

SEVENTH ANNUAL REPORT OF THE INDEPENDENT MONITORING PANEL FOR THE COWAL GOLD PROJECT – OCTOBER 2011

INTRODUCTION

The Independent Monitoring Panel (IMP) was established in accordance with condition 8.8(b) of the Development Consent for the Cowal Gold Project. The members of the IMP are:

- Emeritus Professor Clive Bell, University of Queensland; former Executive Director, Australian Centre for Minerals Extension and Research (ACMER)
- Dr Craig Miller, Associate Environmental Scientist, E3 Consulting Australia Pty Ltd
- a NSW Department of Planning representative

The IMP was established under the Development Consent to:

- provide an overview of the independent audits required under condition 8.8(a) of the Development Consent;
- regularly review all environmental monitoring procedures undertaken by the Applicant and monitoring results; and
- provide an Annual Statement of the Environment Report for Lake Cowal with particular reference to the ongoing interaction between the mine and the lake and any requirements of the Director-General.

Construction activities commenced at the mine site in January 2004. Site visits were made to the mine site by members of the IMP before construction (Allen Kearns, 16-17 September 2003 and 22 November 2004) and after the commencement of construction (Clive Bell, 14-15 December 2004; Allen Kearns, 9 February 2006; Clive Bell and Allen Kearns, 3-4 July 2007; Clive Bell and Craig Miller, 29-30 July 2008; Clive Bell and Craig Miller, 4-5 August 2009; Clive Bell and Craig Miller, 12-14 July 2010; Clive Bell and Craig Miller, 3-4 October 2011).

The Director-General has not specified any requirements under condition 8.8(b)(ii) for the preparation of this report. This report covers site activities and environmental monitoring information provided to the IMP in the 2010 Annual Environmental Management Report (AEMR). The 2011 IMP Report includes the review of the Independent Environmental Audit Report (April 2011) for the period May 2010 to April 2011. The IMP also assessed additional material provided by Barrick Australia Ltd in the reports listed in Appendix 1.

OVERVIEW OF THE INDEPENDENT ENVIRONMENTAL AUDIT (IEA)

Under the Minister's Condition of Approval (MCoA) (26 February 1999), an Independent Environmental Audit was to be completed:

- six-monthly during construction;
- 12 months after commencement of ore processing;
- then every three years thereafter until decommissioning of the mine and ore processing operations, respectively, or as otherwise directed by the Director-General.

In its report of August 2007, the IMP recognised that the template-based approach, that had been used by Trevor Brown and Associates applied environmental management consultants (aemc) in the four six-monthly reports leading up to the 2007 IMP reporting period, was well-structured for addressing complex environmental compliance requirements, and was a good example of best practice for easily accessible and updated environmental compliance information. Thus the IMP made the recommendation that “Barrick consider continuing use of the template-based approach established by aemc for environmental auditing of operations in order to regularly and systematically update progress on each of the environmental management and monitoring components. This approach would greatly assist the IMP in its annual review.”

A report was prepared by aemc and provided to the IMP for the period May 2010 to April 2011, which was the fifth 12 months of operation. The audit was undertaken over the period from 11-16 April 2011.

The independent environmental auditors reviewed the available documentation covering licenses and approvals granted by Government for the project as well as the environmental monitoring documentation held by Barrick at the mine site office in order to verify compliance with the conditions of approval.

As mentioned in previous IMP reports, the independent environmental auditors established a logical framework for verifying compliance by setting out the entire list of requirements, in the separate management plans that have been prepared by Barrick, that cover environmental management under the Minister’s Conditions of Approval. These separate plans include:

- Indigenous Archaeology and Cultural Heritage Management Plan
- Flora and Fauna Management Plan
- Erosion and Sediment Control Management Plan
- Soil Stripping Management Plan
- Landscape Management Plan
- Bushfire Management Plan
- Land Management Plan
- Compensatory Wetland Management Plan
- Site Water Management Plan
- Hazardous Waste and Chemical Management Plan
- Dust Management Plan
- Blast Management Plan
- Noise Management Plan
- Traffic Noise Management Plan
- Cyanide Management Plan

The compliance by Barrick against the requirements of the above-listed plans was assessed by the Independent Environmental Auditors, and comments were

made against those approval conditions that had been activated. The scope of the Independent Environmental Audit dated April 2011 included the following components:

- review of the implementation of the requirements of the development consent conditions, licences and approvals for the project for the operation of the mine and process plant;
- conduct of site inspections and review of on-site documentation and monitoring data relevant to the compliance audit;
- discussions held with project staff in relation to the development consent conditions;
- assessment of compliance of the project with the development consent conditions; and
- preparation of an Independent Environmental Audit Report providing assessment of compliance against each consent condition.

The Independent Environmental Auditors (aemc) drew the following conclusion in their April 2011 report:

The audit findings confirmed a high degree of compliance with the Minister's Conditions of Approval, Environmental Protection Licence conditions and requirements of the conditions attached to the Mining Lease.

The aemc report also made three recommendations, viz.

IEA1- The Indigenous Archaeology and Cultural Heritage Management Plan be reviewed and revised as necessary to reflect the Due Diligence Code of Practice for of Aboriginal Objects in NSW, latest revision (dated 24 February 2010).

IEA-2 The Heritage Management Plan should be reviewed to ensure that the proposed actions related to the homestead and shearing shed on the CPG lease are described and consistent with the approved Heritage Management Plan.

IEA-3 The draft Lachlan River (Jemalong Gap to Condobolin) Floodplain Management Plan (dated January 2011) should be reviewed to determine if any of the requirements of the Plan affect the CGP MCoA 3.10 Land Management Plan or MCoA 4.3 Catchment Area Management.

The IMP considers that these recommendations are reasonable.

The IMP has reviewed the reporting process used in the Independent Environmental Audit Report of April 2011. The IMP was easily able to assess and verify the status of environmental management information at the site and the general compliance with development consent conditions, licences and approvals granted to Barrick, as reported by the independent environmental auditors.

REVIEW OF ENVIRONMENTAL MONITORING PROCEDURES AND MONITORING RESULTS

The 2010 Annual Environmental Management Report (AEMR) was sent to the IMP on 25 August 2011. The 2010 AEMR covers the period 23 December 2009 to 22 December 2010. Overall, it is a well-structured and informative report prepared in accordance with the NSW Department of Trade and Investment, Regional Infrastructure and Services (DTIRIS (Minerals)) Guidelines and Format for the Preparation of an Annual Environmental Management Report, and in consultation with relevant stakeholders. The IMP made three recommendations in the 2010 IMP Report concerning environmental monitoring procedures, and these recommendations are assessed below in terms of adequacy of response by Barrick since the 2010 IMP Report.

2010 IMP Report Recommendation 1: *CGM should continue to evaluate its inventory of topsoil, subsoil and waste materials and the future needs for rehabilitation, paying particular attention to the total requirement for benign, competent rock through to mine closure.*

2011 IMP Assessment 1: In response to the above recommendation, Cowal Gold Mine (CGM) replied (29 January 2011) -
“Barrick (Cowal) Limited (Barrick) will continue to maintain and evaluate its topsoil and subsoil inventory to monitor the availability of soil resources for future rehabilitation. Current estimates (as at 21 December 2010) indicate that approximately 1,728,167 m³ of topsoil and 2,083,400 m³ of subsoil are currently available. Plant growth in subsoil materials with gypsum application has been observed during rehabilitation trials on the tailings storage facilities and the southern waste emplacement.

Analysis of the currently stockpiled soil resources will be undertaken in early 2011 to characterise the soil properties and determine suitability and/or amelioration that may be required to enable use in future rehabilitation.

Based on the latest topsoil and subsoil inventory calculations, the Barrick Reclamation Cost Estimator model estimates and proposed stockpiled soil resource characterisation, Barrick will calculate the volume of benign, competent rock likely to be required for future rehabilitation and mine closure. Barrick will also calculate the volume of benign, competent waste rock anticipated to be available from future development of the open pit, which will be used to update the materials inventory and evaluate the balance of materials for future rehabilitation through to mine closure.”

The IMP was satisfied with this response, but noted that, during the mine visit on 3-4 October 2011, analysis of currently stockpiled soil resources was yet to be undertaken, due to the very wet conditions experienced in the first half of the year. The explanation for the delay was accepted, and the IMP stressed that it is important to do this work as soon as possible.

2011 IMP Recommendation 1 : CGM should undertake the analysis of the properties of the current soil stockpiles as stated in the CGM letter of 29

January 2011, as soon as is practicable, to further assist in the planning for future rehabilitation.

2010 IMP Report Recommendation 2 : *CGM should continue to monitor existing rehabilitation trials with a focus on those treatments showing the most promise. Consideration should be given to the establishment of limited additional replicated trials of the most promising combinations of topsoil, subsoil and benign rock mulch and involving various direct-seeded native species combinations.*

2011 IMP Assessment 2 : In response to the above recommendation, CGM stated-

“Barrick will continue to monitor the existing rehabilitation trials. Barrick will engage DnA Environmental to statistically design a limited number of replicate trial plots (with direct-seeded native shrubs, trees and grasses), which will be established on the outer batters of the northern waste emplacement, adjacent to the D1 contained water storage, in early 2011.

Independent monitoring of the trial plots will be undertaken by DnA Environmental and an annual weeds survey of the trial plots will be undertaken by Carnegie Natives (Mal Carnegie).”

The IMP has read the draft document titled “Experimental Design and Implementation Plan – Northern Waste Emplacement Rehabilitation Trials“(May 2011) prepared for CGM by DnA Environmental. This document describes trials to assess erosion control measures, root growth materials and native species establishment methods. These trials will build upon the trials previously established on the Southern Waste Emplacement.

The experimental design is yet to be finalised, with ongoing discussions between CGM and DnA Environmental staff being held. The IMP notes in the draft document that DnA Environmental recommends discontinuing the use of highly saline subsoil material. The IMP concurs that it is desirable to use subsoil with as low a salinity as possible, but cautions against discounting the use of subsoil previously selected for use in rehabilitation on the basis of previously set salinity criteria. Such subsoil material may still prove to be an important component of the root zone for sustainable rehabilitation, in conjunction with topsoil. It is possible that the additional plant available water capacity (PAWC), which this material provides, may outweigh any initial detrimental effect of the salt level slowing deep (tap) root development.

2011 IMP Recommendation 2 : CGM should continue to evaluate the future needs for cover materials for rehabilitation including the subsoil material previously selected and stored for future use. It is recommended that assessment of this material be included in any future field and column trials and that growth of roots into the subsoil in existing trial plots on the Southern Waste Emplacement be explored and the salinity of this subsoil material be determined. Additionally CGM should attempt to obtain an estimate of the salinity range of materials previously saved for rehabilitation (see 2011 IMP Recommendation 1); this data will assist the site in calculating the volumes and

planning appropriate layering of satisfactory materials for root zone construction through to mine closure.

CGM should also finalise and implement the Northern Waste Emplacement Trials over the next year.

2010 IMP Report Recommendation 3 : *CGM should conduct a trial to determine the success of root establishment and growth by appropriate tree and shrub species into a variety of potential rehabilitation site subsurface materials. Treatments should include 1) no fertiliser, 2) fertiliser, 3) no fertiliser + mycorrhizae.*

2011 IMP Assessment 3 : In response, CGM stated -
“Root establishment trials of tree species grown in various depths of cover materials over tailings were established in 2009 and preliminary results from these trials are expected by end January 2011. Similar trials will also be established for appropriate tree and shrub species into a variety of potential cover materials over waste rock. Treatments will include fertiliser and non-fertiliser (with and without added mycorrhizae).”

The IMP was advised that preliminary trials have been conducted with tree and shrub species in columns with tailings, but data is not yet available. The initial results indicate that the taproot of all species grew through surface potting mix into tailings to the bottom of the column (Mal Carnegie, pers. comm.). Column trials with tree and shrub species should also be considered with materials that will form the cover on the waste rock emplacements (see 2011 IMP Recommendation 1). The 2010 IMP Recommendation 3 is thus still relevant.

During the mine visit on 3-4 October 2011, members of the IMP were able to inspect the rehabilitation on both the Northern and Southern Tailings Storage Facilities and on the Waste Emplacements including the trials on the Southern Waste Emplacement.

The combination of hay mulch, topsoil, gypsum and rock on the tailings dam walls appears to be providing a stable cover which should be sustainable in the future as the native grass species establish and start to dominant over the annual cover crop and broadleaved weed species. Ongoing monitoring of the rehabilitation will be required to confirm this.

2011 IMP Recommendation 3 : CGM should continue to monitor the status of rehabilitation on the tailings walls to provide data to confirm that the current preferred rehabilitation approach will lead to a cover which is stable and sustainable.

ADDITIONAL ISSUES IDENTIFIED BY THE IMP FROM THE 2010 AEMR AND MINE VISIT (3- 4 OCTOBER 2011)

Continued Anomalous Dust Metal Analyses

In its 2008 Report, the IMP first pointed to the anomalously high copper and zinc values for the collected dust samples reported in the 2007 AEMR. Such

results have been reported each year in the AEMR. After the response of CGM to the 2009 IMP Recommendation 2, it was considered that this issue would have been resolved. The 2009 IMP Recommendation 2 stated “CGM should (1) proceed to prepare bulk samples of soil and waste materials, in conjunction with the University of Sydney, for use as standards in the elemental analysis of dust samples and (2) resolve the source of contamination of copper and zinc in the 2008 dust sample analyses.”

Unfortunately, the 2010 AEMR showed exceedingly high values for copper and zinc in dust samples through 2010 (to November) (Appendix A). During the mine visit on 3-4 October 2011, the IMP was pleased to be assured that the data in the 2011 AEMR would be normal, as the reasons for the anomalous metal values had been identified and procedures addressed in 2011.

With respect to the first point in the 2009 IMP Recommendation 2 referring to the need to prepare bulk standard samples of soil and waste materials for use in checking metal (and other) analyses over time, the IMP was informed that the laboratory commissioned to prepare the bulk samples had inadvertently destroyed the samples by excessive grinding and that new bulk samples have now to be collected and prepared.

2011 IMP Recommendation 4 : CGM should ensure that new bulk standard samples of soil and waste materials are prepared for use as an ongoing check on metal and other analyses conducted at various laboratories.

Visit to Lake Cowal Conservation Centre

On the 4 October, the Lake Cowal Conservation Centre was host to a group of primary school students from Cootamundra who visited the Centre and shores of Lake Cowal to conduct experiments on water quality with members of the Centre and CGM. The IMP members were impressed with the enthusiasm of the students and staff who were involved in an exercise designed to increase the students’ awareness of environmental and conservation issues associated with Lake Cowal.

ANNUAL STATE OF THE ENVIRONMENT REPORT FOR LAKE COWAL

The IMP is required to provide an Annual State of the Environment Report for Lake Cowal with particular reference to the on-going interaction between the mine and Lake Cowal.

In March 2008 the CGM Development Consent was modified to remove the requirement to conduct baseline biological monitoring and focus on the potential impact pathways from the mine to Lake Cowal, as recommended by the IMP. The process of revising the monitoring programme required the identification of potential pathways, risk assessment, the identification of trigger values requiring a management response, and the development of the monitoring method. The IMP is pleased that Government recognised the validity of the potential pathways to impact approach and allowed the change. The IMP is also pleased at the rigour and utility of the revised *Surface Water, Groundwater,*

Meteorological and Biological Monitoring Programme developed by Professor David Goldney and applied by CGM over the last three years.

Lake Cowal filled between the 2010 and 2011 visits of the IMP, and the resulting impact on biodiversity is apparent. Water birds have bred in the area in high numbers for the first time in over a decade, and riparian vegetation on the lake edge is flourishing. The IMP is pleased that the operations of CGM during the intervening period of high rainfall and lake filling have not resulted in any of the trigger values being activated, suggesting that the impact of the CGM on the lake and its biodiversity, during a period of environmental stress on the mine, is currently neutral. The IMP considers that this is likely due to the best practice operational and environmental management undertaken by CGM. The turbidity of the lake at present is notable, and this would appear to be due to the mobilisation of lake bed sediments and sediments from surrounding and upstream agricultural areas.

Finally, Condition 8.8(b)(ii)(c) requires the IMP to respond to "any requirements of the Director General". To date, the IMP has not been provided with any information or requests on other "requirements of the Director General".

SUMMARY LIST OF IMP RECOMMENDATIONS FOR 2011

2011 IMP Recommendation 1 : *CGM should undertake the analysis of the properties of the current soil stockpiles as stated in the CGM letter of 29 January 2011, as soon as is practicable, to further assist in the planning for future rehabilitation.*

2011 IMP Recommendation 2 : *CGM should continue to evaluate the future needs for cover materials for rehabilitation including the subsoil material previously selected and stored for future use. It is recommended that assessment of this material be included in any future field and column trials and that growth of roots into the subsoil in existing trial plots on the Southern Waste Emplacement be explored and the salinity of this subsoil material be determined. Additionally CGM should attempt to obtain an estimate of the salinity range of materials previously saved for rehabilitation; this data will assist the site in calculating the volumes and planning appropriate layering of satisfactory materials for root zone construction through to mine closure.*

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INDEPENDENT MONITORING PANEL

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APPENDIX 1 – LIST OF REPORTS ASSESSED BY INDEPENDENT MONITORING PANEL

Cowal Gold Project – 2010 Annual Environmental Management Report (24 August 2011). Barrick Australia Limited.

Cowal Gold Project – Independent Environmental Audit (April 2011). Trevor Brown and Associates (aemc).

Experimental Design and Implementation Plan – Northern Waste Emplacement Rehabilitation Trials. Prepared for Cowal Gold Mine. May 2011. (Draft). DnA Environmental.

Lake Cowal Waterbird Monitoring Survey. Progress Report. August 2011. Centre for Environmental Management, The University of Ballarat.