to 5 million royalties (current dollars) annually
  - $1.7 billion total revenue (current dollars)
- produce the following ore and products;
  - approximately 29.9 million tonnes (Mt) of ore from the deposit
  - ore to be processed on site producing approximately 310,000 tonnes (t) of mineral concentrates throughout the Life-of-Mine (LOM).
- deliver a net benefit to NSW in NPV terms of between $44 million and $146 million.

The project

The Proponent Bowdens Silver Pty Limited (Bowdens Silver or the Proponent) proposes to develop and operate an open cut silver mine approximately 26 kilometres east of Mudgee within the Mid-Western Regional Local Government Area of NSW that will:

- include a LOM of approximately 23 years comprising the site establishment and construction stage, mining and processing operations (to the end of concentrate production) and approximately a 7 year period for final rehabilitation and maintenance.
- include capital investment in the order of $250 million.
- provide estimated employment of up to 320 personnel during site the establishment and construction stage and approximately 190 to 228 during operations.

Introduction

State significant development is regulated under the *Environmental Planning and Assessment Act 1979*, which requires a proponent to apply to the Department of Planning, Industry and Environment for development consent, supported by an Environmental Impact Assessment (EIS).

This Resource & Economic Assessment (REA) conducted for the Bowdens Silver Project by MEG assessed:

- the social and economic benefits to NSW including royalties, capital investment, revenues and jobs.
- the resource/reserve estimates stated in the proponent's EIS.
- if the Proposal is an efficient development of the resource, that resource recovery is optimised and waste minimised.
- if the Proposal will provide an appropriate return to NSW.

The objects of the *Mining Act 1992* are to encourage and facilitate the discovery and efficient development of mineral resources in NSW.

Of particular relevance to this REA are Section 3A Objects:

- to recognise and foster the significant social and economic benefits to NSW that result from the efficient development of mineral resources.
- to ensure an appropriate return to the State from mineral resources.

The relevant section of the State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 is Part 3, Clause 15: Resource Recovery requires that resource recovery is efficient, optimised and minimises waste.

Project overview

Bowdens Silver proposes to develop and operate an open cut silver mine approximately 26 kilometres east of Mudgee within the Mid-Western Regional Local Government Area of NSW. The mine site would be located approximately 2 to 3 kilometres northeast of Lue on Bowdens Silver owned land, land under option to purchase, or land the subject of agreements with Bowdens Silver.

It is proposed that a total of approximately 29.9 Mt of ore would be extracted from the deposit and processed on site to produce approximately 310 000 t of mineral concentrates throughout the LOM. The principal products to be produced from the Bowdens Silver Mine would include a silver/lead concentrate and a zinc concentrate (with a small content of silver).

The Project has a life of approximately 23 years comprising the site establishment and construction stage, mining and processing operations (to the end of concentrate production) and includes an approximately 7 year period for final rehabilitation and maintenance. This includes a mine life of approximately 16.5 years comprising the site establishment and construction stage (approximately 18 months), mining (approximately 15.5 years commencing after the first 6 months) and processing (approximately 15 years to the end of concentrate production).

Size and quality of the resource

The majority of the Project's silver-lead-zinc mineralisation lies within the Rylstone Volcanics which comprise mainly of rhyolitic ignimbrites, tuffs and volcanic breccias, which are partially overlain by a thin screen of Permian Snapper Point Formation in parts of the proposed open pit. The natural surface is undulating. The top of mineralisation extends from near surface to about 30 metres with a base of around 180 metres from surface. The deposit is a tabular body around 500 metres by 750 metres, gently folded into a broad flat east-west anticline that plunges at low angles to the north and is suitable to extraction by open cut mining.

Table 1: Ore Reserve estimate for the Bowdens Silver Project as at May 2018.

Reserve Category	Tonnes	Reserve Grades			Contained Metal		
		Ag	Zn	Pb	Ag	Zn	Pb
	(Mt)	(g/t)	(%)	(%)	(Moz)	(kt)	(kt)
Proved	28.6	69.75	0.44	0.32	64.05	125.11	91.43
Probable	1.3	53.15	0.43	0.29	2.27	5.74	3.91
Total	29.9	69.01	0.44	0.32	66.32	130.84	95.33

Bowdens Silver plan to extract and process up to 2 Million tonnes per annum through open cut mining to produce 20,000 to 30,000 t of mineral concentrate per annum during the 16.5 years mine life.

The Proponent has completed mineral resource and reserve estimation for the Project in accordance with the Australasian Code for Reporting Exploration results, Mineral Resources and Ore Reserves (the JORC Code). The JORC Code is an industry-standard professional code of practice that sets minimum standards for public reporting of mineral exploration results, mineral resources and ore reserves.

It is noted that the optimised open pit shell used as the basis for design excludes from the production profile approximately 98 Mt of ore. The excluded material is estimated to have the following grade and contained metal.

Table 2: Excluded material and contained metal grade.

Excluded Tonnage Mt	Grade			Contained Metal		
	g/t Ag	% Zn	% Pb	Ag Moz	Zn t	Pb t
98.0	30.6	0.36	0.24	96.5	354,460	236,860

Optimisation of the pit design may be revisited in the future with a change in metal prices.

The basal parts of the ore body close to the boundary with the Coomber Formation are relatively sulphide rich. The Proponent has provided supplementary cross sections and metal grades in all parts of the deposit.

Resource recovery

Bowdens Silver has defined three types of recoverable ore:

- Primary Ore: unweathered sulphide minerals >30 g/t Ag
- Low Grade: unweathered sulphide minerals < 30 g/t Ag
- Oxide Ore: weathered sulphide minerals exceeding a nominated cut-off grade.

To optimise the recovery rates the primary and low-grade ore would be mined in conjunction with approximately 1.8 Mt of oxide ore and 46.3 Mt of waste rock. The stripping ratio of waste rock to ore would be approximately 1.6:1. Oxide material will be stockpiled.

The basal parts of the deposit to be extracted in later years (about 11-16) include relatively sulphide-rich material with higher Pb/Ag and Zn/Ag ratios.

On request, additional information has been received from The Proponent on the mineralogy of the ore and the silver, lead and zinc grades of oxide material and other ore to be excluded. These data and figures cover all stages of development.

Conclusion

MEG is satisified the Proponent has a robust understanding of the resource. No significant issues are anticipated with regard to resource sterilisation, including resource extraction.

Economic benefits of the resource

Over the life of the Project MEG has estimated that the value of silver, lead and zinc produced would be around $1.7 billion in current dollars, with the net present value (NPV) of this revenue stream of around $0.8 billion at a real discount rate of 7 percent. The majority of value from the Project would be as a result of silver produced, representing around two thirds of the revenue from the Project over its nearly 17 years of life (construction and extraction).

All of the metals produced from the Project are expected to be exported from Australia. The silver/lead concentrate would most likely be transported by road/rail to Port Pirie for processing, and the zinc concentrate likely to transported by road/rail to either Port Botany or the Port of Newcastle for shipping to South Korea for further treatment. Export income is vital for the health of both the NSW and Australian economies. Export income also contributes to Australia's balance of trade, which provides benefits to both the state and Australian credit ratings, plus it generally has a positive impact on the value of the Australian dollar exchange rate.

The Project, if approved, would provide up to 210 full time operational jobs at full production capacity. The Project would also provide up to 320 construction jobs during the peak construction period. MEG estimates that the 210 full time operational jobs would create an additional around 800 indirect jobs in both mine and non-mine related industries in the both region and elsewhere in NSW. Capital investment for the Project would be of the order of $250 million.

MEG also notes from the Economic Assessment prepared by the Proponent's economic consultant (Gillespie Economics) that the Project would deliver a net benefit to NSW in NPV terms of between $44 million and $146 million, the latter includes net employment benefits the majority of which would be generated in the local region.

Royalty calculation

The Project is a proposed silver, lead and zinc mine therefore a royalty rate of 4 percent applies to all refined metal production. This rate is applicable to the net disposal value. Net disposal value is the price received minus any allowable deductions. In general silver, lead and zinc mines in NSW usually pay around 3 percent in royalty of the metal price received after allowable deductions. Therefore, the Project royalty has been calculated based on 3 percent of the metal price received.

One of the most important assumptions in the calculation of future royalty is the estimate of future metals prices over the life of a project. MEG has used metals prices based mostly on historical real prices, with some regard given to the future supply/demand dynamics of each of the individual metals to be produced from the Project. MEG has used around A$23.50 per troy ounce for silver, A$2920 per tonne for lead and A$3550 per tonne for zinc for its royalty calculation, all prices are real and have been used for every year over the life of the Project. A long term exchange of 0.70 has been used to convert US$ prices to A$ prices.

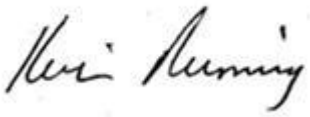
Another important aspect of future royalty calculation for a proposed metalliferous project is the estimation of future annual production. MEG has estimated that if the Project is approved, around 30 Mt of ore resulting in around 48 million oz of silver, 75 kilo tonnes (kt) of lead and 92 kt of zinc would be able to be economically mined from the Project over its nearly 17 years.

Using the above parameters, MEG has calculated that the State will receive around $50 million in current dollars over the project lifetime, and around $24 million in NPV terms (real discount rate of 7 percent) in royalty from the Project. At full production the NSW Government would receive annual royalties in the range of around $2 million to $5 million from the Project.

Departmental Assessment

Assessed by	Unit	Branch
Assessing Officer: Dr David Forster Senior Geologist	Mineral Resource Assessment – Strategic Resource Assessment & Advice	Geological Survey of NSW
Assessing Officer: Bryan Whitlock Senior Resources Analyst	Resource Economics	Resources Policy, Planning & Programs
Assessing Officer: Adam W. Banister Senior Advisor	Assessment Coordination Unit – Resource Assessments	Resource Operations

Approvals

Approved by	Signature	Date
Approving Officer: Dr Kevin Ruming Director Geoscience Assessment and Advice		16/07/2020
Approving Officer: Tamsin Martin Director Resources Planning & Programs		15/07/2020
Endorsing Officer: Stephen Wills Executive Director Resource Operations		21/07/20