

FOURTEENTH ANNUAL REPORT OF THE INDEPENDENT MONITORING PANEL FOR THE COWAL GOLD PROJECT – SEPTEMBER 2018

2018 IMP RECOMMENDATIONS

Recommendation 1: The Government provide a safety advisory notice regarding changes in SOP for tailings dams through an appropriate means.

Recommendation 2: CGO consider trialling application of coarse woody debris within the Fellman's Hill woodland to enhance recruitment and regeneration of woody seedlings.

Recommendation 3: CGO consider trialling integration of biochar in soils to test options for cost-effective soil amelioration and enhanced revegetation.

Recommendation 4: CGO consider trialling the remediation of hydrocarbon contaminated soil for use in Waste Rock Emplacement rehabilitation rather than burying it.

Recommendation 5: CGO consider initiation of high-level environmental planning in anticipation of expansion of mine operations.

INTRODUCTION

In 2018 the Independent Monitoring Panel (IMP, Appendix 1) reviewed the following documents, available on the Evolution (Cowal) website (<https://evolutionmining.com.au/cowal/>):

- Cowal Gold Operations 2017 Annual Review
- Independent Environmental Audit (2018)
- Updated Environmental Management Plans (2017, 2018)
- 2017 Cowal Rehabilitation Monitoring Report
- 2017 Biodiversity Offset Areas Monitoring Report
- Environmental Monitoring Data

The IMP visited the Cowal Gold Mine on 19 September 2018 and met with Danielle Wallace (Superintendent – Environment and Social Responsibility), Craig Fawcett (General Manager), and Tammy Rawson (Environmental Advisor – Land and Rehabilitation).

ASSESSMENT OF COMPLIANCE

The 2018 Independent Environmental Audit (IEA) of the Cowal Gold Operation (CGO) was undertaken by Environmental Resources Management Australia Pty Ltd (ERM). In previous years the IEA was conducted by Trevor Brown and Associates.

The IEA included a review and qualitative risk assessment of:

- DP&E, Ministers Conditions of Approval (CoA) Development Consent DA 14/98 (Modification 13);
- Environment Protection Licence (EPL) 11912;

- Mining Lease (ML) 1535; and
- Implementation of environmental management plans developed as part of the Ministers Conditions of Approval.

The IEA identified five cases of non-compliance, 17 cases of administrative non-compliance, and made 23 observations of issues of concern that were outside of the purview of the audit and assessment of compliance but that could be considered by CGO for action.

One issue of non-compliance, the Transport of Hazardous Materials, had been identified by CGO prior to the conduct of the IEA. CGO self-reported to the regulatory authorities and undertook immediate remedial action. The IMP notes that the non-compliance with statutory and contractual requirements was due to external contractors, although CGO accepts responsibility for not checking to ensure that actual transport of hazardous materials to site met the statutory and contractual requirements. The IMP notes that this non-compliance could have had significant human and environmental health consequences outside of the mine site but is unlikely to have had material consequences within the mine licence area or for the Lake Cowal ecosystem.

The IEA also noted an incident where seepage from the Northern Tailings Storage Facility (NTSF) was identified by CGO and action was immediately taken to:

- Cease deposition of tailings in the NTSF
- Identify the cause
- Notify the relevant regulatory and safety authorities

The IMP noted and observed that remedial action had been undertaken to repair all incidents of scouring in the clay lining of the NTSF and to change the design and standard operating procedure (SOP) of the spigots to ensure that scouring cannot occur again.

The IMP noted that failure of the NTSF in the location where seepage was first observed would have been unlikely to materially affect the Lake Cowal Ecosystem; however mass failure and flow could have impacted the surrounding environment and potentially Lake Cowal. It also noted that other mine tailings dams may have similar unforeseen weaknesses due to changes in SOP and that a general safety advisory note for the industry may be warranted.

The IMP commends CGO for the speed of action, including first response, transparency of reporting, and subsequent remedial action.

Recommendation 1: The Government provide a safety advisory notice regarding changes in SOP for tailings dams through an appropriate means.

In *Table 4.2 Summary of Audit Findings, excluding Management Plans* ERM misunderstood the purpose of the IMP and consider that it should only focus on rehabilitation. The General Manager and Superintendent – Environment and Social Responsibility confirmed that they understood the wider purpose (and terms of reference) of the IMP and that Evolution Mining (Cowal) continues to value the independent review and expert advice provided by the panel members.

The IEA concludes that, notwithstanding the identified non-compliances, conformance was achieved with the audit documents that were reviewed. The IMP has reviewed the non-compliances identified by ERM and considers that they are or were unlikely to have a material impact on the Lake Cowal Ecosystem because of their scale, lack of pathway to impact, and/or because of the CGO response.

REVIEW OF ENVIRONMENTAL MANAGEMENT

The IMP made eight recommendations in its 2017 report and CGO responded in a letter to the Department of Planning and Environment¹. The recommendations and CGO response are summarised in Table 1 (below) and include the IMP's response following the 2018 visit to the site.

RECOMMENDATIONS FOR IMPROVED REHABILITATION OUTCOMES

1. The 2017 Biodiversity Offset Areas Monitoring Report identifies an ongoing issue with a lack of regeneration in the Fellman's Hill woodland offset area due to heavy kangaroo browsing. Culling of kangaroos to reduce the browsing pressure is one option that has been applied to date. The IMP notes that this may reduce the intensity of browsing pressure, but the level required to ensure recruitment of seedlings into the shrub tier may not have been reached.

A recent study conducted by the Australian National University (Stapleton *et al.* 2017) found that coarse woody debris laid in a form resembling natural tree and branch fall could protect emerging seedlings from browsing when combined with kangaroo management. This article has been provided to the Superintendent – Environment and Social Responsibility.

CGO may consider trialling the use of coarse woody debris at Fellman's Hill offset area to enhance recruitment and regeneration within the woodland. This would also provide co-benefits for other biodiversity such as reptiles and small mammals.

Recommendation 2: CGO consider trialling application of coarse woody debris within the Fellman's Hill woodland to enhance recruitment and regeneration of woody seedlings.

2. The availability and quality of topsoil for rehabilitating the Waste Rock emplacements will be an ongoing issue for CGO. The IMP has previously recommended trialling different mulches, different depths of topsoil to subsoil, and suitability of subsoils as a growth medium, for rehabilitation and has noted the results of these trials.

The IMP has looked at other options for improving the suitability and quality of the range of substrates for growing native vegetation on the Waste Rock Emplacements and considers that application/integration of biochar may be another means of cost-effectively ameliorating soil. Biochar is a highly stable form of charcoal produced mainly from biomass and which has several properties that enhance soil productivity, including provision of habitat for beneficial soil mycorrhizae, enhanced water holding capacity, and reduced nutrient leaching, as well as reducing emissions of nitrous oxide from soil, binding heavy metals, and sequestering carbon.

The NSW Department of Primary Industry has been trialling biochar for a range of agricultural and land management uses².

¹ <https://evolutionmining.com.au/wp-content/uploads/2018/06/Response-Letter-to-Thirteenth-Annual-Report.pdf>

² <https://www.dpi.nsw.gov.au/content/research/topics/biochar>

Table 1 Summary of responses to IMP Recommendations 2017

IMP Recommendations 2017	Evolution Cowal Gold's Response (Summary ³)	IMP Response
<i>Recommendation 1: CGM should ensure the direct seeding trial is adequately monitored and be willing to incorporate additional treatments (such as the use of selective herbicides) in the trial if a review of literature identifies potential benefits.</i>	Reviews are underway and will continue annually. The review in December 2017 by DnA Environment indicated that the application of seed directly onto freshly prepared rehabilitation areas that have a rocky soil surface resulted in higher establishment. Should a review indicate that future treatments are necessary, CGO will take appropriate action to ensure implementation of required additional actions.	Noted. The IMP congratulates CGO on its innovative use of aerial distribution of seed. The IMP notes that unfortunately ongoing dry conditions post-seeding will have impacted germination and revegetation success this season.
<i>Recommendation 2: CGM should make every effort to establish the Substrate Profile Trial on the surface of the Southern Waste Rock Emplacement (SWRE) as soon as a site becomes available in 2018.</i>	This trial is to be undertaken when the SWRE has reached its final height.	Noted.
<i>Recommendation 3: CGM to report metal concentrations in dust samples in the 2017 Annual Review.</i>	There is no requirement for monitoring of metals in dust in either EPL 11912 or the currently approved CGO Air Quality Management Plan (2015). As a result, Evolution will no longer report metal concentrations in dust samples.	Noted.
<i>Recommendation 4: CGM should ensure that effective rehabilitation is a KPI for the senior decision maker in the mining division.</i>	Targeted rehabilitation areas are included in the mining operations weekly plan which ensures project completion, timelines and accountability for all personnel involved.	The IMP was pleased to see the commitment by CGO management to ensure that staffing and resources were available for rehabilitation and environmental works.
<i>Recommendation 5: CGM to ensure that Standard Operating Procedures are followed for</i>	Additional Environmental team resources have been incorporated at CGO and Evolution will	The IMP was pleased to see a full complement of environmental staff and a dedicated Land and

³ Summary from 2017 Annual Report (https://evolutionmining.com.au/wp-content/uploads/2018/08/2017-Annual-Review-Report_web.pdf). Comprehensive response provided in letter to Department of Planning and Environment (<https://evolutionmining.com.au/wp-content/uploads/2018/06/Response-Letter-to-Thirteenth-Annual-Report.pdf>).

<i>revegetation and that procedures are in place to cover gaps in staff capability or capacity to deliver rehabilitation activities.</i>	continue to consult with DRG in the coming months regarding rehabilitation commitments in future Mining Operations Plans.	Rehabilitation staff member. The IMP is comfortable that this will ensure that rehabilitation activities can be delivered in a timely manner.
Recommendation 6: <i>The requirement for CGM to conduct annual Austral Pilwort surveys be removed from the relevant management plans.</i>	Monitoring results since 2012 have not detected the presence of Austral Pilwort and Evolution proposes to seek the removal of this requirement.	Noted.
Recommendation 7: <i>CGM explore the options for a coordinated program of Lippia control around Lake Cowal, with the Lake Cowal Foundation and the local Council</i>	Evolution will seek to consult with the Bland Shire Council and Lake Cowal Foundation to assist in further controlling Lippia on Evolution-owned land with frontage to Lake Cowal.	Noted.
Recommendation 8: <i>CGM to record the IMP's recommendations in the 2017 Annual Review.</i>	Completed	Noted.

The IMP is aware of providers of biochar in the Australian market, and of Australian technology that can convert woody biomass (and other organic waste such as tyres) to low volatile biochar without air pollution. CGO has significant quantities of felled woody material and of tyres that could be converted to biochar for use onsite, and potential access to agricultural biomass in the surrounding region. Co-benefits of onsite biochar production could include generation of electricity from the syngas and enhanced seed germination through treatment with liquid smoke, both of which are co-products.

Recommendation 3: CGO consider trialling integration of biochar in soils to test options for cost-effective soil amelioration and enhanced revegetation.

3. Soils contaminated with hydrocarbons are currently treated with organic material on site and then buried within the Waste Rock Emplacement. The IMP considers that this soil could be used as topsoil on the rehabilitation areas with appropriate treatment. Several species of soil microorganism will break down hydrocarbons to access the carbon as an energy source, thereby removing the contaminant (e.g. Iturbe and Lopez 2015).

Some heavy metals may be present in the hydrocarbons, and it would be important to determine the relative concentrations of these in the soil mix, and whether they are bioavailable or can be bound to soil or other media. Remediation practices, such as application of biochar, can bind heavy metals in contaminated soil so that they are no longer bioavailable (e.g. Wang *et al.* 2018).

Given that topsoil is required for rehabilitation and is in limited supply, CGO may consider trialling and monitoring the treatment of hydrocarbon contaminated soil to establish suitability and time-to-suitability for further use.

Recommendation 4: CGO consider trialling the remediation of hydrocarbon-contaminated soil for use in Waste Rock Emplacement rehabilitation rather than burying it.

4. The IMP understands that there is the potential for the development of new open cut or underground areas within or adjacent to the current mining lease area into the future. In anticipation of this, high level planning could be undertaken on a range of issues including to:
 - identify new biodiversity offset areas if existing areas are to be affected
 - calculate volumes of topsoil and subsoil that may require stripping and allocate areas for stockpiling
 - calculate relative volumes of competent rock for use on Waste Rock Emplacements and allocate areas for scheduling and stockpiling.

Recommendation 5: CGO consider initiation of high-level environmental planning in anticipation of expansion of mine operations.

ANNUAL STATE OF THE ENVIRONMENT – LAKE COWAL

The water level in Lake Cowal continues to drop following an extended dry period, and lignum is reappearing from previously submerged areas. It is likely that there will be a period of noticeable fish death (primarily introduced carp) as the levels drop further. The resident water bird population has ceased breeding, but large numbers remain, taking advantage of increased access to food resources. The bund at the toe of the Waste Rock Emplacement continues to maintain a healthy population of

river red gum saplings and this is expected to continue to grow and will provide valuable habitat and connectivity, and aesthetic value into the future.

Monitoring by CGO shows that the mine site continues to be hydrologically disconnected with Lake Cowal and that potential pathways to impact on the lake ecosystem are avoided through rigorous management controls.

REFERENCES

- Iturbe, R.; López, J. (2015). Bioremediation for a Soil Contaminated with Hydrocarbons. *J Pet Environ Biotechnol* 6:208. doi:10.4172/2157-7463.1000208. <https://www.omicsonline.org/open-access/bioremediation-for-a-soil-contaminated-with-hydrocarbons-2157-7463-1000208.php?aid=44916>
- Stapleton, J.P.; Ikin, K.; Freudenberger, D. (2017). Coarse woody debris can reduce mammalian browsing damage of woody plant saplings in box-gum grassy woodlands. *Ecological Management and Restoration* 18: 223-230. doi: 10.1111/emr.12270.
- Wang, M.; Zhu, Y.; Cheng, L.; Anderson, B.; Zhao, X.; Wang, D.; Ding, A. (2018). Review on utilization of biochar for metal-contaminated soil and sediment remediation. *Journal of Environmental Sciences* 63: 156-173. <https://doi.org/10.1016/j.jes.2017.08.004>.

APPENDIX 1

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 L Clive Bell, University of Queensland; former Executive Director, Australian Centre for Minerals Extension and Research (ACMER)
- Dr Craig Miller, Principal Environmental Scientist, CTM Consulting
- a NSW Department of Planning and Environment 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 reference to the ongoing interaction between the mine and the lake and any requirements of the Director-General.

The Director-General (Planning & Environment) has not specified any requirements under condition 8.8(b)(ii) for the preparation of this report.