

MINING, EXPLORATION & GEOSCIENCE ADVICE RESPONSE

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Dear Emily

Project: Cadia East Gold/Copper Project - Modification 14
Stage: Advice on Environmental Impact Statement and provide Resource and Economic Assessment
Development Application: MP06_0295-Mod-14

I refer to your recent correspondence inviting the Department of Regional NSW – Mining, Exploration & Geoscience (MEG) to provide comments on the Cadia East Gold/Copper Project - Modification 14 (MP06_0295-Mod-14) (Cadia East or the Modification) submitted by Newcrest Mining Limited (Newcrest or the Proponent).

The relevant units internal to MEG have been consulted in generating this advice. The Department of Planning, Industry and Environment – Energy, Resources & Compliance Division and the Proponent should be aware that matters concerning subsidence, subsidence management, mine operator, safety, rehabilitation and environmental impacts of final landform design are not assessed by MEG and advice should be sought from the Resources Regulator.

Advice overview

(MEG) assessed the Cadia East Gold/Copper Project - MOD 14 (MP06_0295-Mod-14) (Cadia East or the Modification). MEG considers the Modification will provide an appropriate return to the NSW Government including:

- around \$39 million in total additional royalties (current dollars)

Parameter	\$m (2021 dollars)
Total Royalties received	39
Net Present Value (NPV) Royalties (7% discount rate real)	24
Annual estimated Royalties (average)	4.3

In addition, the Project will generate:

- around \$1.3 billion additional total revenue (current dollars)
- support up to an additional 35 full-time equivalent jobs during operations.
- \$46 million in Net Present Value (NPV) terms of total net production benefits to the NSW economy; and

- Project capital investment of about \$350 million.

The Project is considered to be an efficient use of resources.

Resource and Economic Assessment

The Cadia Valley Operations (CVO) is located 25 kilometres southwest of Orange, in the Central Tablelands of NSW. Cadia East is an established underground panel cave mine in operation since January 2013. Gold and copper (silver and molybdenum) is associated with porphyry-style alteration and materialisation.

Cadia East has approval for mining of 456 Mt of ore using panel caving methods. It is currently mined via two panel lifts (PC1 and PC2) that have an estimated mine life of greater than 30 years.

The main elements proposed for the Modification include the following:

- an increase in the approved ore processing rate from 32 Million tonnes per annum (Mtpa) to 35 Mtpa.
- upgrades to Cadia East mining and ore processing infrastructure to provide capacity to accommodate a mining, materials handling and processing rate of 35 Mtpa.
- continued deposition of tailings into the Northern Tailings Storage Facility (NTSF), Southern Tailings Storage Facility (STSF) and the open pit Tailings Storage Facility (PTSF).
- construction works on the NTSF and STSF, including;
 - changes to wall construction designs of the NTSF and STSF embankments and associated disturbance
 - implementation of NTSF repair works to restore the embankment by encapsulation of the slumped section
 - construction of centreline lifts at the NTSF and STSF embankments in response to the findings of the Independent Technical Review Board's investigation into the NTSF slump.
- additional pre-conditioning of the overburden above the Cadia East orebody, to be achieved via direction drilling from the surface.
- construction and operation of a Sodium Hydrosulphide Solutioning Plant.

In view of the constraints outlined in the Proponent's EIS and based on the information currently available, MEG considers that the Cadia East Project is consistent with the objects of the *Mining Act 1992*. *In addition, in relation to* clause 15 of the State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007, the Proposal represents an efficient development and utilisation of minerals resources which will foster significant social and economic benefits.

MEG is satisfied that, should the operational outcomes be achieved, the proposed mine design and mining method submissions adequately recover resources and will provide an appropriate return to the state.

The resource utilisation, recovery and economic benefits assessment undertaken by MEG is addressed in Attachment A.

The requirement for a mining authority

MEG notes that this Modification, as it currently stands, is located within the existing operations area of Mining Lease 1405 (Act 1992), Mining Lease 1472 (Act 1992), Mining Lease 1481 (Act 1992), Mining Lease 1689 (Act 1992), and Mining Lease 1690 (Act 1992). Based on current authority information MEG advises that the Proponent holds the appropriate authorities as required for mining operations as relating to the project.

Biodiversity offset assessment

MEG requests that the Proponent consider potential resource sterilisation should any future biodiversity offset areas be considered. The Proponent must consult with MEG and any holders of existing mining or exploration authorities that could be potentially affected by the proposed creation of any such biodiversity offsets, prior to creation occurring. This will ensure there is no consequent reduction in access to prospective land for mineral exploration or potential for the sterilisation of mineral and extractive resources.

Summary of review

MEG considers that, should the Modification be approved; efficient and optimised resource outcomes can be achieved.

MEG requests that it be provided with an opportunity to review the draft conditions of approval before finalisation and any granting of development consent.

For further enquiries and advice in relation to this matter, please contact Adam Banister, Senior Advisory Officer - Assessment Coordination, Resource Assessments on 02 4063 6972 or assessment.coordination@planning.nsw.gov.au

Yours sincerely



Param Dogra
A/Executive Director Resource Operations
Department of Regional NSW – Mining, Exploration & Geoscience
5 February 2021



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NSW

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Cadia East Gold/Copper Project - MOD 14 (MP06_0295-Mod-14)

Resource & Economic Assessment

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More information

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Executive summary

Mining, Exploration and Geoscience (MEG) assessed the Cadia East Gold/Copper Project - MOD 14 (MP06_0295-Mod-14) (Cadia East or the Modification). MEG considers the Modification will provide an appropriate return to the NSW Government including:

- around \$39 million in total additional royalties (current dollars)

Parameter	\$m (2021 dollars)
Total Royalties received	39
Net Present Value (NPV) Royalties (7% discount rate real)	24
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In addition, the Project will generate:

- around \$1.3 billion additional total revenue (current dollars)
- support up to an additional 35 full-time equivalent jobs during operations.
- \$46 million in Net Present Value (NPV) terms of total net production benefits to the NSW economy; and
- Project capital investment of about \$350 million.

The Project is considered to be an efficient use of resources.

The Project

Cadia Holdings Pty Limited (CHPL or the Proponent), a wholly-owned subsidiary of Newcrest Mining Limited, is seeking consent to:

- increase the current ore processing rate of Cadia East Gold/Copper Project MOD 14 from 32 million tonnes per annum (Mtpa) to 35 Mtpa, through the implementation of processing infrastructure.
- upgrade the Cadia East mining and ore processing infrastructure to provide capacity to accommodate a mining, materials handling and processing rate of 35 Mtpa.
- undertake construction works on the Northern and Southern Tailings Storage Facilities (NTSF, STSF), including changes to wall construction designs of the NTSF and STSF embankments and associated disturbance.
- implement NTSF repair works to restore the embankment.

- construct centreline lifts at the NTSF and STSF embankments in response to the findings of the Independent Technical Review Board's investigation into the NTSF slump.
- undertake additional pre-conditioning of the overburden above the Cadia East orebody, to be achieved via direction drilling from the surface.
- construct and operate a Sodium Hydrosulphide Solutioning Plant.

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 Cadia East Gold/Copper Project - MOD 14 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

CHPL is the owner and operator of Cadia Valley Operations (CVO). The CVO are located approximately 25 kilometres southwest of Orange, in the Central Tablelands of NSW.

The Modification proposes to increase the current ore processing rate from 32 Mtpa to 35 Mtpa, through the implementation of processing improvements and the upgrade of ore processing infrastructure.

The main elements proposed for the Modification include the following (Figure ES-1):

- an increase in the approved ore processing rate from 32 Mtpa to 35 Mtpa.
- upgrades to Cadia East mining and ore processing infrastructure to provide capacity to accommodate a mining, materials handling and processing rate of 35 Mtpa.
- continued deposition of tailings into the Northern Tailings Storage Facility (NTSF), Southern Tailings Storage Facility (STSF) and the open pit Tailings Storage Facility (PTSF).
- construction works on the NTSF and STSF, including;
 - changes to wall construction designs of the NTSF and STSF embankments and associated disturbance
 - implementation of NTSF repair works to restore the embankment by encapsulation of the slumped section
 - construction of centreline lifts at the NTSF and STSF embankments in response to the findings of the Independent Technical Review Board's investigation into the NTSF slump.
- additional pre-conditioning of the overburden above the Cadia East orebody, to be achieved via direction drilling from the surface.
- construction and operation of a Sodium Hydrosulphide Solutioning Plant.

The Modification would not change the following components of the approved CVO:

- mining method;
- mine life (approved until 2031);
- Cadia East underground mine footprint/dimensions;
- predicted extent of final subsidence zone;
- maximum approved heights of the Tailings Storage Facility (TSF) embankments;
- waste rock management;
- method of concentrate transport to CVO Dewatering Facility (i.e. via pipeline);
- water supply and storage infrastructure; and
- operational hours.

Size and quality of the resource

Cadia East is an established underground panel cave mine in operation since January 2013. Gold and copper (silver and molybdenum) is associated with porphyry-style alteration and materialisation.

The total Mineral Resource for Cadia East as of December 2019 was 2,900 Mt at an average grade of 0.36g/t Au (33 Moz) and 0.26 % Cu (7.5 Mt), 0.68 g/t Ag (63 Moz) and 64ppm Mo (0.19 Mt). Molybdenum (Mo) is a minor by-product that was added to the reserve in December 2019.

Resources are classified as Indicated, with minor Inferred silver resources. This reflects the Competent Person's understanding of grade and geological continuity, data density and non-selective mining method. Mineral Resources are inclusive of Ore Reserves.

Resource recovery

Ore Reserves (Probable) are derived from Indicated resources and total 1,400 Mt grading 0.45 g/t Au (20 Moz) and 0.29% Cu (4 Mt) and 0.78 g/t Ag (34 Moz). Total molybdenum at Cadia East is 1,300 Mt averaging 88 ppm (0.12 Mt). No material changes have been made except to reflect mining depletion.

Cadia East has approval for mining of 456 Mt of ore using panel caving methods. It is currently mined via two panel lifts (PC1 and PC2) that have an estimated mine life of greater than 30 years. The Modification incorporates a Life-of-Mine (LOM) production increase to approximately 525 Mt.

The Modification proposes to increase the ore mined from 32 Mtpa (approved 2015 in MOD6) to 35 Mtpa. The rate is expected to vary between 33-35 Mtpa over time due to draw rates, cave maturity and cave interaction. An average of 34 Mtpa is used for financial evaluation.

Processing of ore will continue at the on-site plant where upgrades are expected to boost throughput and recovery. Gold recovery improvements are expected to achieve LOM recovery rates of 80% for gold and 85% for copper. A molybdenum recovery plant is expected to be commissioned in 2021 and will produce a separate saleable concentrate. Molybdenum recovery is expected to range between 65% and 75%.

Economic benefits of the resource

Cadia East, if approved, would provide total additional revenues from the existing Cadia mine of approximately \$1.3 billion, the net present value (using a 7% discount rate) of this revenue stream would be around \$0.8 billion. The majority of these revenues would be export revenue.

The Modification would increase the existing jobs at the Cadia mine by up to 35 positions. Total additional capital expenditure for the Cadia East would be of the order of \$350 million.

MEG notes from the Economic Assessment (Gillespie Economics) that the Modification would provide \$46 million in NPV terms of total net production benefits to the NSW economy.

MEG also notes the Gillespie Economics report estimates incremental annual direct and indirect effect to the local economy as follows:

- \$202 million in output.
- \$135 million in value added.
- \$15 million in gross wages.
- 169 direct flow-on jobs.

Royalty calculation

As Cadia East is a modification to an existing gold/copper mine, a royalty rate of four per cent applies to the value of all gold and copper (refined metals) produced, a small amount of molybdenum will also be produced with the same four per cent rate applying to this metal. For gold and copper operations, deductions are allowable on the price received and include onsite treatment expenses, realisation expenses, onsite administration and depreciation. The net value after these deductions is called the ex-mine value. The four percent royalty deduction is applied to the ex-mine value amount.

Assumptions

The following assumptions are used to calculate future royalty.

1 Forecast price of metals

The Proponent has estimated that a future gold price of around US\$1,250 per ounce, in real terms and a copper price of around US\$6,600 per tonne. The small amount of molybdenum is assumed to be around US\$17,600 per tonne.

Given that the current gold price (late January 2021) is of the order of above US\$1,800 per ounce, MEG is of the opinion that this is possibly a conservative estimate for the price of this commodity over the long life of the Project.

MEG assumes that the 2020 surge in the US\$ price of gold has peaked. MEG believes that gold prices will remain buoyant in at least the short to medium term due to present global economic instability.

Any long-term price assumption for gold is uncertain. Although a price of US\$1,250/oz is considered on the low side of price expectations. The current copper price as of late January 2021 is close to US\$8,000 per tonne. The Proponent has used a copper price of US\$6,600 per tonne, given the expected long-term strong demand for this metal. MEG's view is this price assumption is reasonable.

2 Forecast annual production

The Proponent has estimated that if the Modification is approved the following additional ounces and tonnes of metals would be produced; approximately 400,000 oz of gold, 66,000 tonnes of copper and 1,000 tonnes of molybdenum. MEG believes these totals are reasonable.

Total Royalties estimate


Using the above assumptions and parameters, MEG has calculated that the State will receive:

Parameter	\$m (2021 dollars)
Total Royalties received	39
Net Present Value (NPV) Royalties (7% discount rate real)	24
Annual estimated Royalties (average)	4.3

Departmental Assessment

Assessed by	Unit	Branch
Assessing Officer: Karen Montgomery Geoscientist Minerals	Mineral Geoscience Assessment & Advice (GAA)	Geological Survey of NSW
Assessing Officer: Bryan Whitlock Senior Resources Analyst	Resource Economics	Resources Policy, Planning & Programs
Assessing Officer: Adam Banister Senior Advisory Officer	Assessment Coordination Unit – Resource Assessments	Resource Operations

Approvals

Approved by	Signature	Date
Approving Officer: Dr Phillip Blevin A/Director Geoscience Assessment & Advice	Approved in CM9	4/02/2021
Approving Officer: Tamsin Martin Director Resources Planning & Programs	Approved in CM9	5/2/2021
Endorsing Officer: Param Dogra A/Executive Director Resource Operations		5/2/2021