Second Annual Report of the Independent Monitoring Panel for the Cowal Gold Project – March 2006

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:

- Professor Clive Bell, Executive Director, Australian Centre for Minerals Extension and Research (ACMER)
- Allen Kearns, Deputy Chief, 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, September 16-17, 2003) and after the commencement of construction (Clive Bell, December 14-15, 2004; Allen Kearns, February 9, 2006).The site activities covered by this report are listed in Attachment 1.

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 for 2004 and 2005 as listed in Attachment 2.

Overview of the Independent Environmental Audits (IEA)

As in 2004, independent environmental audits of the mining and infrastructure areas and construction works were conducted by Trevor Brown & Associates applied environmental management consultants (aemc). Reports were prepared for the periods July 2004 to January 2005, January 2005 to June 2005 and July 2005 to December 2005. Site visits were undertaken by aemc during each of these periods to assess the status of the development activities and environmental monitoring compliance. 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 the First IMP Report in 2005, the independent environmental auditors established a logical framework for verifying compliance by setting out the entire list of requirements, in the thirteen 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

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 same template-based approach has been used in the last three six-monthly reports prepared by aemc in this IMP reporting period. The IMP recognises that this structured approach for addressing complex environmental compliance requirements is an example of best practice for easily accessible environmental compliance information. For example, the independent environmental auditors have structured the Minister's Conditions of Approval item-by-item and provided columns on audit evidence, compliance status and comments. The comments column is updated every six months with different colour text under those consent conditions where there has been recent activity in the last six months.

The independent environmental auditors have made the following conclusions in their most recent six-monthly Independent Environmental Audit report (20 January 2006) about the ease of access to site environmental information and compliance with the development consent, licenses and approval conditions:

> *"The documentation held by Barrick at the Cowal Gold Project site was provided to the auditors in an efficient manner and made the verification of compliance with the conditions of approval and other statutory approvals a straight forward exercise."*

"The documentation, reporting and activities at the Cowal Gold Project for the fourth six month period of construction demonstrated a high degree of compliance with the conditions attached to the development consent, licenses and approvals granted to Barrick for the project."

The IMP has reviewed the reporting process used in the three recent Independent Environmental Audit reports. 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, licenses and approvals granted to Barrick, as reported by the independent environmental auditors.

Review of Environmental Monitoring Procedures and Monitoring Results

The Annual Environmental Management Report (AEMR) for 2004 became available and was reviewed during this 2005 IMP reporting period. Overall, it is a well-structured and informative report. Unfortunately, the AEMR for 2005 will not be available during the 2005 IMP reporting period, although the first three of the four quarters of 2005 monitoring data have been provided to the IMP.

Recommendation 1: *The timing discrepancy between the reporting schedule for the IMP and the availability of the AEMR needs to be rectified by NSW Department of Planning and Barrick to allow for more timely evaluation of the annual environmental monitoring information by the IMP.*

One issue that has been identified by the IMP during this review of environmental monitoring procedures and monitoring results relates to dust deposition results for copper at some sites, as presented on page 20 in the 2004 AEMR. The copper results from some samples are extremely high relative to aluminium, a reliable indicator of soil and dust mineralisation. These high copper levels also appear to be present in the 2005 data set as well. The IMP considers that the copper levels are most unlikely to result from dust from surrounding areas or from site dust alone. A more reasonable hypothesis, that needs to be evaluated by site environmental management staff, would be that the high copper is from some form of contamination of the sampling system at the site, contamination at the analytical laboratory or an artefact of the analytical reporting system.

The IMP discussed this issue with site environmental management staff who were aware of the problem and were evaluating site dust data for spatial and temporal patterns and considering explanations for the anomalous copper results. The IMP also noted that there is a well-structured quality assurance/quality control process in place for tracking environmental samples from sample site to analytical laboratory and for recording site environmental monitoring data that should assist in the timely resolution of analytical anomalies.

Recommendation 2: *That Barrick provides more timely resolution of anomalous environmental monitoring results in the future.*

The IMP also noted another anomalous reporting issue in Table 18, page 40 of the 2004 AEMR whereby the Total Anions would appear to be reported in incorrect units, namely mg/L instead of mEq/L, but this needs verification from the analytical laboratory.

Environmental Monitoring and Adaptive Environmental Management
In the First Annual Report prepared in February 2005 the IMP commented as follows:

> *Over the last decade since the development of the original BACI design in 1991 for ambient monitoring, the ecologically-driven design of the mine site in the late 1990s by North Limited has resulted in a water management system that is better understood and most unlikely to release any contamination to the lake. Given that the lake is currently dry and there is a window of climatic opportunity, it is prudent to consider the overall aims and goals, and scale, of the original BACI design for the environmental monitoring program, with a view to reviewing options and possibly developing a more useful and effective scaled-down environmental monitoring system.*
>
> *The IMP also strongly suggests adopting the ANZECC/ARMCANZ Water Quality Guidelines introduced in 2000, instead of using the approach from the1992 guidelines. Importantly, this would involve looking at a more risk-based approach to environmental monitoring with the use of more ecosystem understanding than a reliance on water quality indicators. In addition, Batley et al. (2003) provide a thorough guide to the application of the ANZECC/ARMCANZ water quality guidelines in the minerals industry. The IMP considers that there is little risk in undertaking this review of the existing ambient monitoring program and proposing suitable changes because if there was a catastrophic failure or unintended discharge to the lake it would be immediately evident to the mine operators and regulators and an assessment could be easily made of damage to the lake against the already existing ambient baseline levels.*

Recommendation 3: *That Barrick comment on whether the suggestions made in February 2005 by the IMP have been acted upon, in particular the adoption of the ANZECC/ARMCANZ Water Quality Guidelines introduced in 2000.*

One of the reasons why these comments and suggestions were made by the IMP in February 2005 is that to be useful to stakeholders environmental monitoring must be evaluated in a regular and timely manner and adapted where necessary as new information and new requirements become known. In addition to the essential prescriptive role in compliance and regulation that

environmental monitoring plays, there is the adaptive role of environmental monitoring to actively inform management of emerging issues in the local environment so that management can change practices and procedures or behaviours. This is sometimes referred to as "learning by doing" or adaptive environmental management.

For example, there is a good illustration of adaptive environmental management in action as evidenced on page 79 of the 2004 AEMR, where a minor hazardous waste spill resulted in a reportable incident that triggered management responses involving improvements in handling procedures, crisis management exercises for staff, and acquisition of additional spill response equipment.

Overall, based on the written evidence, a site tour and meetings with site environmental management staff, the IMP considers that the environmental management and monitoring procedures have provided an adequate framework for detecting adverse environmental impacts should they occur at the Cowal Gold Project. However, there will need to be more timely evaluation, statistical analysis and reporting of the data to allow recognition of any emerging environmental issues and resolution of any "false positive" data points as discussed above for the anomalous copper results.

The reason this is important is because "false positive" data can accumulate and contribute to what are called Type I errors in statistical analysis and environmental impact assessment. This happens when "false positive" environmental monitoring data are used to question the null hypothesis that is either implicitly or explicitly formulated during the environmental impact assessment; for example, that there are no significant adverse environmental impacts likely to arise from the development. "False positive" data can arise from an ineffective design for an environmental monitoring program, problems from field sampling and laboratory analysis such as from external contamination sources assumed to reflect actual site conditions or misinterpretation of the data. If a "no adverse effects" null hypothesis is incorrectly rejected by regulators or others reviewing the data then the site operator may be faced with having to meet some higher level of environmental compliance or extra environmental monitoring when in fact there is no actual environmental impact.

Conversely, a Type II error would involve, for example, the accumulation of "false negative" data leading to the incorrect interpretation and prediction that there is no adverse environmental impact when in fact there is an unrecognised environmental impact occurring, but the environmental monitoring program is not able to detect the adverse effects occurring at the site.

Further discussion on these important issues and how the author's insights could be incorporated into environmental monitoring, decision-making and impact assessment for the Cowal Gold Project can be found in references such as Keough and Mapstone (1997), Underwood (1997), Underwood and Chapman (2003) and Downes et al.(2002).

Finally, the IMP has noted, in the 2004 AEMR, that the Community Environmental Monitoring and Consultative Committee (CEMCC) has been established and is now holding regular minuted quarterly meetings. Topics discussed during these meetings included environmental incidents, complaints, project updates, heritage issues, environmental monitoring and environmental controls. In addition, a Community Information Newsletter, the *Cowal Update* is being sent out to the local community. The *Cowal Update* will be issued regularly during the next IMP reporting period to keep the local community informed about the status of the Project.

Barrick also extended invitations to numerous community, business and catchment management groups to visit the Project for presentations regarding the status of the Project and tours of the Project. Site visits were undertaken by a number of groups during the reporting including:

- Neighbouring landowners;
- Forbes Rural Lands Protection Board;
- Lachlan and Forbes Shire Councils;
- Local primary and secondary schools;
- Lachlan Catchment Management Authority;
- Wiradjuri Condobolin Corporation; and
- Local businesses;
- the Bland Catchment Management Committee;
- the Condobolin Business Community; and
- the West Wyalong Training and Business Advisory Committee.

This level of community engagement is welcomed by the IMP because, as more people come to understand the nature and value of the Cowal Gold Project in the region, the environmental monitoring program has the opportunity to become more adaptive, focussed and relevant to the information needs of a wide range of stakeholders. In addition, the ongoing support from Barrick Australia for the Lake Cowal Foundation (LCF) has allowed the LCF to develop an impressive range of partnerships and environmental projects with community and catchment management groups. The LCF community-based projects are focussed on revegetation to enhance biodiversity conservation and sustainable farming practices and community education about conservation in the Bland Creek catchment. The knowledge generated from these LCF projects should complement and inform the Barrick Australia environmental monitoring program, because all these activities provide information that directly affects the long term sustainability of Lake Cowal.

Annual State of the Environment Report for Lake Cowal

The aim of this activity is to provide an annual state of the environment report with particular reference to the on-going interaction between the mine and Lake Cowal.

Apart from some runoff resulting from widespread Spring rains and intense storm activity in November 2005, there has been no long term standing water

in Lake Cowal and on the monitoring transects during the IMP reporting period. The short term shallow flooding of the lakebed of Lake Cowal did not reach the level to trigger any environmental monitoring under the development consent conditions. Consequently, Lake Cowal remains in an ephemeral dry phase due to the long term dry conditions in the Lachlan River and Bland Creek catchments.

During the IMP reporting period, there has been considerable construction activity along the lake edge as itemised in Attachment 1. In summary, the bund wall between the mine pit and the lake has been constructed as well as the cut-off drains that direct uncontaminated surface runoff from upstream of the mine to the lake. The mine pit was approximately 1,000m x 800m x 20m deep at the time of the IMP site visit. A wire fence has been constructed into the lakebed around the mine lease boundary enclosing approximately 200 ha. This fence is acting as a cattle exclosure, and it is notable that there has been significant regeneration of native grasses, forbs, lignum and native licorice without grazing pressure and with soil moisture from the recent rains. Outside the exclosure, the lakebed continues to be cropped and annual weeds, particularly the invasive Chinese Lantern, have taken advantage of the surface disturbance and soil moisture.

In other respects, based on observations in the field by the IMP, there is little apparent interaction between Lake Cowal and the mine at the present time. However, during the February 2006 IMP site visit water birds were observed on the fresh water stored in the newly constructed tailings dam and on the exposed edges of the dam. This indicates that open bodies of surface water on the mine site will be attractive for a wide range of water birds in the future. Regular monitoring of waterbirds on other open water in the south of Lake Cowal will provide an early warning on the species and numbers of waterbirds frequenting the region that can then be used for risk assessment and management of bird fauna on the tailings dams.

The IMP also noted that Barrick have now prepared a Cyanide Management Plan, incorporating the Cyanide Monitoring Programme, and an Implementation Plan to Protect Fauna from Interactions with the Tailings Storage Facilities. In addition, Barrick have already constructed a set of bird deterrent structures on the tailings dam to restrict future access by birds to the free water that would contain cyanide in the tailings storage facilities.

Finally, Condition 8.8(b)(ii)(c) refers to "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 of Recommendations

Recommendation 1: *The timing discrepancy between the reporting schedule for the IMP and the availability of the AEMR needs to be rectified by NSW Department of Planning and Barrick to allow for more timely evaluation of the annual environmental monitoring information by the IMP.*

Recommendation 2: *That Barrick provides more timely resolution of anomalous environmental monitoring results in the future.*

Recommendation 3: *That Barrick comment on whether the suggestions made in February 2005 by the IMP have been acted upon, in particular the adoption of the ANZECC/ARMCANZ Water Quality Guidelines introduced in 2000.*

Attachments

1. Cowal Gold Project – Major site activities during the IMP reporting period
2. Cowal Gold Project – List of materials provided to the IMP by Barrick Australia Limited.

References

Batley G.E., Humphrey C.L., Apte S.C. and Stauber J.L. (2003). A Guide to the Application of the ANZECC/ARMCANZ Water Quality Guidelines in the Minerals Industry. (Australian Centre for Mining Environmental Research: Brisbane).

Downes, B. J., Barmuta, L.A., Fairweather, P.G., Faith, D.P., Keough,M.J., Lake, P.S., Mapstone, B.D. and Quinn, G.P. (2002) *Monitoring ecological impacts, concepts and practice in flowing waters.* Cambridge, UK: Cambridge University Press.

Keough, M.J. and Mapstone, B.D (1997). Designing Environmental Monitoring for Pulp Mills in Australia. *Wat. Sci. Tech.* Vol. 35, No.2-3. pp 397-404. Pergamon.

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Independent Monitoring Panel

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Cowal Gold Project – Major Site Activities during the IMP Reporting Period

Major activities during the second 6 months of construction July 2004 to January 2005 were:

Temporary and Permanent isolation bunds completed.
Monitoring monuments and bores installed on the permanent isolation bund.
Water storage facilities D1, D2, D3, D4, D5 and D6 constructed.
Catchment drainage works around the mine project disturbed areas constructed.
Internal access road from the lease boundary to the process plant site commenced.
Water pipeline and dewatering bores for the mine pit installed.
Concrete Batch Plant installed (Readymix).
Temporary contractors compound (Hardy Bros) developed.
Crusher pit excavated for installation of the inground crusher at the process plant site.
Process plant foundations commenced for major structures.

Major activities during the third 6 month period of construction January to June 2005 were:

Water storage facilities D8a and D8b constructed.
Catchment drainage works around the project areas constructed and improved.
Internal access road from the lease boundary to the process plant site completed and sealed.
Crusher construction in the excavated pit adjacent to the process plant site commenced.
Process plant foundations commenced for major structures complete.
Fabrication of bulk storage tanks for the process plant in progress with relocation of finished
tanks to the tank farm adjacent to the process plant.
Diesel bulk storage tank construction and installation.
SAG and ball mill footings complete and components received on site.
Fabrication of the mills for the process plant in progress.
Flotation tanks installed at the process area.
Mine Fleet Workshop constructed.
Pre-stripping in the mine pit commenced in April.
Topsoil and infill material stockpiles established from mine pit pre-strip.

Major activities during the fourth 6 month period of construction July to December 2005 were:

Process plant components were all delivered to site and sections of the plant were being constructed
Semi Autogenous Grinding Mill (SAG) and Ball Mill installed
Flotation tanks installed

Leach tanks Installed
Primary crusher plant and ancillaries completed
Permanent Mine Offices constructed
Water storage D5 constructed
Northern Tailings Storage Facility completed
Southern Tailings Storage Facility constructed (due for completion December 2005)
Mine pit excavation advanced with excavation of ore material started for stockpiling
Oxidised ore and primary ore stockpiles established

Cowal Gold Project – List of Materials Provided to the IMP

- Results of the independent audits required by Development Consent Condition 8.8(a) for the following periods:
  - July 2004 to January 2005
  - January 2005 to June 2005
- Annual Environmental Management Report 2004
- Quarterly Monitoring Reports for the following periods:
  - 23 December 2004 to 31 March 2005
  - 1 April 2005 to 30 June 2005
  - 1 July 2005 to 30 September 2005
- Mining Operations Plan 2005 – 2007
- Surface Water, Groundwater, Meteorological and Biological Monitoring Programme – Mine Operations
- Implementation Plan to Protect Fauna from Interactions with the Tailings Storage Facilities
- Results of the independent audits required by Development Consent Condition 8.8(a) for July 2005 to December 2005
- Cyanide Management Plan, incorporating the Cyanide Monitoring Programme; and
- Compliance Report