FIFTH ANNUAL REPORT OF THE INDEPENDENT MONITORING PANEL FOR THE COWAL GOLD PROJECT – SEPTEMBER 2009

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, Senior Research Scientist, CSIRO Sustainable Ecosystems
- 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).

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 2008 Annual Environmental Management Report (AEMR). The 2009 IMP Report includes the review of the Independent Environmental Audit Report (April 2009) for the period June 2008 to March 2009. 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 June 2008 to April 2009, which was the third 12 months of operation. The audit was undertaken over the period from 30 March 2009 to 3 April 2009.

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 (amended 30 October 2008)
- 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
- Operations Emergency Response Plan
- Dust Management Plan
- Blast Management Plan
- Noise Management Plan
- Traffic Noise Management Plan
- Cyanide Management Plan (amended 30 October 2008)

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 2009 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;
- preparation of an Independent Environmental Audit Report providing assessment of compliance against each consent condition.

The Independent Environmental Auditors (aemc) drew the following conclusions in their April 2009 report:

The audit findings generally 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 IMP has reviewed the reporting process used in the Independent Environmental Audit Report of April 2009. The IMP was easily able to independently assess and verify the status of environmental management information at the site and the high degree of compliance with development consent conditions, licences and approvals granted to Barrick, as reported by the independent environmental auditors.

During assessment of the Independent Environmental Auditors (aemc) report, the IMP noted the reference to – (1) the statement on the Erosion and Sediment Control Management Plan that "Ongoing management of erosion and sediment control on the site is required to ensure the stability and rehabilitation of the disturbed and constructed surfaces. The applicability of the mitigation measures outlined in the Erosion and Sediment Control Plan for the operational management and consistency of implementation with the MOP should be confirmed during the required Environmental Management Plan review."(page iii) and (2) that" EPL condition 03.1 is not strictly complied with in relation to the above ground diesel storage facility in the storage area." (page iii). The IMP independently assessed erosion and sediment control during its visit to the mine and viewed recent modifications to the diesel storage tank, and further comments on these issues are provided later in the report.

REVIEW OF ENVIRONMENTAL MONITORING PROCEDURES AND MONITORING RESULTS

The 2008 Annual Environmental Management Report (AEMR) was sent to the IMP on 15 May 2009. The 2008 AEMR covers the period 23 December 2007 to 22 December 2008. Overall, it is a well-structured and informative report prepared in accordance with the Department of Primary Industries – Minerals

guidelines for AEMRs and in consultation with relevant stakeholders. The IMP made four recommendations in the 2008 IMP Report concerning environmental monitoring procedures, and these recommendations are assessed below in terms of adequacy of response by Barrick since the 2008 IMP Report.

IMP Assessment of Response to 2008 IMP Recommendations

The IMP made four recommendations relevant to environmental monitoring procedures and the AEMR in the 2008 IMP Report as outlined below. Barrick responded to the Department of Planning (DoP) by letter on 30 March 2009 setting out its course of action for addressing all IMP recommendations. Additionally, in response to the Department of Planning request of 18 May 2009 for more detail on the response of Cowal Gold Mine (CGM) to the IMP Recommendation 3, CGM responded in a letter dated 22 June 2009.

2008 IMP Recommendation 1: That CGM immediately prepare a revised Operations Monitoring Program as proposed in the letter from Garry Pearson (17 October 2008) to the IMP. This program should set conservative trigger points and specify the remedial management actions that will be initiated should these triggers be activated. The IMP considers that the existing WAD cyanide monitoring-response process is an excellent model for this.

2009 IMP Assessment 1: A draft Surface Water, Groundwater, Meteorological and Biological Monitoring Programme – Mine Operations (hereafter referred to as the Monitoring Programme), dated July 2009, was prepared by CGM and forwarded to the IMP on 14 August 2009 along with a supporting letter (12 August 2009) from Dr David Goldney, Principal Consulting Ecologist, Cenwest Environmental Services.

The IMP has assessed the draft report and is satisfied that the revised Monitoring Programme is consistent with the IMP recommendations made in 2005, 2006, 2007 and 2008. Specifically, it:

1. focuses monitoring so that it is relevant to the potential impact pathways from the Project to the Lake Cowal biology;
2. adopts an approach to the assessment of potential impacts on Lake Cowal resulting from the Project that is consistent with the ANZECC/ARMCANZ Water Quality Guidelines;
3. provides a more useful and effective biological monitoring program.

A minor point in the draft document, that the IMP wishes to draw to the attention of CGM is that, in Table 19 on Data Management (page 64), it is recommended that numerical date of sampling be used (e.g. 04.05.02). Because of the different order used for day, month and year in North America and Australia, specific guidance regarding the order needs to be given to all staff and consultants, i.e. either spell out the month or specify dd/mm/yy or, as probably used by Barrick worldwide, mm/dd/yy. Use of numerical dates, without precise specification, can lead to ambiguity given the lack of an international standard on this issue.

2009 IMP Recommendation 1: *CGM should clarify the guideline regarding the date of sampling in Table 19 on Data Management in the Surface Water,*

Groundwater, Meteorological and Biological Monitoring Programme – Mine Operations document.

2008 IMP Recommendation 2: Whilst no changes to current operational management of waste rock appear necessary, it is recommended that:

1. routine monitoring of waste rock pile run-off/seepage include monitoring for trace elements to confirm that soluble metal and metalloid loads from the waste emplacements are low,
2. additional waste rock geochemical infill programs are undertaken as mining progresses to verify the low potential for ARD and metal and metalloid leaching of waste rock excavated from the pit with depth, and
3. assess any geochemical changes occurring within the waste emplacements with exposure to surface weathering after a few years.

2009 IMP Assessment 2: The IMP is satisfied with the response of CGM to this recommendation and notes particularly the comments in the reply of 30 March 2009 by CGM –
"Chemical groundwater data will continue to be collected as part of the groundwater monitoring programme detailed in the Operations Monitoring Programme. Leachate water quality monitoring will continue to be undertaken at the northern, southern and perimeter waste emplacement external toe drainage points in accordance with Environmental Protection Licence No. 11912." and

"As recommended by EGI in 2004, operational monitoring and testing will be carried out on an occasional and as-needed basis to confirm the low acid rock drainage (ARD) potential of all waste types with particular focus on any unexpected rock types or alteration types that may be exposed during mining."

2008 IMP Recommendation 3: The erosion control and restoration strategies for the Lake Protection Bund, Waste Rock Emplacements and Tailings Storage Facilities should be reviewed as a matter of urgency. While the IMP acknowledges the engineering constraints and logistic advantages behind the construction of stable graded bund walls, we note that it is essential to incorporate roughness and complexity at multiple scales into the design of these walls if they are to a) minimise sheet or rill erosion, and b) sustain native vegetation. Such roughness can be created, for example, by placing a mulch of competent rock on surface soil.

Revegetation of these walls will continue to be a challenge. It is essential that CGM is clear about the goals of revegetation, as these will determine the various stages and potential pathways. For example, establishing a quick grass cover may be facilitated by the use of fertiliser, but this will also favour exotic weeds rather than native species. Mulching will be useful for retaining moisture and providing soil organic matter, but it may have to be planted into, as it can inhibit the establishment of some seedlings. Again, roughness and complexity will be key factors in the rehabilitation of these walls.

The engagement of a person or persons with practical experience in dealing with the rehabilitation/stabilisation of landforms comprising highly dispersible

materials to work with mine and University personnel on this issue is strongly recommended.

2009 IMP Assessment 3: In its 30 March 2009 reply to the IMP recommendations, CGM listed the specialist groups commissioned to work with mine staff on erosion and rehabilitation issues and their role, viz.

- Geo-Environmental Management Pty Ltd – review of erosion control and restoration strategies for the Lake Protection Bund, Waste Rock Emplacement and Tailings Storage Facilities. Specifically, the investigation of the geochemical suitability of rock armouring on the outer batters of the mine landforms.
- Landloch Pty Ltd – completion of a surface materials' assessment and review of rehabilitation strategies and landform design. Specifically, investigation and recommendations regarding erosion control, landform design and suitability of different treatment materials (e.g. rock mulching).
- Gilbert and Associates – assessment and revision of the rehabilitation and water management concepts, particularly in regard to erosion control and water management on the top surfaces of the mine landforms.
- Australian National University – ongoing trials and research relevant to revegetation and alternative surface treatment measures (e.g. mulch) that will assist in the refinement of revegetation objectives. Additional research into topsoil resources and investigation into optimal topsoil amendments (i.e. gypsum treatment) and fertiliser treatments.

Subsequently (22 June 2009), in a reply to a request from DoP (18 May 2008) for further information, CGM referred to the conduct of a Rehabilitation Risk Assessment (RRA) workshop (July 2008) involving representatives/technical experts from Barrick, Lake Cowal Foundation, URS Corporation, GSS Environmental and the Australian National University who were experienced in rehabilitation. The RRA evaluated the risks to the long-term success of the rehabilitation of the waste emplacements and tailings storage facilities at CGM. Risk treatment measures were proposed to reduce the level of risk, where required. The success and suitability of a number of treatment measures were determined to be uncertain by the RRA workshop team due to the further requirement for: trial results; additional knowledge input; and/or further research, such as literature reviews, modelling and survey results. The reply further stated "Following the findings of the RRA, Barrick has further developed its programme to optimise/maximise the potential for the successful rehabilitation for mine landforms at the CGM. The rehabilitation review programme has included the commissioning of specialist/expert personnel to work with mine and university personnel." (details of the work programme were attached) and "The results of the rehabilitation review programme will be used to inform the progressive rehabilitation/stabilisation of mine landforms at the CGM. Any proposed changes to the approved CGM rehabilitation programme (i.e. as described in the EIS) that are not considered to be "generally in accord with the EIS" would be subject to environmental assessment and approval processes (e.g. modifications would be sought under the *Environmental Planning and Assessment Act, 1979)."*

The IMP was satisfied with the replies by CGM of 30 March 2009 and 22 June 2009 regarding its 2008 Recommendation 3. Further discussion on this point occurs later in the section on issues arising out of the mine visit by the IMP from 4–5 August 2009.

2008 IMP Recommendation 4: The reasons for the anomalous results for metals in dust samples collected at the mine need to be determined and steps taken to ensure confidence in future analyses. It is suggested that the mine prepare a homogenous bulk sample of several kilograms of each of "representative" (1) surface soil, (2) subsoil, (3) oxide waste and (4) primary rock. These samples should be sent to at least three reputable laboratories used by the mining industry for analysis of the range of metals (and metalloids) of particular interest at the Cowal Mine and the mean results collated. Thereafter, when dust samples are sent to a given laboratory, a sample of each of the "standards" can be included as blind samples as a check on quality control.

2009 IMP Assessment 4: The response of CGM (30 March 2009) has provided an explanation for some of the anomalous results for metals in depositional dust, pointing to the difference in detection limits of instruments used at different laboratories. CGM states that it will adopt a standard analytical method for elemental analysis of dust samples in the future. Additionally, it was stated that CGM will seek assistance from the University of Sydney on dust sampling methodology to reduce the likelihood of sample contamination.

The response by CGM of 30 March 2009 did not comment on the IMP's recommendation that standard samples of soil, waste and primary rock be prepared to aid in the quality control process with dust analyses. However, the company did state during the mine visit (and confirmed by telephone on 16 September 2009) that steps were being taken to produce the reference bulk samples.

The importance of taking the action on standard samples is reinforced by the fact that anomalous metal concentration data again appear in the Annual Environmental Management Report (2008), and that they probably cannot be explained by the analytical methods used, e.g. copper concentrations in January 2008 are < 1 mg/kg, but in July 2008 range from 3040 to 139,000 mg/kg, with most above 30,000 mg/kg (Appendix A). Geo-Environmental Management (2008) cites copper concentrations for the CGM oxide and primary rock of 5-648 mg/kg. There is obviously copper contamination of the July 2008 samples. Conversely, the data for zinc in the dust samples in the AEMR (2008) show contamination in the January 2008 samples (760-51,000 mg/kg compared with 67-2,180 mg/kg in drill core samples measured by Geo-Environmental Management (2008).

2009 IMP Recommendation 2: *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 the contamination by copper and zinc in the 2008 dust sample analyses.*

ISSUES IDENTIFIED BY THE IMP FROM THE 2008 AEMR, INDEPENDENT ENVIRONMENTAL AUDIT (APRIL 2009) AND MINE VISIT (4-5 AUGUST 2009)

Erodibility of Slopes of Waste Emplacements and Tailings Storage Facilities

Reference was made earlier to the comment in the aemc Independent Environmental Report that "Ongoing management of erosion and sediment control on the site is required to ensure the stability and rehabilitation of the disturbed and reconstructed areas." During its mine visit, the IMP paid particular attention to this issue. It was noted that there was minor rehabilitation of waste rock emplacements, but more progress on the rehabilitation of the walls of the tailings storage facilities (TSFs).

The rehabilitation of waste rock emplacements (including the Lake Protection Bund) should be able to proceed when the results of the various trials become available. As an outcome of the Rehabilitation Risk Assessment (RRA) workshop, CGM has engaged a number of experts in erosion control and rehabilitation to assist in the design of these trials which have been established on waste emplacements and the walls of the TSFs. These trials involve the use of biosolid, rock and woodchip mulches on TSFs and rock mulches on waste emplacements, each with associated gypsum treatments. Additionally, results are being obtained from the ANU plots established on the Lake Protection Bund in 2006 and ongoing glasshouse trials at ANU.

Trials involving rock mulch with gypsum on the TSF walls are particularly encouraging even with the relatively low rainfall experienced over the past year.

2009 IMP Recommendation 3: *The current effort and priority with trials on erosion control and rehabilitation should be continued with a view to narrowing down the best treatments to produce sustainable rehabilitation, as soon as possible.*

Recording and Reporting of Wildlife Deaths

Currently all road-killed or found-dead wildlife within the mine licence area are recorded, recovered, and submitted to the local veterinarian for necropsy where possible. The IMP acknowledges the intent of this process but suggests that it diverts resources from more potentially beneficial environmental activities and can be rationalised without losing effect. For example, all road kill or found-dead wildlife could still be recorded (by species), but only species listed under State or Federal environmental legislation be recovered and/or subject to necropsy. Necropsy of unlisted species may be warranted if there is suspicion or knowledge of environmental contamination, for example, if WAD cyanide levels in tailings have reached a trigger point, or mass deaths are observed.

2009 IMP Recommendation 4: *The current effort and resources expended in recording and submitting for necropsy all road-killed or found-dead wildlife should be rationalised.*

Non-compliance of Diesel Storage Facility
The aemc Independent Environmental Audit Report (April 2009) stated that "the EPL condition 03.1 is not strictly complied with in relation to the above ground diesel storage facility in the contractor's area" and "To correct this anomaly, the double skinned tank is to be placed on the concrete containment area (with a sump) to reduce potential for spillage of fuel to the ground during filling and vehicle refuelling."

The IMP inspected this facility during the mine visit and is satisfied that the modifications have been satisfactorily carried out.

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.

Lake Cowal continued to be dry during 2008 as a consequence of the prolonged drought affecting the central west region of NSW and eastern Australia in general. Consequently, there was no surface water sampling results available for review by the IMP. The long-term bird breeding monitoring continued throughout 2008.

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 2009

2009 IMP Recommendation 1: *CGM should clarify the guideline regarding the date of sampling in Table 19 on Data Management in the Surface Water, Groundwater, Meteorological and Biological Monitoring Programme – Mine Operations document.*

2009 IMP Recommendation 2: *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.*

2009 IMP Recommendation 3: *The current effort and priority with trials on erosion control and rehabilitation should be continued with a view to narrowing down the best treatments to produce sustainable rehabilitation, as soon as possible.*

2009 IMP Recommendation 4: *The current effort and resources expended in recording and submitting for necropsy all road-killed or found-dead wildlife should be rationalised.*

INDEPENDENT MONITORING PANEL

Emeritus Professor L. Clive Bell
University of Queensland
Former Executive Director, Australian Centre for Minerals Extension and Research (ACMER)

Dr Craig Miller
Stream Leader – Biodiversity Conservation, Management and Implementation, CSIRO Sustainable Ecosystems

APPENDIX 1 – LIST OF REPORTS ASSESSED BY INDEPENDENT MONITORING PANEL

Cowal Gold Project – 2008 Annual Environmental Management Report (15 May 2009). Barrick Australia Limited.

Cowal Gold Project – Independent Environmental Audit (April 2009). Trevor Brown and Associates (aemc).

Cowal Gold Project – Surface Water, Groundwater, Meteorological and Biological Monitoring Programme (Mine Operations) (July 2009) Doc. No. SGMP02-1 (00284935) (Draft).

Landform Design and Rehabilitation Strategies. Landloch Pty Ltd Report (December 2008).

Rock Armour Suitability – Geochemical Assessment for the Cowal Gold Mine. Geo-Environmental Management Pty Ltd (December 2008).

Review of Rehabilitation and Water Management Concepts for the Cowal Gold Mine – Stage 1 Report. Gilbert and Associates Pty Ltd (December 2008).

Seasonal Wildlife Use Patterns of the Cowal Gold Project Tailings Storage Facility: 1 October 2008 to 30 March 2009. Donato Environmental Services (July 2009).

Dust Accounting at Cowal Gold Mine (CGM): Characterisation, Provenance and Ecological Impact of Deposited Dust. Summary of Findings for 2008/2009. Prepared by Karl Hemi and Adrienne Ryan, University of Sydney (August 2009).

Restoring Ecosystem Functions: Key to Successful Landscape Rehabilitation. Jess Drake, Australian National University (April 2009).