

Araluen Progress Association (APA) Submission  
in respect of the adequacy of  
the Dargues Reef Gold Project (PA 10\_0054)  
Environmental Assessment (EA) report.

Background

The Araluen Valley is a very productive Valley and is situated downstream of the proposed mine, approximately 10kms as the crow flies. It is also approximately 500 metres below the proposed mine activities. The Valley extends for some 10kms leading to the Deua River and thence into the Moruya River.

The EA provides no clarity for the downstream impact of the proposal. The project site and surrounds (*approximately only 2kms in terms of ground and surface water assessments*) fails to recognise the connectivity of the surface and ground water systems, ecosystems and biodiversity issues that are all obviously interdependent.

Dependent upon the health of the area's ecology is the sustainable socio-economic wellbeing of the downstream region. The absence of any critical assessment particularly of the water issues is worrying for this community and will require addressing prior to any licence approval.

The Valley has niche market stone fruit orchards which are the backbone of the rural enterprises along with cattle production. These orchards start at the base of the Valley within 8kms of the mine and extend throughout the Valley. Throughout the Valley in all the rural enterprises full time and seasonal workers are directly employed with indirect flow on effects throughout the Valley and the Braidwood area in the supply of rural equipment and services. Additionally the Valley supports a sustainable "experiential" style tourist industry with easy access to National Parks, (Monga and Deua) NSW Forestry and the Araluen Creek and Deua River.

The impact of any disturbance to water quantity and quality on the maintenance of the population, maintenance of employment and small businesses, including the accommodation businesses, permanent and seasonal labour for orchards and cattle and of course the possible very negative environmental impacts are of extreme concern. We are also concerned about the potential for a reduction in water to adversely impact the local environment, including threatened and endangered species.

Such was the APA's concern that we maintained regular contact with the Mine proponents and provided them with detailed bore readings from NSW Water Valley readings over many years. The Association also considered the D-G requirements provided to the proponents in respect of their EA and we sought amplification of those requirements. It was our understanding that our concerns were provided to the proponents for addressing in their EA statement.

It is with regret and some frustration that the APA views much of the EA report, in relation to water issues for the valley, as inadequate. It is also noted that the EA at times presents statements with no obvious detail as to how such conclusions were reached. *E.g. The EA finds that no groundwater dependent ecosystems will be affected by the mine, but provides no detail on how this conclusion was drawn.*

Reproduced are the DG requirements and the amplified issues raised by the APA prior to the completion of the EA report.

### **The DG Requirements**

#### **1. Soil and Water** – including:

- a detailed site water balance;
- a detailed groundwater model;
- potential water quality impacts on the environment and other land users; and
- a description of the final landform water management

***Araluen Progress Association amplification request:***

- The three aquifer systems and the long term bore monitoring of these by NSW Department of Water be reviewed in light of the rural industries and domestic users currently and potentially in the Valley. This to include possible impacts of upstream interruption to the ground water, surface water and suggested drainage of upstream ground water aquifers,
- The water quality and quantity impact to include consideration of the Araluen Valley water rights and the water sharing proposals in the pipeline, (*see NSW Dept Water*)
- The assessment to include due regard to the CISRIO climate change predictions and to include consideration of possible no pumping indicators.

This submission will address the inadequacies in the proponent's EA report in light of the D-G requirements and the amplification requested by the APA.

All of the EA is predicated upon a five year mining operation with a mention of a nine year operation. Cortona Resources itself says:

- The company strategy is to fast track the development of a high quality gold operation at Dargues which will provide the cash flow to fund mine development and ongoing exploration.
- Regional exploration continues with the objective of discovering a pipeline of satellite production opportunities in the immediate Dargues area and beyond.
- The extensive tenement holding (659 km sq) is viewed as highly prospective and several new exploration targets have been discovered in highly altered rocks of the northern tenements.

Importantly given this statement it is even more critical that such a large scale mining operation which could alter for ever the ecosystems in the area, be most comprehensively assessed and all risks and mitigation strategies developed in detail with independent and transparent monitoring arrangements a condition of any licence.

Expansion of the mine by stealth in five year increments based on existing operations and capital inputs is dismissive of the value of maintaining the sustainability of the area's ecosystems.

There is no doubt from the EA that groundwater in the Araluen aquifer will drop. Without the necessary research beyond the limited scope of the current EA surface and groundwater study, the effects in the Valley on ecosystems will be inevitable and cumulative and unremediated. Possible reduction in ground cover, reduction in flora and fauna, including vulnerable and endangered species will be devastating for this fertile Valley. It will forever change the Valley terrain and potentially denude the escarpment and Valley walls to the north and western sides.

The Majors, Bell and Araluen Creeks provide a habitat for the endangered Araluen Gum (*eucalyptus kartzoffiana*) listed as vulnerable under the EPBC Act. This gum's habitat is listed as damp. The Araluen Scarp Grassy Forest is listed as an endangered ecological community under the EPBC Act and in 2003-4 evidence of dieback was observed and related to the drought years. Clearly any reduction in ground water which in turn will also reduce the creek flows has not been researched, quantified or mitigated in the proponent's EA.

### **Climate Change predictions. (APA raised issue)**

The EA report is based on 100year weather data but does not take into account extended drought periods or extended wet weather periods. This report uses Braidwood weather data which, given the micro-climates in Majors Creek and the Araluen Valley, is of little relevance. Both centres experience distinct weather patterns and again the APA provided such data (*NSW Water studies*) to the proponents.

Additionally, it would seem most unusual that the EA did not cite the NSW Climate Change Impacts Study produced by NSW Water in conjunction with CSIRO Land and Water and CSIRO Marine and Atmospheric Research in their 2008 Report "Future Climate and Runoff Projections (2030) for NSW and ACT".

This report provides the first detailed understanding of the impacts of climate change on run off and water availability across NSW. The report is used to look at impacts of future flow sequences and river health, aquatic ecosystems and water availability for towns, rural enterprises and industry.

The Harvestable Rights issue alone seems inadequately addressed. It would appear that NSW Water should be assessing the number and type of dams to be constructed and issuing a licence in respect of the use of this water, given it is noted to be used to “make up” for using embargoed water usage. These proposed dams should be further detailed in terms of their construction and future management prior to being approved.

The EA assessment contends that 97% of the time environmental flows can be maintained as outlined by the use of Harvestable Rights water. We are concerned that this statement is not based on reliable information or fully supported by the modelling. *However Harvestable Rights water will also be used operationally???*

In the scientific paper the Harvestable Rights water will be used to “make up” the short fall in the operational water requirements which will not be fully gleaned from the tailings dam.

The driest year on record (*100 year data*) would indicate by the EAs own assessment that the harvestable water would not be available for 182 days of that or similar years. Given the weather data does not include run off predictions projected in light of climate change issues this is also not an adequate response. Several drought years would indicate a significant impact on environmental flows.

**APA request** a review and re-submission of an improved approach to the Harvestable Rights issue, evidence that the climate change projections have been considered and contingency plans for reduction of water use within the operation if environmental flows are not available. We would also like to see some evidence that NSW Water has been consulted on this issue prior to a decision being made. This would appear to be best practice.

### **Groundwater Management (APA raised issue)**

The obvious need to manage groundwater and surface water sustainably within the Valley has led residents of the Valley through both the APA and the Local Landcare Group to pro-actively participate with the Southern Rivers Catchment Management Authority (SRCMA) to repair sections of the Araluen Creek.

The formation of the Upper Deua catchment Landcare Group in 1996 (UDCLG) has resulted in a range of activities being undertaken to improve the water quality, environmental health and biodiversity of the stream. The NSW Department of Water and Energy, Department of Water (water sharing officers) and SRCMA have all worked with UDCLG to improve the stability of the creek bed, and management of vegetation. The monitoring of flows and ground water levels (improved) has enabled the work to prove its worth. The Araluen stream is now a chain of ponds that even in severe dry periods maintains groundwater-fed waterholes. The water quality is highly improved with some erosion and sedimentation issues reduced significantly.

The 10 km stretch of creek is now a vastly different stream and the funding provided (\$150, 000) and the thousands of hours of volunteer work are testament to the Valley's commitment to sustainable ground and surface water management. The UDCLG has a Water Sharing Committee which has been in negotiations with NSW Water concerning a plan for the Valley.

While 90% of NSW is now managed by Statuary Water Sharing Plan, the UDCLG has not yet completed the plan with NSW Water due to the workload of NSW Water. However, data from monitoring bores across the Valley is available and was provided to the proponents.

Water Sharing Plans set out how water is to be shared between people and the environment through extraction licences and allocations for environmental flows.

In the absence of such a plan, the APA is concerned that the EA does not address further groundwater impacts "downstream". The prediction that Majors Creek and

Spring Creek will be impaired for five years plus post mine years, and the environmental flow proposed shows little consideration of any cumulative impacts on ground and surface water users remains very concerning. Indeed the proponent suggests supplementary flows for only 2 years post mining completion.

The possibility of extending the life of the mine raised in the consultation processes is also an ever present concern given the EA focuses on a 5 year project only. There is no evidence in the modelling that the environment will cope and if the water system is permanently altered, then the ecosystem might be deprived of sufficient water permanently, which will fundamentally alter it.

The water for the supplementary environmental flows is proposed to come, in the first instance from harvestable rights, and then from old mine workings. The groundwater issues raised by the estimated extraction of 126ML from the new mine incline are to be mitigated by the 34ML of available harvested water. This approach means an increase from 9 ML (existing capture) to add a further 25.5 ML of water runoff will be captured on the site. This represents water that will no longer be available to re-charge the ground water. The proponent also contemplates the extraction of 78 ML from old mines in respect of any short fall in harvestable rights from dams. This would indicate that the ground water systems, including the Araluen Valley, will be under potential stress due to a potential reduction of 103.5ML annually.

There are also inconsistencies in the figures for the total amount of water required for operational use, and different figures that will be available under harvestable rights. The 885ML/y required for operational pursuits e.g. processing, dust suppression etc will have 755ML/y drawn from the tailings dam. The scientific paper indicates that the “new or make up” water required for operational water requirements is estimated at 130ML/y and will be drawn from the harvestable rights dams, dewatering of proposed mine and old workings. Also the harvestable rights water is to be used for environmental flows.

- *Where does the 755ML/y to be drawn from the tailings dam come from in the first instance??*

- *The double-up use of the harvestable dams water for environmental flow return and operational requirements does not add up???*

Additionally there is no attempt to consider cumulative impacts on groundwater hydrology from existing and proposed uses in the area.

The NSW Groundwater Policy states that the degree of stress or potential threat a particular system is under will indicate the prioritisation for the development of a Groundwater Management Plan. **The APA would submit** that there is now a potential threat which requires prioritisation.

Clearly integrated management will mean groundwater will be considered in relation to surface water management and land use decisions. Additionally, aquifer boundaries do not always follow water catchment boundaries thus a Ground Water Management Plan involving NSW Water, the CMA, the UDCLG, Moruya Catchment, Majors Creek LG and others would be advisable.

The critical factor for the APA is that Spring Creek will be dry, thus that flow will not enhance Majors Creek which will also be compromised. Majors Creek flows over the escarpment into the Araluen Creek thence to the Deua River thus the potential effects could be devastating for many rural producers all the way down the river.

The state of the scientific knowledge and understanding of aquifer characteristics and behaviour and ground water quality is an emerging field. Currently NSW Water has monitoring bores in the Valley which could be used to assist in gaining further knowledge. Certainly the re-charge characteristics are poorly defined both seasonally and long term. *Given our knowledge is ever expanding it would seem preposterous to set in place a water arrangement with the proponents that did not allow for adaptations or close monitoring by independent agencies and that did not have a clear principle that adjustments to water access and use rights will and can be made in response to evidence indicating stress.*



It is the Association's understanding that the precautionary principle is a key component of ecologically sustainable development and is a matter that the Minister MUST take into account when arriving at a decision.

*“This principle states that a lack of full scientific certainty about the effect of a proposed development on the environment should not be used to argue that the development should go ahead. Rather, a precautionary approach should be taken.”*

The ground water report (*Department of Land and Water Conservation 1999*) provided to the proponents states that the Araluen aquifers were judged to be “high risk”. However the proponent did not extend the surface and ground water study to include the Valley. The EA states Araluen is 20kms away and will not be or will be only minimally affected based on Araluen Valley water studies.

However given the study's findings and the erroneous nature of the proponent's linkage of the Valley to Majors Creek (20kms) with residents in the Araluen Valley being 5kms downstream of the mine site, this assessment should have included the greater area.

*Best practice in relation to Surface and Groundwater Balances was described in the Murray-Darling Basin Commission report of 2004.* It states:

“It is considered best practice that the framework should be applied not only to water resource management in systems where there are connections between aquifers and streams, but also in systems that are disconnected. It has been shown even in disconnected stream-groundwater systems: the use of one resource can affect the other. Disconnected stream-groundwater areas tend to be associated with unregulated stream sections or mid to lower alluvial areas of catchments. The connected re-charge and discharge areas may be distant but should not be ignored in the water management planning.

“All assessments must be underpinned by an analysis of the entire aquifer system of interest, not just the lowest salinity resource areas or an administrative region where the ground water users are located.”

It is of most concern that the mine will extend 130metres below the Valley floor, and there is no apparent assessment, research or modelling that has even acknowledged the potential hazard this poses for the Valley.

The Araluen studies describe the type and function of the aquifers and the water quality. The EA notes those studies however does not address the very real pertinent findings in the report in March 2000 namely:

- The Araluen Valley groundwater resource is deemed of high beneficial use, as it provides drinking water, water for large scale crop irrigation, plus stock and domestic supplies. Unfortunately, this aquifer system is also ranked as the third most “at risk” aquifer in the Sydney South Coast Region, based on both the quantity and quality pressures on the groundwater resource’.
- As part of the water quality sampling, the source of the base flow in Araluen Creek was also investigated. ....’it appears that less than 40% of the flow in Araluen Creek was from rainfall, with the large component coming from either shallow or deep groundwater, or a source outside the valley’.

The proponent’s commitment to a second year review of groundwater drawdown (*Majors Creek aquifers*) is neither comprehensive nor transparently independent. It is also based upon a flawed assessment that does not adequately map the ground and surface water systems and calculate future and cumulative impacts, inclusive of the Araluen Valley.

The EA brief that excluded a study of the greater area inclusive of Araluen systems, in spite of representations from the APA, is patently inadequate.

**APA request** that a further independent comprehensive study be undertaken that reviews the work to date and extends the work to cover the surface and groundwater systems inclusive of downstream, the Araluen Valley. This study should follow “best practice” guidelines.

**APA request** (*assuming an extended study has been completed*) the Minister attaches a condition to any consent that mine's impact on water is regularly independently reviewed and consent remains conditional on adequate water being available for other users and the environment. Such monitoring to include Araluen Valley bore data.

**APA request** the proponent submits a willingness to join with the appropriate NSW Government agencies and local authorities and communities in the development of a Ground Water Management Plan (*including monitoring and adjustment arrangements*) prior to any development determination. Further, that any development determination be delayed until such a Plan is drafted, agreed and approved by NSW Water in accordance with their Groundwater Policy Framework document.

**APA** will concurrently make strong representations to NSW Water to prioritise the development of A Ground Water Management Plan for the Moruya Catchment Area as a priority under its Groundwater Policy citing the development application as a potential threat.

### **Water Quality (APA raised issue)**

The NSW Groundwater Policy Framework includes the component policy related to groundwater quality. The Quality Protection Policy (*within the framework*) aims to ensure that potential source contaminants from activities such as land filling, mining, waste-water, manufacturing, underground storage or accidental spills are avoided. Under this Policy such high risk activities are either avoided or risk mitigated which may include the use of regulatory tools to ensure compliance and safety standards are upheld.

The quality of the groundwater in the Araluen Valley is excellent. It is used for all domestic (*including accommodation businesses*) activities, irrigation of over 200 000 fruit trees, irrigation of vegetable and pasture crops and stock watering.

Clearly the quality of the groundwater is crucial to all these activities as contaminants either from direct mining activities, accidental spills and/or sedimentation will have a negative effect upon all activities. Resultant economic effects could be far reaching, immediate and cumulative in the Valley.

The EA describes the mitigation strategies for implementation concerning the monitoring of the ground water, which will include analysis for contaminants including metals and metalloids. The EA further indicates that by not using hazardous chemicals during processing “the tailings dam is not expected to generate leachate”. However the placement of the tailings dam in a tributary of Spring Creek, even with surface water from above the dam to be diverted around it, remains an unmitigated risk in terms of the possibility of leakage and contamination.

There is no apparent treatment in the EA of the possibility of sedimentation contamination or of the water quality management of the proposed supplementary environmental flow to be directed to the confluence of Majors Creek and Spring Creek. Any water drawn from old mine workings to supplement the surface harvestable rights water ought to be quality monitored prior to discharge.

The project site operation will depend upon the pumping of water from the mine incline to the surface and its use and management around the site for a variety of purposes and then discharge to Majors Creek to fulfil the EA environmental flow determination. There is no mention of management of water quality in this scenario.

It is also noted that the surface water flow into Majors Creek will pass across the project site. Thus the management of possible site surface contaminants, including sedimentation, has not been addressed. There are some notes concerning the site management of hydrocarbons and chemicals and a commitment to the refuelling of all equipment and maintenance processes, involving hydrocarbons, “where practical” to be undertaken within designated sealed sites. This is of concern.

**APA request** the proponent review the water quality management measures suggested in the EA and adjust those measures to ensure both the proposed returned

environmental flows and surface water (*including possible tailings dam leakage*) are monitored for contamination including sediment.

There also needs to be some sort of plan for what will happen if contaminants above a certain level are detected. The mine should be responsible not only for mitigating the risk of contamination, but for cleaning any contamination that does occur. Systems need to be put in place to ensure the water quality of the affected streams and groundwater is not reduced.

### **Surface Water (APA issue)**

The surface water to be captured under the proponent's Harvestable Rights will be used to replace the reduction in base flows anticipated from the drying of Spring creek and the reduction in the Majors Creek aquifer re-charge due to the generated water inflow to the new mine from ground water.

In several places within the document the rate of the replacement is cited as 2.1MLs combined. This is of course assuming the original calculations are correct. The EA also indicates the harvested surface water may need supplementing from old mine workings.

There are two places within the document where a mention is made that monitoring will determine whether the full 2.1MLs are returned. However it appears that 2.1ML is the anticipated limit. Given that the harvested right water is primarily to supplement the environmental flow that is being reduced by the use of embargoed ground-water (*mine incline inflow*) and that is also a calculation which may or may not be accurate, the safeguards of independent monitoring and management of this water balance appear insufficient.

Additionally, given the calculations around possible deficiency in volume of the available harvested water and the need to supplement with old mine workings water extraction, there appears no safeguard against the possibility of contaminated ground water impacting on surface water or eco systems.

The extraction of water from old mine workings appears to have received no consideration in respect of subsidence. The 1800 gold workings within Majors Creek and the Araluen Valley were undertaken with none of the current understandings associated with water management and environmental issues and have resulted in disturbed water-ways and environments. This would indicate that the proponent's modelling may not accurately reflect a fractured environment that over 100 years has stabilised, albeit in a unique and singular manner.

**APA request** that the proponents be required to have independent monitoring of the water balance issues associated with the level and quality of the proposed supplementary environmental flow.

## **Summary**

Prior to any approval to this project the ground and surface water assessment and modelling requires an independent review and additional research to address the APA's concerns, as raised in this submission. We believe the EA is not adequate and includes erroneous information. We therefore request that the EA is reviewed by an independent third party, particularly with regards to the water modelling. We also request that the EA be expanded in scope to include the full environment that is likely to be affected, and this includes the Araluen Valley.

A surface and ground watering monitoring and management regime needs to be implemented for the future.

Additional research should also be carried out into the bores extending from the boundary of the current study to the existing Araluen NSW Water monitoring bores to evaluate the interdependencies of the surface and groundwater systems. This to include attention to the previously noted EPBC Act listed flora and escarpment and Valley hillsides.

Ministerial consent to remain conditional:- on adequate water being demonstrably available for other water users and the environment.

### **End Notes**

The NSW State Groundwater Policy Framework Document

Southern Rivers Catchment management Authority – *Case Study Araluen Creek*

NSW Water Hydrology Reports – *Araluen Valley 1997, 99 2000*

Water Management Act 2000

Future Climate and runoff Projections (2030) – *NSW Water in conjunction with CSIRO Land and Water and CSIRO Marine and Atmospheric Research.*

Murray-Darling Basin Commission – *Guiding Principles for Sustainable Groundwater Management May 2004.*

The Secretary,  
Braidwood Greens  
Charleys Forest Rd,  
MONGARLOWE NSW 2622



October 29 2010

Environmental Planning Officer  
Regional Projects  
NSW Department of Planning  
GPO Box 39  
Sydney NSW 2001  
plan\_comment@planning.nsw.gov.au

To whom it may concern

**Re: Dargues Reef Gold Project, Major Project No. 10\_0054**

The Braidwood Greens are opposed to the Dargues Reef Gold Project. The Environmental Assessment does not adequately address the impacts of the mine on the environment or the community. This mining project shows clearly that the well-being of our local communities is taking second place to the interests of mining speculators and investors.

The mine will cause a net loss of biodiversity, and poses a serious threat to the water quantity and quality of the Upper Deua catchment including the Araluen Valley. There are no assurances in the EA that contamination of groundwater and surface water will not occur. There are also no contingencies to deal with such a catastrophic event.

The Dargues Reef Goldmine poses a series of threats that cannot be ameliorated. These are:

- **Further degradation of the fragile Upper Deua Catchment** – the Upper Deua catchment has undergone severe stress from human disturbance, historical and ongoing land management practises, historical gold mining, weed invasion and commercial water extraction (Araluen Valley). The community is working together to restore this important part of the catchment yet the Dargues Reef Gold Project is mostly likely to damage it beyond rehabilitation.
- **Decreased Water quality** – water quality will decrease and the effects on the health of the people and stock from the long-term use of the local water sources (bores and surface water) have not been addressed. Water modelling has used default and one off figures, and is not providing an accurate assessment of the hydro-geological picture at the mine site.
- **Decreased surface and groundwater in the catchment** – Use of full harvestable right, bore water and dewatering of mines will lead to overall losses in water flow throughout the catchment. The impact on the ecology, domestic and agricultural use is far too great to accept.
- **High risk of contamination.** The EA does not adequately address how it will safeguard the Upper Deua water quality and supply.
- **Poor water quality for environmental flows** – there is no indication of the water quality of the historic mine workings that will be released into the water supply. This is potentially fraught and can cause serious water quality and ecological impacts to the catchment.



- **Local noise increase** – all the figures provided are modelled and not based on real data. Increase in noise will adversely affect neighbours and surrounding ecology. The noise impacts will decrease the tourism values and liveability of the township of Majors Creek. The proposal will result in sleep disturbance (EA-4-35) under noise enhancing inversion conditions which are a common feature of the local nighttime environment. A real time acoustic assessment (winter night) using real data is required to accurately assess and subsequently ameliorate noise impacts on the surrounding local residents. Processing and construction 24 hours a day in a small community is unacceptable.
- **High risk tailings management** – How does the proponent know that residual sulphides in the tailings will not oxidise? Permeability into groundwater is highly probable. This cannot be ameliorated.
- **Clearing of Native Vegetation** – including Endangered Ecological Communities (EECs). The Tableland Basalt EEC exists in the area and will be impacted on and has not been addressed in the EA. Impacts are noted within the Natural Temperate Grasslands EEC and the preliminary listing of Tablelands Frost Hollow Grassy Woodlands EEC. Downstream the Araluen Grassy Scarp Forest EEC and the Majors Creek State Conservation Area will be affected by decreased water tables. This cannot be undone.
- **Consultation with Aboriginal Communities** – the recommendation from the Buru Nqunawal Aboriginal Cooperation that site officers be present during ground disturbance is standard practise and would represent good faith between Cortona and aboriginal communities (4-120). The consultation process was also lacklustre – effort was not made to make sure each interested party fully understood the project. This is not good enough.
- **Bushrock Removal** – disturbance of bushrock is noted as a Key Threatening Process under the Threatened Species Act. Several threatened species are recorded in the Wildlife Atlas that utilise bushrock. This is not addressed, nor can it be mitigated.
- **High risk sediment basins** – are based on 100 yr rain events – which does not address the recent impacts on weather associated with climate change in the Southern Tablelands. Parts of the catchment experienced a 100-year flood event twice last year. The impact of this will be catastrophic.
- **Risk of contamination from chemical storage** – overfilling is a serious risk and contamination is likely. This is too high a risk.
- **Poor monitoring and inspection planning** – There is no baseline surface or groundwater monitoring (only point in time data). Proposed monitoring held quarterly is not good enough when dealing with a high risk of contamination. If the proponent was serious about working with the community then water quality testing, piezometer testing, local bore testing, control structure inspections should occur weekly.
- **Perception of conflicts of interest** – various donations, any Councillor shareholdings and Section 94 Planning Agreement processes have raised questions in the community about the conduct of various stakeholders and the transparency of pre-approval discussions and decisions.
- **Large carbon footprint** - the EA does not address the extra energy requirements. It will increase our local carbon emissions. The proponent should also be proposing to offset its energy use through sourcing renewable energy and/or investing in solar and wind generation in the Majors Creek area.
- **Transportation of ore** – The EA does not address the high carbon footprint ore transportation by road for processing. Road maintenance costs will have to be met by a range of Local Government Areas, as well as pollution from increase in fuel use, and increased safety issues for other road users. This is unacceptable.
- **Impact on Braidwood** – The heavy vehicles transporting gold ore to Orange will take a route through Braidwood, NSW. *Braidwood and its setting*, which are of state

significance as an excellent surviving example of a Georgian period town plan, dating from the late 1830s is listed under the NSW Heritage Act. Vibration induced damage is a real threat for the main street buildings, and increased heavy vehicle movements impact on the visual amenity and the noise pollution within the township.

***Other grammatical/spelling errors:***

- There is a cut and paste error in the document on 5-13 referring to the Newell Highway rather than the Majors Creek Road.

The Environmental Assessment is only as reliable as the data that has been used. For what Cortona is proposing, there has been minimal testing and monitoring. There are too many variables.

The proposed Dargues Reef Gold Project is a high risk proposal with serious potential impacts. The risk rankings are poorly modelled. If this project is approved, the danger to the catchment will be realised far too late.

Thankyou for the opportunity to make a submission and we reiterate our serious concerns about this project, for the environment and for the community it will affect.

Yours faithfully

A handwritten signature in black ink, appearing to read 'Maggie Hickey', with a stylized flourish at the end.

Maggie Hickey,  
Secretary  
Braidwood Greens





# Coastwatchers

***Eurobodalla's environment and  
climate action group***

---

31 October 2010

NSW Department of Planning  
GPO Box 39  
Sydney NSW 2001

plan\_comment@planning.nsw.gov.au

## **SUBMISSION ON DARGUES REEF GOLD PROJECT Reference Number 10 0054**

The Coastwatchers Association objects strongly to the proposed Dargues Reef Gold Project which poses a high risk to the health of the Upper Deua Catchment and the Araluen Valley.

### **IMPACT ON HUMANS THAT LIVE IN THE CATCHMENT**

1. The Moruya Catchment is a major source of Eurobodalla's water supply, more so due to a recent facility upgrade to increase rate of extraction from the Deua River. Surface waters in the vicinity of the project flow into Majors Creek, which drains in to Araluen Creek and then to the Deua River, part of the Moruya River system.  
The Executive Summary of the Environmental Assessment for the project states that all surface disturbing activities are planned to be undertaken within the Moruya Catchment with a predicted reduction in base flow into Majors Creek of 66 ML per year. We are not convinced that the plans to "return" water to Majors Creek from the eight new "harvestable rights" dams will be able to replace this reduction in base flow.
2. The EA does not adequately address how the Upper Deua water quality will be protected. Release of low quality water from these dams into the water supply could lead to serious impacts on this important catchment. There is no indication of the quality of the water that would be released from these dams.
3. A reduction of base flow and water quality in Majors Creek will have adverse impacts on the valuable peach growing area of Araluen.

4. The recent impacts on weather in the Southern Tablelands associated with climate change have not been addressed. Parts of the catchment experienced a 100 year flood event twice last year. The impact of such events on sediment movement on the site could be catastrophic.

## **ECOLOGICAL IMPACTS**

1. The effect of the mine on terrestrial and aquatic environments beyond the actual mine site have not been given adequate consideration in the studies for the EA.
2. The Dargues Reef Mine proposes to remove 66.2 megalitres of groundwater per year from the area. This will lower the regional water table and greatly reduce the water available to native plants and to the native animals that drink from the springs currently supplied by this groundwater.
3. The proposed mine is extremely close to a Nature Reserve and a National Park yet there has been no study of the impact of the loss of groundwater on ecosystems beyond the two square kilometre radius of the mine. Survival of the fragile ecosystems in the gorge below the mine, which include endangered and threatened species such as the Powerful Owl and the native Araluen gum *Eucalyptus kartzoffiana*, is of special importance.
4. The impact on the Tableland Basalt EEC which exists in the area has not been addressed in the EA. Also planned bushrock disturbance, which is noted as a Key Threatening Process in the Threatened Species Act, has not been addressed.

## **MANAGEMENT OF TAILINGS**

1. The tailings storage facility, which covers nine hectares, has an embankment which will be approximately 25 metres above the natural surface. There is no proposal to construct a secondary wall in case this embankment fails.
2. Prolonged wet conditions may threaten the integrity of the low-permeability layer of the tailings storage facility due to interflow concentrated in natural fissures.
3. The reported chemical composition of the tailings is based on analysis of only three samples of the local granodiorite. This very small sample will not reflect the likely heterogeneous make up of the large volume of material that will actually be mined over the lifetime of the project.
4. There is no proof to back up the claim that residual sulphides in the tailings will not oxidise.

Coastwatchers Association formally requests that:

1. Test bores be drilled between two and six kilometres downstream from the mine site, to test the impact of drilling on the groundwater over a period of a year, to allow for variation in rainfall.
2. Greater scrutiny be made of the design of the tailings storage facility and the composition of the tailings that would be generated throughout the life of the mine.

3. A more detailed assessment be made of endangered and threatened flora and fauna in the four kilometres below the mine site. This should be carried out over a period of one year to allow for inclusion of migratory species and those that can only be identified in late winter when they call.
4. Detailed assessments be made of the heritage and indigenous sites, two to six kilometres downstream from the proposed mine site and tailings dam.
5. If this mine proceeds a secondary wall be built as back up for the tailings dam.

*Sheila Monahan*

Sheila Monahan  
President

# Conondale Range Committee

**PO Box 150 Kenilworth 4574**

**... still watching over the Conondales and Mary Valley.**

**Formed in 1976 to press for a significant National Park in the Conondales, the Conondale Range Committee has worked with successive state governments on the Conondales Consultative Process, the Agricola Mine Rehabilitation Process, the South-east Queensland Forest Agreement and the recent establishment of the Conondales Great Walk. Our work has been recognised with two Sunshine Coast Environment Council awards.**

Your Reference No. 10 0054

October 30 2010

The above committee wishes to lodge an objection to the proposed Dargues Reef Goldmine at Majors Creek. We find it scarcely credible that final copies of the Environmental Impact Assessment, containing considerable new information, were supplied so close to the closing date for submission, allowing scant time for scrutiny and assessment by other parties.

The incredibly divergent estimates as to impact on ground water should evoke a note of caution with this proposal.

We have the experience of dealing with the Agricola gold mine in the Conondale Ranges just north of Brisbane, one where all manner of promises and under-assessment of impacts were made in the original EIS but which finally failed financially, with the company going bankrupt, leaving only a deposit of a few thousand dollars for a clean-up that would eventually cost the state government well over a million dollars.

Probably the simplest way to have major effects on surrounding ecosystems is to effect major impacts on groundwater and this proposal seems certain to do that.

Impacts on endangered species like the powerful Owl *Ninox strenua*, a high order predator, reliant on a healthy complex food chain, are not adequately addressed. Although not listed under federal EPBC legislation, the precarious situation of *Ninox strenua* is recognised in different state legislation. In NSW, I understand it is declared as "Vulnerable", precisely the classification which should urge caution with approving a proposal such as this. It is also my understanding that the area that would be affected by this proposal is home to all existing wild specimens of *Eucalyptus kartzoffiana* and further that the availability of groundwater is critical for its survival.

The on site treatment and tailings dam provide other threats to both surface and ground water.

In the Conondales, our experience was that each time the price of gold rose, it was followed by an increase in exploration interest and activity. Only after years of protracted scientific study and lobbying was the area recognised with a sizeable national park and protected against the threat of mining.

At the heart of the Conondale National Park, there is one gaping hole. It is the site of the revegetating Agricola gold mine. Even after spending well over a million dollars in rehabilitating it, it is not yet at a standard where it can take its place in the surrounding national park.

We always hoped that the Agricola saga would act as a deterrent to locating mines and treatment works in, or adjacent to, environmentally sensitive areas, but in the case of the Dargues Creek proposal, it would seem that lesson has not been learnt.

We urge you to reject this application. The environmental risks far outweigh the benefits.

Ian Mackay (President)



email: [su@wild-river.com.au](mailto:su@wild-river.com.au)  
www.wild-river.com.au/fmr

PO BOX 175  
Braidwood 2622  
Phone 0422167867

---

**Please accept this submission as an ALTERNATIVE to the version you received on the due date. That one had not been passed around our membership fully for comments. This one has the approval of the community group.**

### **Key points in our submission**

We thank the proponents and contractors in producing their environmental impact statement and for the opportunity to respond to it.

FMR is not fundamentally opposed to mining. But we do consider it critical that the precautionary principle be applied. The precautionary principle has not been applied in this proposal in several ways.

We consider it critical that best practice operations be undertaken if this mine does go ahead. This is partly because of the potential for damage from this mine, but also because other mines in this area are likely in the future. We are aware of at least four former mines on the Mongarlowe River or its tributaries being considered for mining by Commissioner's Gold Ltd. Because of these potential mines FMR considers itself a stakeholder. The Dargues Reef mine should strive to establish a benchmark to ensure that the regional environment and community are either maintained or enhanced by the development.

Having read the proposal, we consider that the mine cannot be sustainable at the proposed scale. One clear indicator of this is the over-estimation of the capacity of harvestable rights dams, and the proposed use of potentially polluted old mine water as an alternative to ensure environmental flows.

Hence, we request that the proponent provide an adequate response to the following issues of concern.

### **Key points**

*Water*



Can the proponent explain why two conflicting amounts have been used in regard to the annual quantity of water required? (EA 2.2.5 "the Project would require 870ML per year for mining related purposes" and in 752/04 2-46 "The maximum project related water requirement would be 215ML".)

Though there is much discussion of water recycling (98ML per annum has been estimated as recoverable water and subtracted from the estimates of total water usage) there is no mention of where and how much start up/ original water would be required to initiate the recycling process or indeed where this water would come from. Can this be clarified and explained?

#### *Environmental Flows*

Environmental flow regime proposed the mining operation could result in pollution of Majors creek and the Araluen Deua and Moruya River Systems. Section 2 Description of Project 245 "The Proponent would ensure, where practicable that the water released conforms to water quality criteria. This statement reflects the fact that the harvestable right dams do not have the capacity to adequately supply environmental flow requirements and that old mine water would have to be used (Harvestable Right 38ML stated environmental flows 66.2ML). The quality of the old mine water fails both the conservative ANZECC, 2000 water quality standard for aquatic ecosystems and the Moruya River Water Quality Objectives. It seems inconsistent with the precautionary principle to use this water for environmental flows when some of the allowable parameters for particular indicators are exceeded by more than 300%.

The Deua river system has been identified by the Commonwealth Government as a High Conservation Value Aquatic Ecosystem (why was this not mentioned in report)

#### *Location of Environmental flow release*

According to the documentation "In order to compensate for the anticipated reduction in base flows in Majors and Spring Creeks the proponent would release water to Majors Creek down stream of the anticipated area of groundwater draw down". (Description of Project 752/04 July 2010 p.2-45). The outer boundary of the mapped cone of anticipated draw down is not delineated (somewhere near the escarpment) while the 1m draw down gradient downstream of the site is located well outside the proponents property.

This statement "downstream of the anticipated area of groundwater draw down" has concerning implications of potential environmental damage.

#### *Groundwater*

- Applying the precautionary principle requires that the dual impacts of mining and climate change need to be considered and managed.
- Will the aquifers suffer if more environmental flow water is obtained from the mine?

If only 64,700 cubic metres of waste rock, a small proportion of the estimated total of 510,375 cubic metres that is expected to be generated by the project, is to be used for stope backfilling there will be an underground void that will impact on groundwater behaviour in the area for many years after the mining operations have ceased. Further clarification of the quantities would be appreciated, together with a program of ongoing monitoring of groundwater impacts.

#### *Dewatering of old mines*

- We understand that other hydrologists are providing input, and we urge the proponents to respond to that professional input.
- Beyond these points, we seek general further clarification of the consequences and action that will occur if measurable, negative impacts are found.

#### *Chemical Management*

We are unconvinced that the precautionary principle has been applied to chemical and tailings dam management. The use of material that is toxic to aquatic species is of great concern. Pollution prevention systems should be designed with regard to potential extreme and unprecedented flooding events due to climate change. Triple bunding at the chemical and fuel facilities would constitute best practice. Greater capacity to maintain tailings dam integrity in the event of a large flood also seems necessary to achieve a precautionary approach

#### *Other water questions*

- What is the chemical composition of the flotation reagent and does it pose a pollution risk?

#### *Hours of Operation*

##### *Noise*

- To prevent community stress, we suggest that blasting be undertaken at regular times, so that local people know when to expect them. Otherwise that ongoing community liaison be used to minimise the stress associated with high noise events.
- We strongly agree with the condition that there be no noise at the boundary at night time. Limiting bulk earthworks to 7:00am to 6:00pm is a start, but any other noise levels should be similarly controlled.

- What about sirens? They are not listed among noise issues, but are common at mine sites.
- We have reviewed the submission by the Major's Creek Community Liaison Committee regarding noise. We support their requests for noise management in their entirety.

#### *Business Risk Management*

- The potential for greater than anticipated environmental damage, together with external risks such as fluctuating share market prices for gold, and the approach of peak oil all suggest that there is no certainty that the mine will last for its anticipated life-span. We seek assurance that the Department of Primary Industries – Mineral Resources is ensuring that a security bond will be in place sufficient to meet the costs of outstanding rehabilitation?

#### *Ongoing Research*

- Other environmental and community impacts could continue to emerge. There needs to be processes in place to be able to discover and take these on as the mine is developing and operating.
- These could include assessment of foundations of old buildings, and vibrations through rock in and beyond Majors Creek affecting communities further away.
- We strongly suggest that local input, including local experts be employed in this ongoing research.

#### *Communicating issues*

- The omission of water resource and noise issues from the 'Key Statistics' section in the summary is disturbing. It suggests that some important issues could be overlooked or downplayed in communication documents.
- There is no clarity on how community views will be incorporated in the long-term.
- As one solution, we request that results from monitoring to be made public – eg published on-line in real time.

#### *Climate Change*

The Department of Planning has formally requested that the assessment include due regard for the CSIRO Climate Change predictions- There is no discussion of Climate Change in the whole Environmental Assessment- Why?

Climate change would affect recharge dynamics and HR dam capability, common predictions of heavier summer rainfall is likely to

increase the rate of rill, sheet and gully erosion and would be an important consideration meriting a detail discussion in respect to the proposed tailings dam. – Why is there no discussion of these fundamentally prudent considerations?



email: [su@wild-river.com.au](mailto:su@wild-river.com.au)  
www.wild-river.com.au/fmr

PO BOX 175  
Braidwood 2622  
Phone 0422167867

---

### **Key points in our submission**

We thank the proponents and contractors in producing their environmental impact statement and for the opportunity to respond to it.

FMR is not fundamentally opposed to mining. But we do consider it critical that the precautionary principle be applied. The precautionary principle has not been applied in this proposal in several ways.

We consider it critical that best practice operations be undertaken if this mine does go ahead. This is partly because of the potential for damage from this mine, but also because other mines in this area are likely in the future. We are aware of at least four former mines on the Mongarlowe River or its tributaries being considered for mining by **Commissioner's Gold Ltd. Because of these** potential mines FMR considers itself a stakeholder. The Dargues Reef mine should strive to establish a benchmark to ensure that the regional environment and community are either maintained or enhanced by the development.

Having read the proposal, we consider that the mine cannot be sustainable at the proposed scale. One clear indicator of this is the over-estimation of the capacity of harvestable rights dams, and the proposed use of polluted old mine water as an alternative to ensure environmental flows.

Hence, we request that the proponent provide an adequate response to the following issues of concern.

### **Key points**

#### ***Water***

Can the proponent explain why two conflicting amounts have been used in regard to the annual quantity of water required? (EA 2.2.5 **"the Project would require 870ML per year for mining related purposes"** and in document 752/04 section 2.10.2.6, on p.2-46 **"The maximum project related water requirement would be 215ML".**)

Though there is much discussion of water recycling (98ML per annum has been estimated as recoverable water and subtracted from the estimates of total water usage) there is no mention of where and how much start up/ original water would be required to initiate the recycling process or indeed where this water would come from. Can this be clarified and explained?

### ***Environmental Flows***

The environmental flow regime proposed the mining operation would result in the major pollution of Majors Creek and the Araluen, Deua and Moruya River Systems. Section 2 Description of Project 2-45 **"The Proponent would ensure, "where practicable" that the water released conforms to water quality criteria.** This statement reflects the fact that the harvestable right dams do not have the capacity to adequately supply environmental flow requirements and that polluted old mine water would have to be used (Harvestable Right 38ML stated environmental flows 66.2ML). The quality of the old mine water fails both the conservative ANZECC, 2000 water quality standard for aquatic ecosystems and the Moruya River Water Quality Objectives. Some of the allowable parameters for particular indicators are exceeded by more than 300%.

The Deua river system has been identified by the Commonwealth Government as a High Conservation Value Aquatic Ecosystem (why was this not mentioned in report)

Not only have the impacts of using polluted old mine water for environmental flows been totally ignored in the EA, but also the full magnitude of their use has been left open ended. The ability of the harvestable right dams to supply environmental flows is one of the critical determinants concerning how much polluted old mine water will be used for environmental flows. The capacity of these HR dams has been overestimated through selective and erroneous use of rainfall data (see section on harvestable rights in this submission) as well as reliance on inherently uncertain theoretical modelling to calculate the actual amount of these compensatory environmental flows.

### ***Location of Environmental flow release***

According to the documentation **"In order to compensate for the anticipated reduction in base flows in Majors and Spring Creeks the proponent would release water to Majors Creek down stream of the anticipated area of groundwater draw down". (Description of Project 752/04 July 2010 p.2-45).** The outer boundary of the mapped cone of anticipated draw down is not delineated (somewhere near the escarpment) while the 1m draw down gradient downstream of the site is located well outside the proponents property.

**This statement “downstream of the anticipated area of groundwater draw down” has a number of serious implications that have not been** discussed or even acknowledged by the proponent. These include:

- Environmental damage to a large section of Majors and all of Spring Creek located over the anticipated area of groundwater draw down that would not receive any environmental flows as well as being subject to as yet accurately quantified groundwater draw down;
- There are no arrangements for piping water for environmental flows over properties that are not owned by the proponent;
- There are no licensing arrangements for piping and disposing of polluted old mine water into Majors Creek adjacent to the escarpment on property that may adjoin the State Conservation Area this concern should have been addressed by the proponent given that pollution of waters is an offence against s 120 of the Protection of the Environment Operations Act 1997.;
- Given the uncertainty inherent in the highly subjective assumptions underpinning the theoretical modelling used to construct the groundwater draw down gradients combined with the overestimation of the capability of the harvestable rights dam (which mean more old mine water than estimated will have to be extracted for environmental flows) it is reasonable to assume that the proponent has no idea where the environmental flow outlet will be located or the severity of impacts on the environment and surrounding landholders this will cause.

### **Groundwater**

- Applying the precautionary principle requires that the dual impacts of mining and climate change need to be considered and managed.
- **Leakage from the Alluvial Aquifers i.e. “seepage from the alluvium to the mine or shafts where the groundwater flow gradient has been reversed... is embargoed water”**(3-54 Report 752/05 of Majors Creek due to mining activities is an unlicensed extraction of embargoed water . This leakage has been grossly understated as more water will be required from the dewatering of old mine workings to supply for operational and environmental flows )(as described above)
- The cone of groundwater drawdown is currently estimated at 1m within 500m of the escarpment – where is the drawdown zero in relation to the escarpment?
- Will the cone of drawdown and extent of depressurisation of the granodiorite and regolith aquifer extend to the Araluen Escarpment and the town ship of Majors Creek if more operational and environmental flow water is obtained from mine dewatering ?

- When do the drawdown impacts on Spring Creek finally recover after the five years post mining?
- Given that the groundwater modelling used contains **“numerous qualitative and subjective interpretations”** what degree of confidence can be had in the outputs generated by the model especially considering the high degree of uncertainty associated with the modelling and the potential implications and impacts of the modelled results?
- This degree of uncertainty could easily be reduced through collection of real data this should be done in a way that produces a statistically robust time series of observations and the model recalibrated accordingly.
- No long term monitoring has been undertaken only a one off steady state calibration with the assumption that the water levels in the bores selected for steady state calibration were representative of the long term average (steady state) groundwater levels.

The particularly sensitive results being the modelled predictions relating to:

- Modelled cone of groundwater draw down especially its distance from the Araluen escarpment;
- Draw down impacts and recovery rates for groundwater;
- Reversal of flow gradients from embargoed alluvium;

There is too much uncertainty about the modelling for it to be suitable for formulating accurate risk assessments and parameters for the groundwater impacts of this development.

More fundamental is the fact that there is an impact on the embargoed alluvial aquifer

If only 64,700m of waste rock, a small proportion of the estimated total of 510,375m that is expected to be generated by the project, is to be used for stope backfilling there will be a huge underground void that will have major impacts on groundwater behaviour in the area for many years after the mining operations have ceased. Can these impacts be fully explained and clarified and with what certainty?  
Dewatering of old mines

- We understand that other hydrologists are providing input, and we urge the proponents to respond to that professional input.
- Beyond these points, we seek general further clarification of the consequences and action that will occur measurable, negative impacts are found.

### ***Chemical Management***



- We are unconvinced that the precautionary principle has been applied to chemical and tailings dam management. The use of material that is toxic to aquatic species is of great concern. Pollution prevention systems should be designed with regard to potential extreme and unprecedented flooding events due to climate change. Best practice would require triple bunding of any hazardous chemical store.
- In particular, the tailings dam is clearly insufficient to prevent possible pollution from tailings in the event of large floods. It is also clear that the two proposed harvestable rights dams for water collection are too small to provide an effective back-up in case of flooding. Additional backup storages are required.

### *Other water questions*

- What is the chemical composition of the flotation reagent and does it pose a pollution risk?
- Cyanide is known to have been used in some of the old mines whose dewatering is to be used for environmental flows. What are the risks associated with this practice?

### *Hours of Operation*

- No justification is given (in the summary) for the 24 hour operation. The benefits would appear to be maximised, without additional cost to the company if it runs normal working hours. Why is this not proposed?
- If there are inherent reasons for 24 hour operation, then at the least, could the night-time operation be minimised.

### *Noise*

- To prevent community stress, we suggest that blasting be undertaken at regular times, so that local people know when to expect them. Otherwise that ongoing community liaison be used to minimise the stress associated with high noise events.
- Truck movements have been identified but what about additional traffic from workers?
- We strongly agree with the condition that there be no noise at the boundary at night time. Limiting bulk earthworks to 7:00am to 6:00pm is a start, but any other noisy activities should be similarly controlled.
- What about sirens? They are not listed among noise issues, but are common at mine sites.
- What are the noise generation characteristics of the hydraulic rock breaker to be used to process oversize ore?
- What noise attenuation measures are proposed to reduce the residential amenity impacts of this operation?

- **We have reviewed the submission by the Major's Creek** Community Liaison Committee regarding noise. We support their requests for noise management in their entirety.

### ***Waste rock management***

- The documentation suggests that nearly 446,000 of waste rock generated through the life of the project be used for site establishment. How will this be done if it has not yet been generated?

### ***Business Risk Management***

- The potential for greater than anticipated environmental damage, together with external risks such as fluctuating share market prices for gold, and the approach of peak oil all suggest that there is no certainty that the mine will last for its anticipated life-span. We seek assurance that the Department of Primary Industries – Mineral Resources is ensuring that a security bond will be in place sufficient to meet the costs of outstanding rehabilitation?

### ***Ongoing Research***

- Other environmental and community impacts could continue to emerge. There needs to be processes in place to be able to discover and take these on as the mine is developing and operating.
- These could include assessment of foundations of old buildings, and vibrations through rock in and beyond Majors Creek affecting communities further away.
- We strongly suggest that local input, including local experts be employed in this ongoing research.

### ***Communicating issues***

- The **omission of water resource and noise issues from the 'Key Statistics' section** in the summary is disturbing. It suggests that some important issues could be overlooked or downplayed in communication documents.
- There is no clarity on how community views will be incorporated in the long-term.
- As one solution, we request that results from monitoring to be made public – eg published on-line in real time.

### ***Climate Change***

The Department of Planning has formally requested that the assessment include due regard for the CSIRO Climate Change predictions- There is no discussion of Climate Change in the whole Environmental Assessment- Why?

Climate change would affect recharge dynamics and HR dam capability, common predictions of heavier summer rainfall is likely to increase the rate of rill, sheet and gully erosion and would be an important consideration meriting a detail discussion in respect to the proposed tailings dam. – Why is there no discussion of these fundamentally prudent considerations?

### ***Ecologically Sustainable Development***

Many of the specialist investigations contained in the assessment, especially the theoretical groundwater modelling which is underpinned by highly subjective assumptions underpinning the theoretical modelling which is used to construct the groundwater draw down gradients, cannot claim as the proponent does in the assessment, to contain a high degree of certainty. The high degree of easily remedied uncertainty contained the assessment and some of the investigations it is based on, would in my opinion most likely fail the Precautionary Principle Criteria concerning uncertainty as outlined Planning Principles and documents produced by the NSW Land and Environment Court to provide guidance on these matters. There is a high possibility that this development will cause more than negligible damage to the environment, agricultural systems, water supplies and local resident amenity.

### ***Development near Waters***

There are relevant legal precedents to protect ecological communities from potentially hazardous developments that may impact on water resources or water dependent biota or ecological communities when carried out in proximity to such sources of water.

In *Gerroa Environment Protection Society Inc v Minister for Planning and Cleary Bros (Bombo) Pty Ltd*, [2008] NSWLEC 173 the extension of a sand mine could potentially have impacted on groundwater and groundwater dependent ecological communities and, in particular, on a swamp sclerophyll forest, a type of endangered ecological community dependent on ground and surface waters. After a hearing involving considerable hydrological and ecological expert evidence, the NSWLEC determined to grant development consent to the extension but imposed strict conditions requiring the collection of base data, ongoing monitoring and adaptive management to mitigate any potential adverse impacts. Significant biodiversity offsets were required to compensate for the loss of biodiversity caused by the extension. *Gerroa Environment Protection Society Inc v Minister for Planning and Cleary Bros (Bombo) Pty Ltd* [2008] NSWLEC 173 (primary judgment) and [2008] NSWLEC 254. Some relevant elements of these determinations are listed below.

Under the polluter pays principle, the polluter should pay for the costs of:

- preventing pollution or reducing pollution to comply with applicable
- standards and laws;
- preventing, controlling, abating and mitigating damage to the environment caused by pollution; and
- making good any resultant environmental damage, such as cleaning up pollution and restoring the environment damaged and making reparation (including compensatory damages and compensatory restoration) for irremediable injury.

Where there is uncertainty concerning the supply of and demand for water resources, a precautionary approach is prudent in determining future water use. This may involve approving water use on conditions requiring monitoring of water supply and demand and adaptive management.

#### ***D Precautionary Approach Where There Exists Uncertainty in Water Resources and Use***

Often, there is uncertainty as to the supply of water resources, both current as well as future water resources, particularly having regard to climate change. A precautionary approach to deal with such uncertainty is prudent and implements ecologically sustainable development. A precautionary approach may involve approving use of water resources subject to conditions that require monitoring and adaptive management.

In *Ulan Coal Mines Ltd v Minister for Planning*,<sup>64</sup> a neighbouring coal mine challenged, by way of **judicial review, the Minister for Planning's approval of a new coal mine** on grounds including that a condition of the approval, requiring that the new mine must have sufficient water for all stages of the project, was uncertain and manifestly unreasonable. The NSWLEC rejected the challenge, holding that the Minister had adopted a precautionary approach by requiring monitoring of the water supply and use of an adaptive management approach, notably by requiring an adjustment of the scale of mining operations (and hence of the demand for water) to match the available water supply. Such an adaptive management response was considered appropriate to dealing with any uncertainty arising from potential impacts.

The Court adopted a precautionary approach, recognising the uncertainty in the data as well as considering the impacts of climate change on future water resources. 70 [2008] NSWLEC 1385.

The Court held that the condition was imposed in accordance with the precautionary principle and was a proper response to deal with uncertainty as to potential impacts.<sup>69</sup>69 [2009] NSWLEC 213 at [131].

Other States have also made judgements concerning the use of the precautionary principle would use considerable volumes of groundwater and expose the catchment to a significant risk of overuse and consequential harm. The SASC noted that the evidence of certain experts, whilst insufficient to support a conclusion of unsustainable water use, was sufficient to support a conclusion of significant risk of serious harm due to water overuse, coupled with current scientific uncertainty about the extent of environmental harm, thereby attracting the precautionary principle.

#### ***E Preventative Approach where Water Use is Unsustainable***

Where a proposed development will unsustainably use water resources, a preventative approach is appropriate and development consent may properly be refused. In *Mercer v Moorabool Shire Council*,<sup>73</sup> the Victorian Civil and Administrative Appeals Tribunal refused a permit to enlarge two dams which would reduce flows into a nearby creek. Evidence showed that the catchment was already overcommitted and that the ecology of watercourses in the area was being seriously adversely affected.

# Political donations disclosure statement



NSW GOVERNMENT  
Department of Planning

Office use only:

Date received: \_\_\_\_/\_\_\_\_/\_\_\_\_

Planning application no. \_\_\_\_\_

This form may be used to make a political donations disclosure under section 147(3) of the *Environmental Planning and Assessment Act 1979* for applications or public submissions to the Minister or the Director-General.

Please read the following information before filling out the Disclosure Statement on pages 3 and 4 of this form. Also refer to the 'Glossary of terms' provided overleaf (for definitions of terms in *italics* below). Once completed, please attach the completed declaration to your planning application or submission.

## Explanatory information

### Making a planning application or a public submission to the Minister or the Director-General

Under section 147(3) of the Environmental Planning and Assessment Act 1979 ('the Act') a person:

- (a) who makes a *relevant planning application* to the Minister or the Director-General is required to disclose all *reportable political donations* (if any) made within the *relevant period* to anyone by any *person with a financial interest* in the application, or
- (b) who makes a *relevant public submission* to the Minister or the Director-General in relation to the application is required to disclose all *reportable political donations* (if any) made within the *relevant period* to anyone by the person making the submission or any *associate of that person*.

### How and when do you make a disclosure?

The disclosure to the Minister or the Director-General of a *reportable political donation* under section 147 of the Act is to be made:

- (a) in, or in a statement accompanying, the relevant planning application or submission if the donation is made before the application or submission is made, or
- (b) if the donation is made afterwards, in a statement of the person to whom the relevant planning application or submission was made within 7 days after the donation is made.

### What information needs to be included in a disclosure?

The information requirements of a disclosure of reportable political donations are outlined in section 147(9) of the Act.

Pages 3 and 4 of this document include a Disclosure Statement Template which outlines the information requirements for disclosures to the Minister or to the Director-General of the Department of Planning.

Note: A separate Disclosure Statement Template is available for disclosures to councils.

**Warning:** A person is guilty of an offence under section 125 of the *Environmental Planning and Assessment Act 1979* in connection with the obligations under section 147 only if the person fails to make a disclosure of a political donation or gift in accordance with section 147 that the person knows, or ought reasonably to know, was made and is required to be disclosed under section 147.

The maximum penalty for any such offence is the maximum penalty under Part 6 of the *Election Funding and Disclosures Act 1981* for making a false statement in a declaration of disclosures lodged under that Part.

Note: The maximum penalty is currently 200 penalty units (currently \$22,000) or imprisonment for 12 months, or both.



# Political Donations Disclosure Statement to Minister or the Director-General

If you are required under section 147(3) of the Environmental Planning and Assessment Act 1979 to disclose any political donations (see Page 1 for details), please fill in this form and sign below.

<b>Disclosure statement details</b> Name of person making this disclosure <u>Gordon Waters</u>		Planning application reference (e.g. DA number, planning application title or reference, property address or other description) <u>Dargues Reef Gold Project - PA 10-0054</u>		
Your interest in the planning application (circle relevant option below) You are the APPLICANT    YES / <u>NO</u> OR    You are a PERSON MAKING A SUBMISSION IN RELATION TO AN APPLICATION <u>YES</u> / NO				
<b>Reportable political donations made by person making this declaration or by other relevant persons</b> <small>* State below any reportable political donations you have made over the 'relevant period' (see glossary on page 2). If the donation was made by an entity (and not by you as an individual) include the Australian Business Number (ABN).</small> <small>* If you are the applicant of a relevant planning application state below any reportable political donations that you know, or ought reasonably to know, were made by any persons with a financial interest in the planning application, OR</small> <small>* If you are a person making a submission in relation to an application, state below any reportable political donations that you know, or ought reasonably to know, were made by an associate.</small>				
Name of donor (or ABN if an entity)	Donor's residential address or entity's registered address or other official office of the donor	Name of party or person for whose benefit the donation was made	Date donation made	Amount/ value of donation
None				
Please list all reportable political donations—additional space is provided overleaf if required.				
By signing below, I/we hereby declare that all information contained within this statement is accurate at the time of signing.				
Signature(s) and Date <u>Gordon Waters</u> 31/10/10				
Name(s) <u>Gordon Waters</u>				

### **Submission from the Majors Creek Community Liaison Committee.**

**The group of Majors Creek residents represented by this committee expresses a wide variety of opinions regarding the mine proposal from vehemently against it, to passionately in favour. This committee has worked hard to reflect that wide variety of opinion. This submission is our best attempt to do so.**

The committee would like it noted that;

- This committee is neither for nor against the mine- it exists to help protect the best interests of Majors Creek and its inhabitants and to give voice to their concerns
- We do not speak for all the members of the Majors Creek Community, only those who attended our public meetings, spoke to us privately and undertook our surveys
- We are very happy with the willingness of Cortona/ Big Island to engage with the community in general and this committee and group in particular
- That if anyone builds a gold mine in Majors Creek it should be Cortona/ Big Island as they appear to have the right attitude and seem to be trying to address the concerns of the community
- That Cortona management have already addressed a great many of the community's concerns
- That the establishment of a mine here would bring quite substantial benefits to the community but these would be tempered by negative impacts
- That Cortona has already expressed an interest in establishing a community development "fund" to assist in community initiated improvement programs obviously to compensate and balance the negative aspects of the proposed mine
- The last thirty days is not a sufficient time for non experts to properly assess and reply to an Environmental Assessment document of the size and complexity of this one
- That Australia holds the world's record for destruction of species
- That Australia is amongst the world's leaders in habitat destruction
- That the area of Majors Creek is strikingly beautiful but also substantially damaged by the historic mining which has occurred over the last century and a half. It needs protection.

**The overall view emanating from all the community meetings, the survey, the questions asked of Cortona and the responses to the answers, as well as the discussions held with the Environmental Defenders Office and from all the committee meetings is one of "hesitant, guarded support" for the mine but that there are a number of perceived weaknesses in the EA and a number of very significant concerns expressed even from quite strong supporters of the mine.**

**Very few people spoke about, or indicated, absolute opposition to the mine. What was expressed constantly was a serious concern about the number of "unknowns", or "inadequately explained" items associated with the development. They are listed below.**



- **The most serious concern is the issue of water.** There is an understanding that the massive water usage is for the duration of the mine and that it will “come back” afterwards. The concern is what will happen to all aspects of the environment while the water table is lowered. This is not just about some bores dropping in level: there is a wide concern about the survival of plants whose roots might dry out and native animals whose water supply will dry up. We understand that water levels in Majors Creek will be maintained by augmentation from other water supplies but the community is most concerned about the lack of ground water no longer passing through the environment. There is a substantial concern that the EA has not thoroughly investigated this issue in a large enough area.

There is concern about the stated heavy reliance on water harvesting rights to fill a series of yet to be built dams to replace the water in Majors Creek and the inconsistency of rain. The general belief is that Cortona can *“build as many dams as it likes but they won’t fill if it don’t rain! Then what will they do?”*

We believe what is needed is a much larger study over a much larger area over a longer time, including downstream into the Araluen Valley to include the habitats of two endangered species and a much larger radius around the mine site. This should be done by an independent body.

We request that the appropriate Federal Authorities be contacted about these rare species- the *Newholland Mouse* and the plant, the *Araluen Zieria* and the possible threat to their habitat.

We request more thorough and widespread monitoring of water impact and stronger powers for appropriate agencies to shut the operation if there is a measurable negative impact on the environment such as dieback of trees and grasses and observable migration of animals.

Efficient independent monitoring processes must be put in place and if there is any evidence of dieback, the company must take immediate remediation measures to save the trees, shrubs and grasses. It is noted that Cortona, wisely, chose to relocate the planned mine entrance to not knock down trees. What if the habitat trees die through lack of water?

- **Another significant issue for the community is noise.** A person can choose to not look at something but one can not choose to not hear something. There seems to be general acceptance that during daylight hours, noise is inevitable and that there is already noise in the village and that industrial sounds coming from the mine would have little impact on that. The issue arises with industrial type noise between 6pm and 6am. Because of the unknown (and poorly explored in the EA) factor of how much noise will be generated at night the overriding attitude from the community is that the mine should not operate over 24 hours as is proposed. The EA explores the issue of noise but only deals with “acceptable’ maximum levels at certain distances but the community concern is not an issue of how much noise is “legally allowed”. Many nights are absolutely silent in this village. Any noise at all is anathema to the ambience of the night experience. So in that sense no (ongoing industrial) noise is acceptable at night. The committee is aware of the absolute necessity for the mine to operate over the 24 hour period for

“technical reasons”. But it is not really the 24 hour operation that is the issue, only the noise emanating from the mine site into the village. If the operation can go ahead with no noise, the 24 hours / 7 days a week idea is not a problem on the grounds of noise at least.

There is general concern for the interests of the closest neighbours to the mine and the impact the noise will have on their lives, and the value of their properties.

There is a general concern about the substantial noise that will be generated during the set up stage- major earthwork machinery as well as (community anticipated) surface and near surface explosions.

Activities will need to be restricted at night so NO industrial noise emanates from the mine site. Included in the final licence should be a process of monitoring and community reporting to be in place so if noise is heard by the community those activities will need to stop forthwith.

No one is allowed to create noise which disturbs other- that should include a mine next door to a village.

- **Traffic generation and the Majors Creek Road** are ongoing issues of concern not yet resolved by either the EA, statements from Cortona or the agreement recently made between Cortona and Palerang Council. Cortona has stated there are only a “few” truck movements per day from and to the mine and that hours of departure and arrival will be timed to not coincide with work and school journey times for the community. The MCCLC notes and appreciates this however the community is concerned that this may well be a serious underestimation of vehicle movements. They believe there will be a great many light vehicle movements to and from the mine as well as a plethora of small and medium service vehicles. This will be particularly noticeable during the mine development stage over the next year or two as large machinery comes and goes and then at changes of shift and times of deliveries. Company policies need to be in place that somehow control the movement of transport servicing the mine but not owned or operated by Cortona.
- **Potential for ground movement is still a concern.** There are a number of home owners in the village who own quite old homes with brick or stone walls and foundations. Everyone who attended our meetings agreed that explosions at the mine should not be allowed to cause damage to these lovely old homes. If vibrations do occur and cause damage as a result of mine activities some system of compensation and/ or repair needs to be established before the explosions start. **Insufficient study** seems to have been made about the fault lines in the area and the likelihood of these events occurring. No system of monitoring is yet in place to record or measure if these events occur. This committee has, on several occasions, warned those residents with concerns they should contact Cortona and photograph their properties in case they need “proof” of movement/ damage. The committee believes the licence could mandate this.

- The last meeting of the group which followed the joint announcement between Cortona and Palerang about the road reiterated their concern about the proposed intersection. Everyone agrees that an acceleration lane is required from the mine entrance to the north not just a simple T- intersection. Several times people mentioned the need to establish passing places. They are also suspicious that the amount of money agreed to will not be sufficient to make the road safe and that more ideas need to be explored about road sharing and safety, particularly at dawn and dusk and in fog.
- There is a concern that while the EA is a very substantial series of documents it is still lacking in important detail and fails to explore ideas of transparent and public monitoring and reporting systems for the issues of water, dust, native species issues, noise and traffic. The EA contractors, for instance, failed to identify a number of properties closely affected by the proposal- they did not ask the council about buildings approved but not yet built with straight line views to the mine site, they failed to note a property 4000 metres to the east that's been there thirty or forty years. What other unknown things were not done by the EA scientists? How do people complain about matters? What does happen if the mine makes too much noise, or dust, or if the trees die? What mechanisms are in place for the community to make a real difference? There is a very real concern that once the approvals are granted it will be "too late"- the community won't be able to do anything about anything. Consequently, we believe a process for community concerns to be addressed needs to be established for this to occur.
- There is also an underlying concern that a development such as this and the EA which tries to explore its impact is also dealing with undefinable and unmeasurable concepts- beauty, ambiance, history, silence, the night sky, sharing the planet with other species, the spirit of community. This committee thinks Cortona management is trying to deal with these ideas but the lip service paid to them by the "specialists" who wrote the EA does not do them justice.
- There continues to be a concern about the values of properties in the area. Most people came here to live the quiet life in a quaint, little former gold mining village- they did not come to live in a mining town. Some ratepayers are already planning to sell. Buyers may be difficult to find. Again this is one of those "unknowns". For all we know, if there is an influx of people this may increase prices by putting pressure on existing dwellings. The limited availability of rented accommodation has been noted at several meetings. There may even be a building boom. These are also issues not necessarily welcomed by the whole community. There is no doubt that the mine proposal has divided the community and that the ongoing existence of the mine will probably extend those ill feelings.

**In summary, while there is no adamant anti- mine feeling generally in the community, there are some people who simply want it to go away. In the main there is a general sense of inevitability and guarded acceptance. However, even those who express very**

**strong support for the mine still articulate some misgivings. This committee is hopeful that the planning authorities do set in place very strict guidelines to keep all the activities associated with the Dargues Reef venture, and any subsequent development nearby, from negatively affecting the village and surrounding environment of Majors Creek on the issues outlined above as well as the other strongly felt issues raised in other submissions.**

**Finally the committee would like to thank Peter van der Borgh from Cortona for doing his best to keep the community informed and his willingness to maintain an open and candid dialogue with this committee. He has done far more than he has to. The committee has no doubt that he has the best of intentions.**

On behalf of Majors Creek Community Liaison Committee

Bill Waterhouse

Chairman

4846 1333

Email: [ssnakebyte@bigpond.com](mailto:ssnakebyte@bigpond.com)

Community Website: <http://www.majorscreek.org.au/>

## George Mobayed - Online Submission from Gordon Waters of Majors Creek Community Liaison Committee (other)

---

**From:** Gordon Waters <gordon@majorscreek.org.au>  
**To:** George Mobayed <George.Mobayed@planning.nsw.gov.au>  
**Date:** 1/11/2010 10:23 AM  
**Subject:** Online Submission from Gordon Waters of Majors Creek Community Liaison Committee (other)  
**CC:** <assessments@planning.nsw.gov.au>  
**Attachments:** Submission from the Majors Creek Community Liaison Committee-1.pdf;  
PoliticalDonationsDisclosure.pdf

---

---

---

Submission from the Majors Creek Community Liaison Committee.

The group of Majors Creek residents represented by this committee expresses a wide variety of opinions regarding the mine proposal from vehemently against it, to passionately in favour. This committee has worked hard to reflect that wide variety of opinion. This submission is our best attempt to do so.

Name: Gordon Waters  
Organisation: Majors Creek Community Liaison Committee

Address:  
46 Red Hill Rd  
Majors Creek NSW 2622

IP Address: gbauto.lnk.telstra.net - 203.45.142.199

Submission for Job: #3871 Dargues Reef Gold Project (PA 10\_0054)  
[https://majorprojects.onhiive.com/index.pl?action=view\\_job&id=3871](https://majorprojects.onhiive.com/index.pl?action=view_job&id=3871)

Site: #2222 Dargues Reef Mine  
[https://majorprojects.onhiive.com/index.pl?action=view\\_site&id=2222](https://majorprojects.onhiive.com/index.pl?action=view_site&id=2222)

-----

**George Mobayed**  
Planner - Mining & Industry Projects

P: (02) 9228 6467  
E: [George.Mobayed@planning.nsw.gov.au](mailto:George.Mobayed@planning.nsw.gov.au)

---

Powered by [Internetrix Affinity](#)





Sharing sustainable solutions  
with communities

The Hon Tony Kelly MLC  
Minister for Planning, Minister for Infrastructure, Minister for Lands  
Level 34 Governor Macquarie Tower  
1 Farrer Place  
Sydney NSW 2000

Received

27 OCT 2010

The Hon. Tony Kelly MLC

26 October 2010

Dear Mr Kelly

**RE: Proposed Dargues Reef Gold Project (PA 10-0054)**

I write to you on behalf of the members of Permaculture Sydney North (PSN) to object to the proposed Dargues Reef Mine.

PSN has some 500 members living in the northern area of Sydney and is part of a wider network of permaculture organisations throughout the Sydney basin and throughout NSW. Permaculture is a design system for the development of sustainable agricultural systems as the basis of a sustainable society. Our members have concerns that the proposed Dargues Reef Mine is environmentally unsustainable. Allowing it to proceed could result in irreparable damage to local plant and animal populations and to ground water systems.

In addition, we request that additional independent studies of environmental impacts are undertaken before any final consideration of the proposal by Big Island Mining Pty Ltd takes place.

Our primary concern is that the impact of the mine on ground water and in turn flora and fauna have not been adequately assessed. It is considered that:

- The impact on ground water levels need to be extended further from the proposed mine site
- The evaluation of likely recharge scenarios is inadequate in that measurements need to be taken over a longer period to allow for variations in rainfall. The Environmental Assessment presented by the proponent provides an optimistic view of likely recharge rates which may not be justified when NSW re-enters a period of drought.
- Even if recharge will restore ground water levels within 5 years of the mine ceasing operations as predicted (after a 9 year project life) ground water levels will have been suppressed for 14 years. This extended period of changed water regime may lead to serious adverse consequences for local flora and fauna. These impacts need to be thoroughly assessed before any consideration could be given to approving the Dargues Reef Mine.

Page 1 of 2

- It is considered that a detailed assessment should be made of endangered, critically endangered and threatened flora and fauna in the four kilometres below the mine site. This will require a study period of 12 months for completion, as some species are migratory, and others, such as the endangered powerful owl, can only be easily identified in late winter when they are calling.
- It is considered that a detailed assessment should be made of heritage and indigenous sites 2-6 kilometres downstream from the proposed mine site and tailings dam.

We urge you as Minister for Planning not to approve the proposed Dargues Reef Mine until such time as an adequate assessment of all environmental and heritage impacts has been completed and it has been demonstrated that there will be no adverse impacts.

If there is any doubt, as to whether or not the proposal could proceed without environmental damage, then the Precautionary Principle of Environmentally Sustainable Development would dictate that approval should not be granted.

Yours Sincerely



Barry Hadaway  
Advocacy Team Leader - Permaculture Sydney North

Page 2 of 2





## ***SOUTH EAST FOREST RESCUE***



Representations on Dargues Reef Gold Mine, Majors Creek.





## Representations on Dargues Reef Gold Mine, Majors Creek.

South East Forest Rescue takes a firm stand on environmental protection of the native forest estate and expresses deep alarm at the welfare of forest-dependent threatened species and the cumulative impacts of industrial degradation of native forests that are exacerbating extinction rates and destroying soil, water, and carbon capacity, and we welcome the invitation to provide comment.

South East Forest Rescue strongly objects to the proposed mine at Dargues Reef. The mine is being planned in an area that is two kilometres from the township and directly upstream from residents. The timeline for submissions is spurious. There is no proposed secondary wall to be constructed on the tailings dam if the first wall fails. The tailings storage facility seems to have potential to impact Spring Creek and further the tailings facility should have a liner throughout, not just clay in some parts as implied.

No studies have been done for the Environmental Assessment on the mine's effect on the land beyond the actual mine site. The proposed mine is situated close to Majors Creek Araluen National Parks Reserve, Monga and Deua National Parks. Threatened, endangered and critically endangered species in the gorge below the proposed mine site, ranging from the Powerful Owl to the critically endangered *Eucalyptus kartzoffina* are not mentioned. This is contrary to current case law on definitions of significant impact.<sup>1</sup>

In the *Nathan Dam* case Black CJ, Ryan and Finn JJ held that 'impact' is not confined to direct effects but includes effects that are or would be a consequence of the action.<sup>2</sup> In both the *Hazlewood* case and the *Anvil Hill* case it was held that the impacts of Scope 1, 2 and 3 emissions must be considered.<sup>3</sup> In *Gray v The Minister* it was held that environmental assessments must also consider the emissions from the use of the product.<sup>4</sup>

The Dargues Reef Mine proposes to remove 130 mega litres of water per year from the local water table. This would cause a drop in ground water levels of between 1.5 and 10.5 metres. The water table currently supplies underground springs that provide drinking water for the local native animals and also keep the native flora watered. The dramatic drop in the water table could impact these native animals and their habitat.

Mining is an industrial activity that takes place in the natural environment, disturbing areas around where it occurs. These mining operations come with several direct and indirect environmental impacts which include waste-water spills and water pollution (chemical spills), visual changes, solid waste generation (containing waste chemical solutions), ground vibration, noise pollution and air pollution.

The almost complete consensus of public opinion is the requirement to leave the land in a better state than it was found, and to eliminate or drastically reduce land clearing and greenhouse gas emissions immediately. In concurrence with the Stern Report and the Mackey Report, action to avoid further land degradation should be an urgent priority. Accordingly, if no action is taken, the health of ecosystems and therefore the Australian public will be severely detrimentally affected.

### Chemicals

The proponent makes scant mention of the chemicals to be used and no mention of their effects on biota. The Assessment Report states the company will transport 'sulphide concentrate'. We would state that this is a cynical understatement and an attempt to hide the real facts.

The EA must provide details of the project that are essential for predicting and assessing impacts to waters: including the quantity and physio-chemical properties of all potential water pollutants and the risks they pose to the environment and human health, including the risks they pose to Water Quality Objectives in the ambient

---

<sup>1</sup> *Minister for the Environment and Heritage v Queensland Conservation Council Inc* (2004) 134 LGERA 272

<sup>2</sup> *Minister for the Environment and Heritage v Queensland Conservation Council Inc* (2004) 134 LGERA 272 at 288; see also *Re Australian Conservation Foundation* [2004] VCAT 2029.

<sup>3</sup> *Australian Conservation Foundation v Minister for Planning* above n2; *Gray v the Minister for Planning* [2006] NSWLEC 720.

<sup>4</sup> Rose A, 'Gray v Minister for Planning: The Rising Tide of Climate Change Litigation in Australia' (2007) 29 *Sydney Law Review* 725.

waters (as defined on [www.environment.nsw.gov.au/ieo](http://www.environment.nsw.gov.au/ieo), using technical criteria derived from the Australian and New Zealand Guidelines for Fresh and Marine Water Quality, ANZECC 2000).<sup>5</sup>

*Copper Sulphate Pentahydrate:*

This chemical is also used as a fungicide. The effects on biology are listed as being slightly to highly toxic:

Taxa	Effects
Amphibians:	Development, Growth, Mortality
Annelida:	Accumulation, Behaviour, Enzyme(s), Morphology, Mortality, Physiology
Aquatic Plants:	Accumulation, Biochemistry, Growth, Mortality, Population, Reproduction
Cnidaria:	Growth, Mortality
Crustaceans:	Accumulation, Biochemistry, Cell(s), Development, Hormone(s), Mortality, Reproduction
Fish:	Accumulation, Behaviour, Biochemistry, Cell(s), Development, Enzyme(s), Feeding Behaviour, Growth, Immunological, Intoxication, Morphology, Mortality, Physiology, Population
Insects:	Mortality
Molluscs:	Behaviour, Feeding Behaviour, Growth, Intoxication, Mortality, Physiology
Nematodes and Flatworms:	Mortality
Phytoplankton:	Population
Zooplankton:	Behaviour, Feeding Behaviour, Intoxication, Mortality, Reproduction

The effects on humans is listed as being Moderately Hazardous. Copper sulphate is an irritant. The usual routes by which humans can receive toxic exposure to copper sulphate are through eye or skin contact, as well as by inhaling powders and dusts. Skin contact may result in itching or eczema. Eye contact with copper sulphate can cause conjunctivitis, inflammation of the eyelid lining, ulceration, and clouding of the cornea.

Upon acute oral exposure, copper sulphate turns to be only moderately toxic. According to studies, the lowest dose of copper sulphate that had a toxic impact on humans is 11 mg/kg. Because of its irritating effect on the gastrointestinal tract, vomiting is automatically triggered in case of the ingestion of copper sulphate. However, if copper sulphate is retained in the stomach, the symptoms can be severe. After 1–12 grams of copper sulphate are swallowed, such poisoning signs may occur as a metallic taste in the mouth, burning pain in the chest, nausea, diarrhoea, vomiting, headache, discontinued urination, which leads to yellowing of the skin. In case of copper sulphate poisoning, injury to the brain, stomach, liver, kidneys may also occur.<sup>6</sup>

*Potassium Amyl Xanthate:*

Xanthates are toxic to aquatic biota at concentrations of less than 1 mg/L and can be a water contaminant downstream of mining operations.<sup>7</sup>

Exposure of solid xanthates to moisture and heat causes decomposition and formation of carbon disulphide. The heat generated by hydration or decomposition could raise the temperature to the auto-ignition point of carbon disulphide.

Xanthates decompose in aqueous solution by dissociation, oxidation and hydrolysis. Hydrolytic decomposition is the main reaction in alkaline solutions while the other two reactions occur in acidic solutions. Potassium amyl xanthate is used in the flotation process in alkaline conditions, and therefore the main reaction is hydrolytic decomposition and the major decomposition product is carbon disulphide.

Decomposition of xanthates is accelerated at high concentrations and raised temperatures and is also rapid at pH below 7 and decreases as the pH increases.

<sup>5</sup> Director-Generals Requirements, Dargues Reef Gold Mine Project, Department of Environment Climate Change and Water, 2010.

<sup>6</sup> TOXNET, 1975-1986, National library of medicine's toxicology data network, Hazardous Substances Data Bank (HSDB), Public Health Service. National Institute of Health, U. S. Department of Health and Human Services, Bethesda, MD: NLM; Clayton G D, and Clayton F E, [eds] *Patty's Industrial Hygiene and Toxicology*, Third edition, Vol. 2: Toxicology, NY: John Wiley and Sons (1981).

<sup>7</sup> Xu Y, Lay J P, Korte F, 'Fate and Effects of Xanthates in Laboratory Freshwater Systems' (1988) 41 *Bulletin of Environmental Contamination and Toxicology* (5)683.

Toxicity data for xanthates has not been included in the proponents application.

The target sites are the central nervous system, liver and the spleen. Oral LD50 for xanthates in mice range from 411-583 mg/kg and in rats from 1000-2000 mg/kg.

The target sites for the adverse effects of potassium butyl xanthate both after single and repeated oral administration were the central nervous system, liver and kidneys indicating similar target organs for the various xanthates.

Inhalation of potassium amyl xanthate in a 30-day study produced adverse effects on the liver in dogs, rats and mice. The other affected organs were the kidneys in rats and the central nervous system in mice.

The target sites for all xanthates are the central nervous system, liver and kidneys. The adverse effects seen in the toxicity studies could be due to the xanthates themselves, their decomposition products or a combination of both.

Liquid solution of potassium amyl xanthate is strongly alkaline. Eye contact will result in mild to severe eye irritation. Contact with the skin will result in mild to severe burns of the skin. Ingestion of product will irritate mouth, throat and gastrointestinal tract. Inhalation of product vapours, mist may cause irritation of respiratory airways.

The Canadian Centre for Occupational Health and Safety (1994) has summarised a report by Rakhimova (1973) of acute exposure of a worker who opened a tank containing xanthates. The worker lost consciousness and was removed from the work site. On revival he was restless, vomited and had convulsive twitching of muscles in his arms and legs. He complained of difficult breathing, teary eyes and hoarseness and later developed light sensitivity and fluid accumulation in the eyelids and eye discharge.

In accordance with the health effects criteria detailed in the National Commission's Approved Criteria for Classifying Hazardous Substances (Approved Criteria), potassium amyl xanthate is classified as 'harmful' by the oral and dermal routes and as an eye and skin irritant. Based on the classification of its health effects, and in accordance with the Approved Criteria, potassium amyl xanthate is considered to be a hazardous substance.

According to the Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG Code) Xanthates are classified as a dangerous good, Class 4.2.

3342 XANTHATES 4.2 II 0 P002 IBC06 B2 T3 TP33 4.2 III 223 0 P002 IBC08 LP02 B3 T1 TP33

This product is listed as a HAZARDOUS material under criteria of NOHSC

This product is classified as DANGEROUS GOODS by the criteria of the ADG Code

Hazard Category ..... Corrosive

The freshly prepared xanthate solution will contain low levels of carbon disulphide. This is formed by decomposition of some xanthate molecules during dissolution of dry PAX.<sup>8</sup>

During storage of xanthate solution there will be further decomposition of xanthate molecules producing yielding increasing levels of carbon disulphide in the solution. The rate of decomposition depends on factors such as the temperature of the solution and the presence of other elements and molecules.

Because it is a highly volatile liquid, carbon disulphide present in xanthate solution will produce carbon disulphide vapour which is toxic and extremely flammable (Flash Point -30°C).

If the freshly supplied xanthate solution is to be stored for more than 5 days the presence of carbon disulphide

---

<sup>8</sup> LogiChem Material Safety Data Sheet, see <[http://www.logichem.com.au/downloads/msds\\_xanthate\\_solution.pdf](http://www.logichem.com.au/downloads/msds_xanthate_solution.pdf)>.

becomes an important consideration in the safe storage and handling of the solution.

Atmospheric monitoring for potassium amyl xanthate is not carried out at the mine sites where it is used and there is no recognised methodology for potassium amyl xanthate, although random instantaneous monitoring for carbon disulphide is carried out at some of these mine sites.

Potential for fire is high during transport and storage if packaging is inadequate or damaged. The presence of moisture can lead to the formation of carbon disulphide, which is highly volatile and readily released at temperatures above 20°C.

Potassium amyl xanthate decomposes releasing carbon disulphide and there may be some public exposure to carbon disulphide, particularly in the case of accidental spillage during transport. While potassium amyl xanthate is used in Australia, it is hazardous to health.

#### *Carbon disulphide:*

Xanthates in the presence of heat or moisture decompose and under the conditions of storage and use the major decomposition product is carbon disulphide. The national exposure standard for carbon disulphide in Australia is a TWA of 10 ppm with a skin notation which indicates that significant absorption occurs through the skin. Carbon disulphide is a dangerous fire and explosion hazard. Xanthates readily decompose at high temperatures and in the presence of moisture to evolve carbon disulphide. Carbon disulphide has a low autoignition temperature and is highly flammable and explosive. Carbon disulphide also produces adverse health effects.

Carbon disulphide can be absorbed by inhalation, through the skin and by the oral route. Acute exposure to high concentrations (500 to 1000 ppm) may result in psychosis and narcosis. Carbon disulphide vapour is a severe irritant to the eyes, skin and respiratory system, and the liquid may cause burns.

Repeated exposure to carbon disulphide vapour can adversely affect the central and peripheral nervous systems, including weakening of the leg muscles and damage to the peripheral and cerebral arteries. Carbon disulphide has been shown to contribute towards coronary heart disease in exposed workers, and severe effects on the retina of the eye have been observed. Hearing defects in workers exposed to carbon disulphide have also been reported.

Adverse effects on the reproductive system of workers has been noted. Menstrual disorders have been observed in female workers exposed to carbon disulphide levels below 3 ppm for 3 years. Decreased libido was observed in earlier studies while a later study revealed changes in sperm morphology when carbon disulphide levels were believed to be about 13-26 ppm but with excursions up to 250 ppm.

The exposure standard for carbon disulphide recommended by the National Commission is a time weighted average (TWA) of 10 ppm. Instantaneous samples using detector tubes indicate that at times, short-term excursions above 10 ppm occur in the mixing area during mixing activity at some sites. High levels were also recorded in the containers in ship holds on the arrival of xanthates at ports. The monitoring data indicate that there is the potential for exposure to high levels of carbon disulphide during mixing and transport.

Since the compound decomposes and the major product is carbon disulphide, there exists some potential for the contamination of the immediate atmosphere which may impact on public health. Release of the hazardous degradation products may also result from the decomposition of residual amounts of xanthates which remain in the aqueous phase in the tailings slurry, which will be discharged to a tailings dam.

#### *Incidents*

There is a potential for high worker exposure to Xanthates and carbon disulphide, during the mixing process, depending on the degree of automation. During tipping of the drums there is a likelihood of dust generation and spillage of the powder or pellets which could lead to worker exposure.

Two transport incidents have been reported in Alice Springs. One in May 1993 involved a chemical leak at the railway station. Six workers were hospitalised after inhalation of toxic fumes and 100 people were evacuated. The cargo consisted of 56 drums of xanthate. Some of the drums had lost their lids and the inner plastic lining had ripped due to the inferior quality of the packaging and mechanical damage.

In another incident in 1984 approximately 20 steel drums of xanthate had been loaded into a freight container together with medical equipment and supplies. On arrival of the container at its destination in Alice Springs it was found that a considerable quantity of the xanthate dust had escaped from the drums and had permeated the medical equipment and supplies.

Fire incidents involving xanthates have also been reported. In January 1994 a trial shipment of sodium ethyl xanthate packaged in 700 kg plastic bulker bags caught fire in the storage area at a mining site. The fire spread rapidly and three operations personnel and one fireman were affected by fume inhalation and hospitalised overnight.

The fire was observed to spread quickly from bag to bag, whereas only one drum containing sodium ethyl xanthate in the area caught fire. This highlights a major problem with the use of bulker bags in contrast to drums. The material continued to reignite and was disposed of immediately. The company concluded that the most likely cause was ineffective sealing of the inner bag due to manual tying of the inner plastic bag leading to the escape of carbon disulphide and the likely cause of ignition was a spark associated with a forklift unloading steel drums at the time of the fire. However, spontaneous combustion cannot be ruled out.

In November 1994, a shipment of 80 bulker bags each containing 700 kg of potassium amyl xanthate was unloaded for testing at Fremantle the first port of call, following the issue of a product alert by the manufacturer. The containers were taken by road to a transport yard at O'Connor after two days at the Fremantle port to facilitate product testing (temperature measurement). Two of the bulker bags that were found to be 'smoking' and another that was found to be unstable were placed in an empty freight container and isolated. The potassium amyl xanthate was allowed to burn under controlled conditions. The cause of the fire has not been determined. The likely cause may be spontaneous combustion following release of carbon disulphide.

In another incident, residents living in the vicinity of a mine using sodium ethyl xanthate complained of headache, dizziness, nausea and foul odour. Other symptoms reported were eye irritation, sore throat and impaired breathing. The ill effects were reported up to three kilometres from the mine site. The situation was thought to have been aggravated by the weather conditions. Atmospheric monitoring for carbon disulphide showed that the levels were below 10 ppm and yet there still was ill effects.

At least four of the incidents reported over the last two years have revealed deficiencies in packaging. Specific problems which have been encountered with the packaging are:

- the lids of drums working loose during transportation and carbon disulphide given off; and
- carbon disulphide release from bulker bags during transportation and storage.

These packaging problems led to the hospitalisation of several workers and in one incident the serious threat of fire to persons and property. The incidents highlight the need for a thorough investigation of packaging and in particular whether packaging meets the requirements of the ADG Code and, if so, whether there is need for change in the requirements.

Low dust levels are shown to be difficult to maintain. This is of great concern in view of the dermal toxicity of potassium amyl xanthate and the likelihood of carbon disulphide formation.



### *Xanthates and Ecology*

Hydrolysis will be the main factor determining the environmental fate of minor residues associated with the tailings. Xanthates are hydrolytically unstable when exposed to acidic conditions, such as found in tailings dams. Data from animal studies are consistent with the observed human health effects.

Aquatic toxicity data for xanthates are variable, reflecting the unstable nature of the substance. High toxicity to fish and invertebrates is evident, particularly when test organisms are continuously exposed under flow-through conditions. Mortality has been observed at concentrations extending below 1 ppm.

Simple calculations indicate that xanthate levels in the tailings slurry are likely to be in the order of 1 ppm, consistent with measured values from Canadian operations. Therefore, concentrations of Xanthates likely to be found in the tailings slurry is toxic to aquatic fauna.

Direct discharge of xanthates or effluents containing them to waterways is unacceptable.<sup>9</sup> As Potassium amyl xanthate is highly toxic to aquatic fauna, ore tailings containing xanthate residues should therefore not be discharged to any waterways.

### *IF6500:*

We would state that the listing for this flotation frother verges on the disingenuous. Is this frothers properties 2-ethyl hexanol, a-terpineol, diacetone alcohol, a ploypropylene glycol methyl ether, sodium dodecylbenzene sulfate, SDBS? Does it contain carbonodithioic acid, aluminium, iron salts and polymers?

Some examples of chemical properties of frothers are:

MIBC (CH<sub>3</sub>)<sub>2</sub>CHCH<sub>2</sub>CH(OH)CH<sub>3</sub>

DF-200 CH<sub>3</sub>(PO)<sub>3</sub>OH

DF-1012 CH<sub>3</sub>(PO)<sub>6</sub>.3OH

a-Terpineol CH<sub>3</sub>-C<sub>6</sub>H<sub>8</sub>-C(CH<sub>3</sub>)<sub>2</sub>-OH

Diacetone alcohol (CH<sub>3</sub>)<sub>2</sub>(OH)CCH<sub>2</sub>C(O)(CH<sub>3</sub>)

Interfroth 6500 is manufactured by Interfroth Chemical and Mining Services Pty Ltd. The company states the chemical properties of IF6500 are non-hazardous.

The MSDS for other flotation frothers state they are irritating to the eyes, respiratory system and skin and harmful if swallowed. They may aggravate existing medical conditions such as rashes, allergies or other sensitive areas. Symptoms may include reddening, swelling of affected areas with possible itching, burning or other discomfort. Inhalation of mists into lungs may cause pulmonary disorder.

They contain Poly[oxy(methyl-1,2-ethanediyl)], α-propyl-ω-hydroxy- 65-95 25265-71-8 Dipropylene glycol.

Petroleum hydrocarbon component, if separated from product, is combustible. On thermal decomposition oxides of carbon and nitrogen are produced.

### *MF351 Flocculant:*

Magnafloc 351 is a non ionic coagulant and a polymeric flocculant in the Polyacrylamide range of chemicals. Dust generated in handling this product can be explosive if sufficient quantities are mixed with air.

Prolonged exposure may cause irritation , swelling, or dermatitis. Exposure may cause irritation to eyes and eye lids, may cause slight irritation of nose and throat, and may cause nausea and vomiting. MF351 can cause upper respiratory tract irritation.

---

<sup>9</sup> See <[http://www.nicnas.gov.au/publications/car/pec/pec5/summary\\_report.asp](http://www.nicnas.gov.au/publications/car/pec/pec5/summary_report.asp)>.

On thermal decomposition oxides of carbon and nitrogen, various hydrocarbons and /or ammonia are produced.

This chemical must not enter waterways. Cationic polyelectrolytes are toxic to fish due to their tendency to adsorb at the gill thus causing suffocation. Therefore unused or waste polyelectrolyte should not be discharged, or allowed to spill, into watercourses

#### *Nitric Acid:*

Nitric acid ( $\text{HNO}_3$ ), also known as aqua fortis and spirit of nitre, is a highly corrosive and toxic strong acid. Nitric acid reacts with alkalis, basic oxides, and carbonates to form salts, such as ammonium nitrate. Nitric acid reacts violently with many organic materials and the reactions may be explosive.

Nitric acid is a poisonous liquid that gives off choking red or yellow fumes in moist air. The vapour is very irritating to the eyes, throat, lungs and corrosive to the teeth. If the vapour is inhaled in significant amounts it will result in severe coughing, chest pain and shortness of breath. Contact with the skin will result in a severe corrosive burn. Symptoms from swallowing nitric acid may include severe abdominal pain, burns to skin or mouth, fever, severe mouth pain, rapid drop in blood pressure, severe throat pain and swelling which leads to breathing difficulty and vomiting blood.

Symptoms from breathing in (inhaling) nitric acid may include bluish coloured lips and fingernails, chest tightness, choking, coughing, coughing up blood, dizziness, low blood pressure, rapid pulse, shortness of breath and weakness.

Nitric acid is an inorganic compound used primarily to make synthetic commercial fertiliser. The raw material is also used for the production of adipic acid and explosives, metal etching, and in the processing of ferrous metals. Further now that most adipic acid plants have implemented abatement technologies, nitric acid production is currently believed to be the largest industrial source of  $\text{N}_2\text{O}$  green house gas emissions.

#### *Other chemicals*

Heavy metals such as copper, cadmium, zinc, mercury, lead and arsenic are used in the mining of gold. Kalgoorlie Consolidated Gold Mines (KCGM) admitted on July 27, 2005, that the mine's roaster and carbon kilns were emitting five to seven metric tons of mercury per year.

Much has been written and studied about the effects of these heavy metals therefore this submission will concentrate on Arsenite. Arsenite is extremely toxic to biota and is a carcinogen. This is evidenced by the effect on population drinking groundwater in Bangladesh, through contraction of skin cancer.<sup>10</sup>

There are two features of arsenic chemistry and behaviour that may cause an impact in the long term at the proposed Dargues Reef Gold Project, if not detected sufficiently early.

During the course of mining, the pockets of ore containing a higher concentration of arsenic compared to the rest of the ore are exposed to air and may oxidise leading to the creation of evaporites. This particular material should not be allowed to stand stockpiled on the surface for any long period of time. Although the area where ore is handled is bunded and material cannot be easily transferred off site, care will be needed to ensure that this does not happen and that pockets of ore are not stored in an unprotected fashion. Evaporites can be wind-blown and moved to other locations where an impact may be induced.

Furthermore the arsenic is soluble and might be of water quality concern.

---

<sup>10</sup> Dr Barry Noller, Deputy Director of the National Research Centre for Environmental Toxicology at The University of Queensland

When ore is converted to tailings, the product deposited in the tailings dam tends to exist in pockets reflecting the origin of the material. That is, arsenic concentrations may be higher in pockets associated with the original material than elsewhere in the tailings.

The physico-chemical properties of arsenic show that arsenic exists in soluble forms under reducing conditions, ie excluding oxygen as would be found in tailings at depth. Under such conditions arsenic converts to arsenic (III) or arsenite. Arsenite is extremely toxic to biota and is a carcinogen.

Further, in regards to the waste rock dumps, arsenic remains a potential contaminant due to the close proximity of Spring Creek, even though care may be taken with the design of the dumps and their covers to ensure that no seepage or run-off is likely to arise.

### **Overburden/Waste Rock**

For most commodities there are clear trends of increasing solid waste burden, even allowing for the common lack of reporting of waste rock. For many commodities the extent of waste rock/over-burden mined far exceeds the ore mined, especially the case for copper, gold and black coal. On average, it takes 79 tons of waste to extract one ounce of gold, according to a conservative estimate by the No Dirty Gold campaign, a project of EarthWorks and Oxfam.

The chemical composition of the tailings has been assessed by analysis of just 3 samples of local granodiorite. There is likely to be considerable heterogeneity of the material actually mined as gold is not uniformly distributed throughout the granodiorite.

Given the extent of sulphides likely to be present in much of the tailings and waste rock, this could lead to significant risks such as acid mine drainage in the future, especially given the recalcitrant environmental problems caused by smaller scales at numerous abandoned and/or rehabilitated mining projects around Australia.

The two components include both the waste rock:ore ratio as well as the total quantity of waste rock. If the ratio continues to increase over time as is apparent for many minerals, this will lead to ever increasing volumes of waste rock to be managed. At present there is not sufficient data on the public record to examine this quantity of waste rock with respect to the potential for acid mine drainage or other environmental problems, leaving major uncertainty with respect to the long-term sustainability of waste rock production and management authorities.

The scale and nature of waste rock often presents significant environmental risks if not identified and managed accordingly. Historically this has not been achieved, with numerous former abandoned mine sites leaving major pollution legacies following closure.

### **Acid Mine Drainage**

Acid mine drainage (“AMD”) occurs when surface or groundwater flows from or over abandoned mine features containing sulphide mineralisation. Discharge from adits or open pits, as well as surface flow over and seepage through sulphide rich waste rock and tailings can produce acid drainage. Acid drainage begins with the exposure of iron sulphide materials to air and water.

The exposed, relatively insoluble sulphide materials are converted to soluble sulphuric acid and to iron compounds by oxidation. The sulphuric acid, in turn, dissolves other metals such as aluminium, copper, zinc, cadmium etc. Although these constituents can occur naturally in water in trace amounts, as a result of hydrologic and weathering processes, their concentration can increase substantially as a result of acid drainage.

AMD-polluted water is invariably quite toxic to aquatic ecosystems.



There are numerous mine sites around Australia (and internationally) which have left major legacies of acid mine drainage impacting on surrounding and downstream ecosystems, of which some infamous case studies include :

Mt Lyell – the 100 Mt of tailings discharged to the Queen and King Rivers until 1994 as well as the 50 Mt of waste rock has created perhaps Australia’s most notorious environmental legacy of acid mine drainage impacts – which reach as far downstream as the marine ecosystems of Macquarie Harbour;

Mt Morgan – poor tailings as well as waste rock management has created a major legacy of AMD impacts in the adjacent Dee River, with the Queensland Government now liable for a rehabilitation cost of the order of \$100 million or higher;

Rum Jungle – a complete lack of tailings and waste rock management during operations created a major legacy of AMD impacts in the adjacent Finnis River. The Commonwealth Government, as owner of the former project, contributed about \$20 million for rehabilitation in the 1980’s but this work is not meeting expectations – with recent evidence that the covers are allowing more water to infiltrate into the underlying waste rock – thereby continuing the AMD cycle. Significant pollution loads still emanate from the Rum Jungle waste rock dumps.<sup>11</sup>

These are a few among many others.

In conclusion there is no guarantee that even with testing the community and the environment will be protected. Acid generation testing (waste rock and tailings) is often inadequate and ends up being incorrect because of the distribution of acid generating material.

### **Rehabilitation**

A major issue which is not widely acknowledged is that of the long-term effectiveness of rehabilitation measures. That is, the long-term performance of various engineering approaches to mined land rehabilitation to reduce surface water and groundwater pollution, erosion issues, gaseous emissions for example radon and methane, restore a productive land use following mining and the like. Although the engineering and regulatory standards are considerably better at present than in the past, there remains concern over long-term effectiveness.

On evidence mining companies seem to collapse before remediation is undertaken leaving the environment as ‘an unfortunate victim.’

Finally, and perhaps most critically, there are not yet uniform standards or criteria for determining ‘acceptable’ rehabilitation.

### **Noise and Blasting**

Earthworks and drilling associated with the establishment of the box cut, ROM Pad and Tailings Storage Facility at the ROM area, access portal and tailings storage dam, have been predicted to exceed the noise criterion under inversion (night-time) conditions at several receivers.

These ‘predicted’ noise levels are models. The reality for residents is that sound and noise carry in rural areas. This noise will be 24 hourly. The truck movements and mining operations will exceed noise levels, use of explosives likewise, will shatter the peace rural residents are entitled to.

---

<sup>11</sup> Mudd G M, The Sustainability of Mining in Australia : Key Production Trends and Their Environmental Implications for the Future, Research Report No RR5, Department of Civil Engineering, Monash University and Mineral Policy Institute, October 2007.

At other underground gold mine sites residents have complained of excessive noise during exploration drilling and other mining activities. Communities like Stawell, Castlemaine /Kangaroo Flat and Kalgoorlie-Boulder residents state in the early morning the noise is so loud its unbearable.

Current noise limits for KCGM are not to exceed a maximum of 51 decibels in the evening or on Sunday at one location, a level just under what could be heard during normal conversation at a distance of two metres.

However KCGM's own monitoring shows otherwise. The company states:

Monitoring indicates noise from the existing KCGM operations exceeds the assigned noise levels in the noise regulations at all five reference locations, during both day and night.<sup>12</sup>

Earthworks and drilling associated with the establishment of the box cut, ROM Pad and Tailings Storage Facility at the ROM area, access portal and tailings storage dam, have been predicted to exceed the noise criterion under inversion (night-time) conditions at several receivers.

At Angus underground mine, even though 'blasts were below requirements' the mining company received 16 community complaints relating to blasting, noise and odour from January to March.

### *Vibration*

In Stawell in Victoria there has been cracking of brick veneer houses. The mining company denies any responsibility, but houses which were sound for many years before gold mining resumed, have cracked.

It is known that vibration effects are cumulative and with 5 years of blasting it will not be surprising if cracks in neighbouring residents appear.

### **Ecology**

The lack of coordinates on maps is of concern. Further the Assessment Report Ecology Section states datasets produced during this survey are 'compatible with those generated during the comprehensive regional assessment of forests' ("CAR ").

The notion that the CAR Reserve System is genuinely based on the principles of Comprehensiveness, Adequacy and Representativeness, is false as the declining populations of forest-dependent threatened species does not support the Assessment Report's argument. The output of the CAR was deeply biased towards logging industry objectives and as such is a flawed document.<sup>13</sup>

...serious flaws in the information and scientific process underpinning the RFAs undertaken to date have been identified.<sup>14</sup>

To base a value judgment on whether an EEC is viable or not on CAR is therefore based on flawed data.

Of note is that a Preliminary Determination has been made to list the Ribbon Gum - Snow Gum grassy open forest as an Endangered Ecological Community by the New South Wales Scientific Committee.<sup>15</sup>

Tablelands Frost Hollow Grassy Woodlands in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South western Slopes Bioregions is eligible to be listed as an Endangered Ecological Community as, in the opinion of the Scientific Committee, it is facing a very high risk of extinction in New South Wales in the near future,

<sup>12</sup> See The Australian, <http://www.theaustralian.com.au/news/nation/the-mine-thats-swallowing-a-town/story-e6frg6pf-111115511984>

<sup>13</sup> Compliance with the criteria meant that the protected reserves had to cover the full range of forest community types, be sizeable enough to allow for species survival and reflect the diversity of the individual communities see Hollander R, 'Changing place' Commonwealth and State Government Performance and Regional Forest Agreements' Paper presented to the Australasian Political Studies Association Conference, University of Adelaide, (2004).

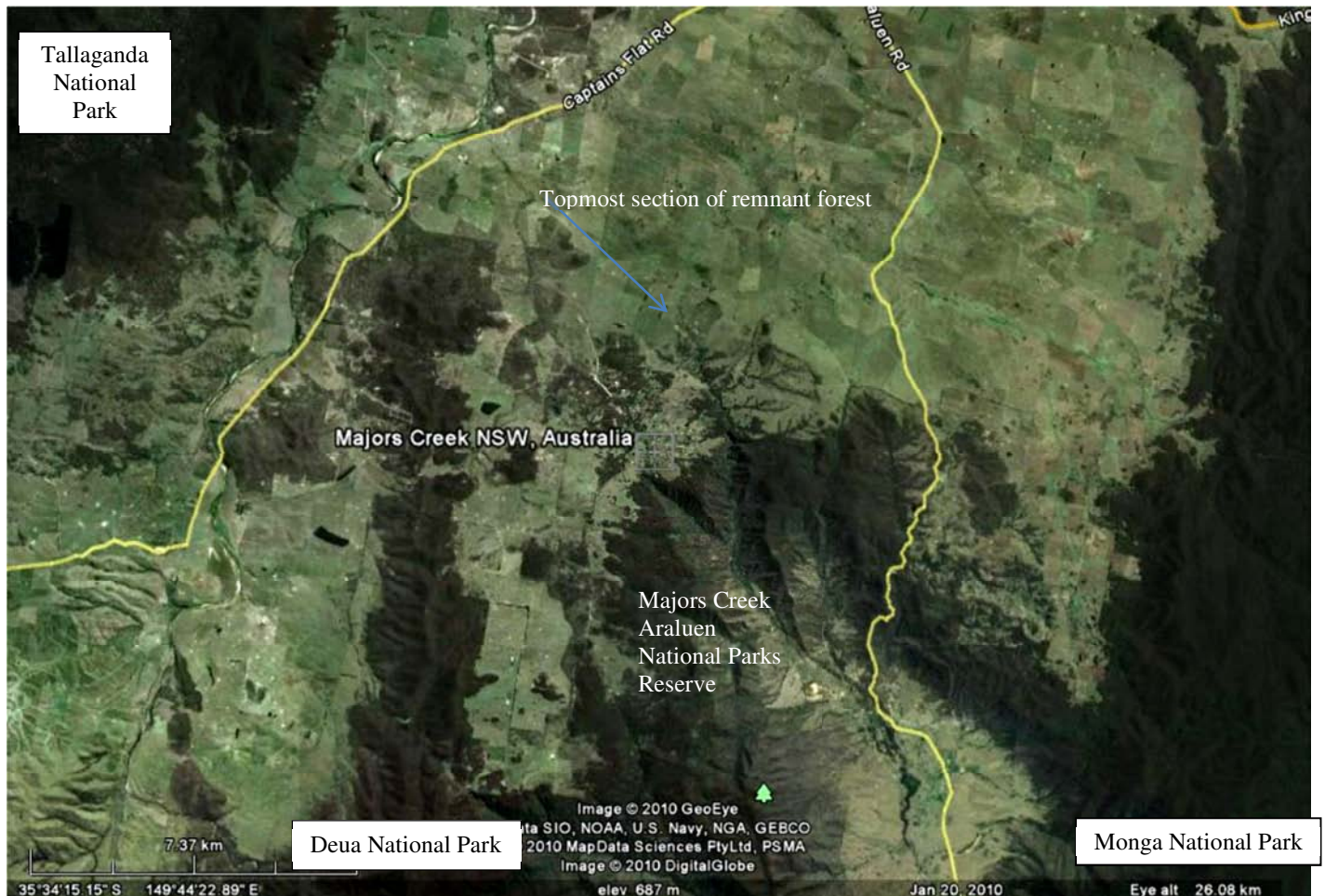
<sup>14</sup> See McDonald J, 'Regional Forest (Dis)agreements: The RFA Process and Sustainable Forest Management' (1999) 11 *Bar Law Review* 295; Redwood J, 'Sweet RFA' [2001] 26 *Alternative Law Journal* 255.

<sup>15</sup> NSW Scientific Committee Preliminary Determination, < <http://www.environment.nsw.gov.au/determinations/tablelandsfrosthollowsPD.htm>>; see Fischer J, Lindenmayer D B, 'The Conservation Value of Paddock Trees for Birds in a Variegated Landscape in Southern New South Wales: Species Composition and Site Occupancy Patterns' (2002) 5 *Biodiversity and Conservation* 807. NSW Scientific Committee Preliminary Determination, < <http://www.environment.nsw.gov.au/determinations/tablelandsfrosthollowsPD.htm>>.

as determined in accordance with the following criteria as prescribed by the Threatened Species Conservation Regulation 2002.

The public exhibition has now closed and the final determination in the positive will be likely.

The remnant Ribbon Gum forest provides shelter and habitat to many fauna. It provides a much needed corridor between the Monga National Park, Majors Creek Araluen National Parks Reserve, Deua National Park and Tallaganda National Park.



Clearing of any native vegetation is not ecologically sustainable. The definition of ecologically sustainable development currently in place is contained within the *Protection of the Environment Administration Act 1991* (NSW) at s6(2):

Ecologically sustainable development can be achieved through the implementation of the following principles and programs:

(a) the precautionary principle—namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

In the application of the precautionary principle, public and private decisions should be guided by:

(i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and  
(ii) an assessment of the risk-weighted consequences of various options,

(b) inter-generational equity—namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations,

(c) conservation of biological diversity and *ecological integrity*—namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration.

There is much uncertainty on the effects of climate change but one of the certainties is that land degradation and native vegetation clearing is one of the biggest causes.

The loss of natural forests around the world contributes more to global emissions each year than the transport sector. Curbing deforestation is a highly cost-effective way to reduce emissions; large scale international pilot programmes to explore the best ways to do this could get underway very quickly.<sup>16</sup>

The Stern Review goes on to state in Annex 7f:<sup>17</sup>

Deforestation is the single largest source of land-use change emissions, responsible for over 8 GtCO<sub>2</sub>/yr in 2000. Deforestation leads to emissions through the following processes:

If logged and cleared the carbon stored within the trees or vegetation is released into the atmosphere as carbon dioxide, either directly if vegetation is burnt (i.e. slash and burn) or more slowly as the unburned organic matter decays. Between 1850 and 1990, live vegetation is estimated to have seen a net loss of 400 GtCO<sub>2</sub> (almost 20% of the total stored in vegetation in 1850).<sup>18</sup> 80% was released into the atmosphere. The removal of vegetation and subsequent change in land-use also disturbs the soil, causing it to release its stored carbon into the atmosphere.<sup>19</sup>

The Assessment Report repeatedly states that, as the area to be cleared is small, there will be no negligible effects. We would contend that this statement is erroneous and only serves the proponent.

While much is made of the undertaking not to destroy any hollow bearing trees the undertaking to not destroy any feed trees or habitat trees is missing from the Assessment Report. This is not acceptable.

#### *Listed Endangered Ecological Communities*

Of note is that there is no mention in the Assessment Report that in 2006 The NSW Scientific Committee made a Final Determination to list the Araluen Scarp Grassy Forest in the South East Corner Bioregion as an Endangered Ecological Community ("EEC").

The Assessment Report states:

A small strip of Native Grassland was also identified. However, due to the narrowness of the strip (<5m) and location adjacent to an eroding stream bank, the community was determined not to be viable.

The Natural Temperate Grasslands of the Southern Tablelands (NSW and ACT) is listed as an endangered ecological community. If the point of listing an EEC community is that it is endangered then to allow it to be destroyed seems in complete conflict with everything known about biodiversity and the point of its listing. It is also in tension with other legislative instruments.<sup>20</sup> The Department of Environment Climate Change and Water has developed 18 Priority Actions to enable recovery of this EEC. Destroying an EEC is not one of the Priority Actions.

---

<sup>16</sup> The Stern Review on the Economics of Climate Change, <[http://web.archive.nationalarchives.gov.uk/+http://www.hm-treasury.gov.uk/independent\\_reviews/stern\\_review\\_economics\\_climate\\_change/stern\\_review\\_report.cfm](http://web.archive.nationalarchives.gov.uk/+http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_report.cfm)>

<sup>17</sup> The Stern Review, above n10, 'Emissions from the land-use change and forestry sector'.

<sup>18</sup> Baumert, Herzog and Pershing 'Navigating the Numbers: Greenhouse Gas Data and International Climate Policy' Washington, DC: World Resources Institute (2005); see also Houghton 'Revised Estimates of the Annual Flux of Carbon to the Atmosphere from Changes in Land Use and Land Management 1850-2000' (2003) 55 *Tellus B* 378.

<sup>19</sup> Houghton J T, 'Tropical Deforestation as a Source of Greenhouse Gas Emissions' (2005) in *Tropical Deforestation and Climate Change*, Moutinho and Schwartzman [eds]; see also Intergovernmental Panel on Climate Change (2001): 'Climate change 2001: the Scientific Basis, Contribution of Working Group I to the Third Assessment Report of the Intergovernmental Panel on Climate Change' Houghton JT, Ding Y, Griggs DJ, et al [eds], Cambridge: Cambridge University Press; also Food and Agriculture Organization of the United Nations (2005): 'State of the World's Forests' Washington, DC: United Nations.

<sup>20</sup> Eddy D, 'Managing Native Grassland: A Guide to Management for Conservation, Production and Landscape' (2002) World Wide Fund for Nature Protection, available at <[http://wwf.org.au/publications/managing\\_grasslands/](http://wwf.org.au/publications/managing_grasslands/)>; see Rehwinkel R, 'Revision of PATN Analysis of Grassland Associations Within the Natural Temperate Grassland Endangered Ecological Community in the Southern Tablelands of NSW' (2009) Report to NTG Recovery Team; see also Sarah S, Dorrrough J, Rehwinkel R, Eddy D, and Breckwoldt A, 'Grassy Ecosystems Management Kit: A Guide to Developing Conservation Management Plans' (2005) Environment ACT.



### *Fauna Survey Methods*

Studies have been undertaken which suggest that spotlight surveying methods are ineffective for detecting arboreal mammals. Detectability of arboreal marsupials by spotlighting depends on weather conditions.<sup>21</sup> Spotlight transects may substantially under-estimate the actual abundance of animals in a given area.

On survey methods scientific judgment on surveying runs thus:

Unless the probability of detecting a species when it is present is equal to 1, false negative observation errors will occur in species surveys. The probability of detecting the presence of the case study species in any single standard survey based on spot-lighting and call elicitation has been found to be very low (Pr[detection/presence] ~ 0.12–0.45); making the reliability of absence data a potentially serious form of uncertainty in our case study. Recent studies have demonstrated the negative impact that false-negative observation error may have on species habitat analyses, meta-population models and monitoring studies.<sup>22</sup>

The Lindenmayer study found that spotlight searches on species that are smaller and faster moving than the Greater Glider for example the sugar glider, *Petaurus breviceps*, or partially terrestrial mountain brushtail possum, *Trichosurus caninus*, are likely to yield even lower detection rates.

We would state that this proposal triggers the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) and requires the Commonwealth's approval before proceeding. Federally listed animals within four kilometres of the project include:

New Holland mouse (*Pseudomys novaehollandiae*): listed as vulnerable;

Araluen Zieria (*Zieria adenophora*): listed as endangered;

Button Wrinklewort (*Rutidosia leptorrhynchoides*): listed as endangered;

Araluen Gum (*Eucalyptus kartzoffiana*): listed as vulnerable

Grey Deua Pomaderris (*Pomaderris gilmourii* var. *cana*): listed as vulnerable;

Spotted-tailed Quoll (*Dasyurus maculatus*): listed as endangered.

### *Ecosystem Maintenance*

Scientists advocate an approach based on maintaining ecosystem structure and function, and therefore ultimately protecting more species.<sup>23</sup> Protecting species and diversity is a key way to do this thereby enhancing ecosystem resilience, so that they are able to maintain their functions and processes.

Fauna experts consulted during the Response to Disturbance Project have recommended that corridors and riparian buffers be expanded to 200 m for yellow-bellied gliders, 1 km along major rivers for owls, 240 m for fishing bats and golden tipped bats, and 1km between catchments for stuttering frogs.<sup>24</sup>

Fragmentation of the landscape and the consequent habitat loss is the major threat to biodiversity.<sup>25</sup> It has been suggested that fragmentation within a forest will force the inhabitants of the logged forest patch into the surrounding forest, thereby causing dysfunctional behaviour due to higher than normal densities.<sup>26</sup> This phenomenon is reduced when the remaining forest is left intact.

Roads result in fragmentation of the landscape, but they also have much broader and wide ranging effects. At

<sup>21</sup> Lindenmayer D B, Cunningham R B, Donnelly C F, Incoll R D, Pope M L, Tribolet C R, Viggers K L, and Welsh A H, 'How Effective is Spotlighting for Detecting the Greater Glider (*Petauroides volans*)?' (2001) 28 *Wildlife Research* 105.

<sup>22</sup> Wintle B A, Elith J, and Potts J M, 'Fauna Habitat Modelling and Mapping: A Review and Case Study in the Lower Hunter Central Coast Region of NSW' (2005) 30 *Australian Ecology* 719.

<sup>23</sup> McIntyre S, Barrett G, Kitching R, and Recher H, 'Species Triage – Seeing Beyond Wounded Rhinos' (1992) 6 *Conservation Biology* 4 p604; see also Walker B, 'Conserving Biodiversity Through Ecosystem Resilience' (1995) 9 *Conservation Biology* 4, p747.

<sup>24</sup> From CRA Report 'Draft Assessment of Forest Management Practices for the Eden RFA' CSIRO Forestry and Forestry Products and Andrew Smith, Sestscan and Pat O'Shaughnessy and Associates, (1997), ne27esfm, ISBN 0-642-28398-2 p48.

<sup>25</sup> Benson J, 'Past, Present and Future: the Role of Scientific Knowledge in Nature Conservation' (1993) *National Parks Journal* February, p17; see also Wilcove D S, Rothstein D, Dubow J, Phillips A, and Losos E, 'Quantifying Threats to Imperiled Species in the United States' (1998) 48 *BioScience* 607.

<sup>26</sup> Hagan J M, Vander Haegen M, and McKinley P S, 'The Early Development of Forest Fragmentation Effects on Birds' (1996) 10 *Conservation Biology* p188.

the landscape scale, roads disrupt ecosystem processes and, at both a fine and coarse scale, cause a loss of biodiversity.<sup>27</sup> In this proposal's case the transportation of hazardous chemicals elevates the risk of environmental damage.

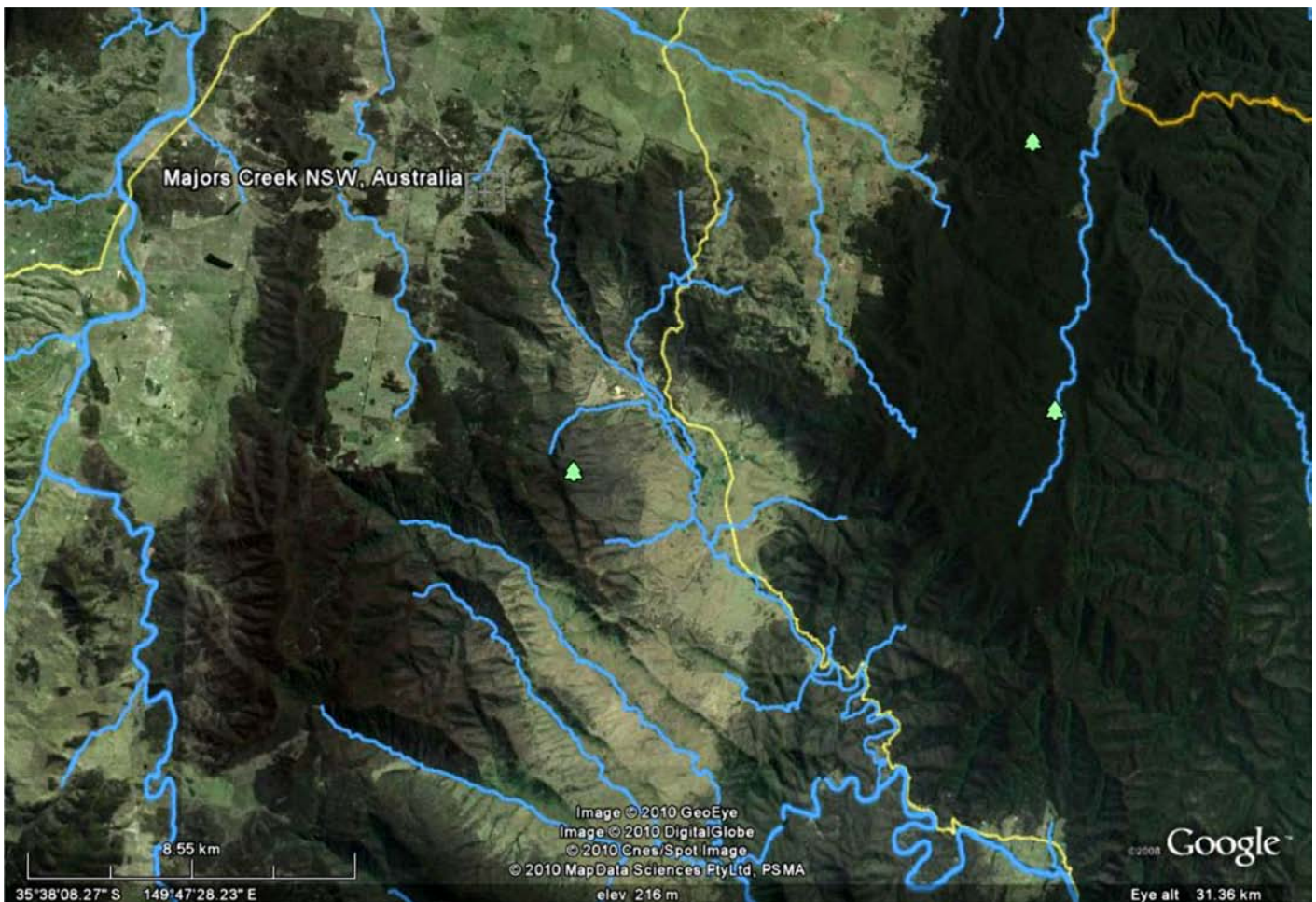
As stated in the Assessment Report the trees in the Ribbon Gum forest are between 120 -200 years old. To destroy these trees for the sake of a project that has a five year life span verges on the corrupt. Further much of the Assessment Reports Ecology Section recommends that further more comprehensive surveys be undertaken.

We would remind the Department of Planning that Alteration to the natural flow regimes of rivers, streams, floodplains and wetlands, Clearing of native vegetation and Human-caused Climate Change have all been listed as Key Threatening Processes under the *Threatened Species Conservation Act 1995* (NSW).

### Groundwater

Maximum operational water requirements for mineral processing, dust suppression, underground mining and workshop wash-down purposes have been estimated to be approximately 885ML/year. Of this approximately 755ML/y can be reclaimed from the tailings storage facility. Therefore approximately 130ML/y of make-up water will be required as a maximum.

The water table currently supplies underground springs that provide drinking water for the local native animals and also keep the native flora watered. The dramatic drop in the water table would be a disaster for these native animals and their habitat. Spring Creek feeds into Majors Creek which passes through the Majors Creek Araluen National Parks Reserve and then feeds into the Deua River which turns into the Moruya River which passes through National Park and then out to the Pacific Ocean.



<sup>27</sup> Forman R T T, and Alexander L E, 'Roads and Their Major Ecological Effects' (1998) 29 *Annual Review of Ecology and Systematics* 207.

Three sources of water are identified in the Assessment Report by the proponent:

1. Water recovered by dewatering the active mine
2. Water captured in 8 surface dams constructed under the 'harvestable rights' provisions of the *Water Act 2000*
3. Water pumped from old abandoned mines.

Seemingly the water modelling has been based on an inadequate understanding of how water catchments work. There seems to be an assumption that the surface dams will not be affected by the draw-down in the regional water table and will somehow be filled by hortonian overland flow.

However most run off in these catchments will be due to baseflow, sub-surface stormflow or overland flow which is the result of exfiltration of interflow in saturated zones.<sup>28</sup>

Borefield studies undertaken by the proponents show that the regolith and granodiorite aquifers are tightly connected. Any surface dams constructed in the zone surrounding the mine which may be even slightly affected by the draw-down in the water table are unlikely to yield significant volumes of water.

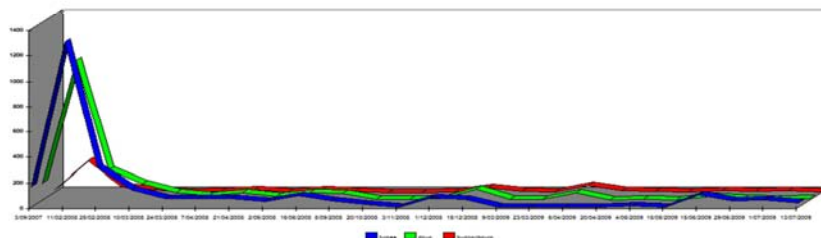
The strategy to attempt to replace lost baseflow in Major's Creek with releases from the 'harvestable rights' dams is unlikely to succeed due to the poor yield from those dams.

The use of water recovered from abandoned workings will definitely reduce the baseflow in Majors creek and lower the regional water table. The Project would result in lowering of groundwater levels within the Shoalhaven Catchment.

A failure to secure the baseflow in Majors Creek will have adverse impacts on the valuable peach orchard production at Araluen and ultimately the urban water supply scheme for the Eurobodalla Shire due to the recent upgrade in extraction capability from the Deua River.

The severity of the prolonged drought and inclement climate change conditions is readily portrayed by the flow recordings of the three rivers, the Tuross, Deua, and Buckenbours, in the Eurobodalla Shire. The Shire's water supply depends upon these rivers. Since the last minor flood peak in 2010 these rivers have been extremely low.

**Eurobodalla Rivers Water Flow 2007-2009 (ML/day)<sup>29</sup>**



<sup>28</sup> Bonnell M, 'Progress in the Understanding of Runoff Generation Dynamics in Forests' (1993) 150 *Journal of Hydrology* 217; see also Hewlett J D and Hibbert A R 'Factors Affecting the Response of Small Watersheds to Precipitation in Humid Areas' (1967) *International Symposium on Forest Hydrology*, Pennsylvania State University, 29 August to 10 September, 1965, Pergamon, Oxford, pp 275-290; O'Loughlin E M, Cheney N P and Burns J 'The Bushrangers Experiment: Hydrological Response of a Eucalypt Catchment to Fire' (1982) *Proceedings of the First National Symposium on Forest Hydrology*, National Conference Publication No. 82/6, Institution of Engineers of Australia; and see also Topalidis S and Curtis A A, 'The Effect of Antecedent Soil Water Conditions and Rainfall on Runoff Generation in a Small Eucalypt Catchment' (1982) *Proceedings of the First National Symposium on Forest Hydrology*, National Conference Publication No. 82/6, Institution of Engineers of Australia, p45.

<sup>29</sup> Collated data from Eurobodalla Shire Council Eurowater "Eye on Supply" statistics, <<http://www.esc.nsw.gov.au/site/Water/index.html>>.



There is no proposed secondary wall to be constructed in case the first wall of the tailings storage facility fails. The clean water diversion structure around the tailings storage facility appears to be a mainly a surface drain/bund. This will intercept hortonian overland flow but not intercept the interflow of subsurface water. In prolonged wet conditions, such interflow, concentrated in natural fissures, might threaten the integrity of the low-permeability layer of the tailings storage facility.

The failure of the tailings storage dam at Captains Flat, which contaminated vast reaches of the Molonglo River with heavy metals, resulting in Lake Burley Griffin being rendered biologically poor is one such example.

### **Energy Use**

A high voltage connection agreement will be required to permit connection of the proposed electricity transmission line to the existing transmission grid from Country Energy which holds an electricity distributor's licence under the *Electricity Supply Act 1995*.

Mining of hard rock and processing the ore and transporting the concentrate will all use considerable fossil fuel energy. The electricity usage is predicted to be between 36 444 885 kWh to 46 662 513 kWh per year for a total of 209 735 707 kWh for the 5 years of the project.

With climate change mitigation being listed as apriority by both the State and Federal Governments to approve a project that has such considerable usage of fossil fuels seems hypocritical, particularly as anthropogenic climate change has been listed as a Key Threatening Process.

### **Air Quality**

The Project Site is situated in a rural area with no major sources of air pollution, the local air quality is good and the community wishes it to stay that way. The township of Majors creek is two kilometres from the mine site.

Low dust levels are difficult to maintain. This is of great concern in view of the toxicity of many of the chemicals used in this project. Research has shown that current standards for dust protection are not being met in some mines.

The inhalation of dust particles less than 10 microns (PM10) is known to increase death and asthma attacks. With the pit close to residents and schools this dust is a major concern. Further issues such as sulphur dioxide emissions and silicosis have not been addressed in the Assessment Report.

### ***Silicosis***

Silicosis is an lung disease which is caused by repeated and prolonged exposure and inhalation of relatively high levels of free silica dust. Exposure typically occurs when rocks containing silica are ground up during mining or quarrying operations; if inhaled the dust can cause scarring in the lungs. While there are often no outward symptoms of the disease, breathlessness and coughing can occur. Silicosis also has the potential to cause chronic respiratory disease.

While the causes of silicosis are well known, according to a recent Australian Senate enquiry, there is still a lack of understanding about the actual size of the problem. Throughout the industry, it is not known whether the current standards of risk minimisation for exposure to inhalable silica are enough to eliminate the risk of the disease completely.

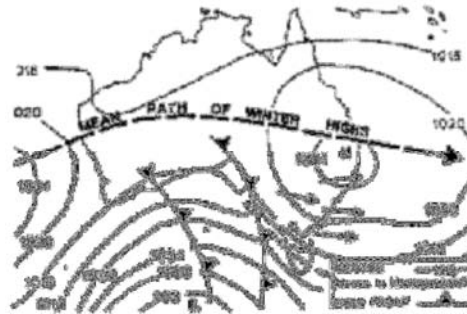
What is known is that particles that pose the greatest risk are in the respirable range, and are extremely fine at a size of 2.5 µm or even less than 1 µm. On top of this, there is concern that existing exposure standards are not providing safe levels of protection for mine workers.

### ***Pollution Impacts via Airborne Pollutants and Emissions***

In April 2007 the Western Australian fined KCGM \$25,000 for sulphur dioxide emissions that affected Coolgardie residents. Every year the south coast experiences dust storms and westerly winds. In 2009 there



were two severe events within a week of each other. This northward movement of the high pressure systems and the mid-latitude cyclones results in predominantly west to south-west winds across most of NSW in winter.<sup>30</sup>



The weather patterns show that if there is chemical or toxic release into the atmosphere in Majors Creek it will effect the residents of the south coast if there is a south westerly or westerly wind.

### Other Issues of Consideration

#### *The Majors Creek Fault Line*

A major fault line runs along Majors Creek. It has been subject to minor slippage in the past 30 years and major slippage in the past. No assessment seems to have been made of the effect of slippage from the Majors Creek fault line. There is no reference to this in the Environmental Assessment.

The proposed Dargues Reef tailings dam and the Dargues Reef Mine itself is only 1.5kM away from the Majors Creek fault line. Any slippage on this fault line would result in the failure of the dam impacting on residents and the environment.

#### *Radon Gas Exposure*

This is not mentioned in the Assessment Report, nor have the community been informed, of the depth and extent of mine tunnels. The vertical mine shaft is proposed to be 500 metres deep. The horizontal tunnels will extend out for possibly more than two kilometres. This is of particular relevance as, in most areas of decomposed granite, radon gas is a particular hazard at depth.

Radon gas is a major health hazard, and this is well known to the Majors Creek community as residents have been warned of the danger with regard to home cellars and enclosed rooms like bathrooms with little ventilation, by medical experts and geologists.

It is symptomatic of the Assessment Report that there is no mention of Radon gas and further there appears to have been no testing of Radon gas levels in the three existing historic mine shafts. There is also no mention in the Environmental Assessment of monitoring Radon gas levels, nor of the threat to worker health.



<sup>30</sup> See 'What Drives NSW Weather' Department of Primary Industries, 2009.

### ***Aboriginal Heritage***

There are known Aboriginal women's sites within ten kilometres of the proposal. Further cultural objects were found within the area of the proposal indicating that if a more thorough survey were to be conducted there is a likelihood of more objects being discovered.

### ***Inconsistency in The Survey Results***

When compared with the consultant's poorly developed 'predictive model' for predicting past Aboriginal occupation and the potential to find evidence of such occupation in the Spring Creek study area, one particular conclusion drawn by the archaeological consultant is not consistent with the 'predictive' model that he infers would apply to the current study area.

The archaeologist expresses surprise at the results of the field survey where a significant number of Aboriginal Objects, as defined under the *National Parks and Wildlife Act 1974* (NSW) 'archaeological sites', were found in the immediate proximity to the study area's Spring Creek and that prior to more recent European land management activities it was likely that there would have been a lot more evidence of past Aboriginal occupation present along the banks of Spring Creek (see Section 7, Discussion).

He then states, in contradiction, that the Spring Creek environment was unlikely to have been a location favoured by past Aboriginal inhabitants as an occupation area but would have been merely part of an Aboriginal movement corridor between more suitable and habitable areas.

Surely then the archaeologist should have been questioning the results of the field survey if he was surprised by the results of the field survey. The presence of a relatively large number of geographically separate Aboriginal site locations should have been a trigger to create some concern in the consultant's mind as to question what had in fact caused the unexpected presence of Aboriginal stone artefact scatter sites along the banks of a creek which he defined in his report as 'ephemeral' in nature.

### ***Survey Area Coverage.***

None of the material talks about survey area coverage. DECCW should have required a map of field survey coverage of the survey area and a description of the coverage strategy and a justification for such a strategy.

Field survey coverage details should include, for example the percentage of survey area covered, patterns of on-foot or vehicle coverage, surface visibility, other impediments to effective coverage of the study area.

These are essential components of any Aboriginal archaeological study (Witter 1995) and should have been required as an integral component of any assessment of the Aboriginal Heritage report by the statutory reviewing authority.

Furthermore, whilst there is no map provided which identifies survey area coverage, it would appear that the survey focused primarily upon archaeologically sensitive alluvial/colluvial stream banks only.

In comments from one of the Aboriginal community participants (Bell, pers coms 2010, Appendix ) the participant stated that he was concerned that they were not afforded an opportunity to visually inspect the entire study area.

There seems to be no evidence that even a representative sample of each survey area landform was in fact visually inspected during the current Dargues Reef project archaeological study. We would suggest that the impending destruction of Aboriginal cultural heritage should not be treated as some kind of guessing game.

We would state, based on these assertions that DECCW will have difficulty approving of the standard or percentage coverage of the field survey, or furthermore be able to validate the standard of the survey.

### *Landform Based Archaeological Sensitivity Assessment*

The report makes no attempt to provide to the reader, and most importantly to a DECCW reviewer, a description of survey area landform and /or Study Area landforms.

No attempt is made to formally classify and differentiate between the various survey area landforms such as alluvial creek banks, alluvial and colluvial creek bank terraces, adjacent low hillslopes and hillslope terrace, spurlines and spurline crests, for example.

All of the above mentioned landform units, many of which occur within the Dargues Reef study area, may be considered to have high levels of archaeological potential, depending upon levels of past disturbance, along with varying levels of assessed archaeological sensitivity, based upon existing Aboriginal site distribution patterns and predictive models.

From the copies of topographic maps and aerial photos provided in the report the alluvial stream banks, of which the report author refers to in his report as containing numerous Aboriginal 'sites' (Aboriginal Objects as defined under the Act) are not the only archaeologically sensitive landforms contained within the study area. However, they appear to have been the focus of the field survey.

This is yet another example of the narrow scope of the Assessment Report and the lack of regard to impact.

### *Aboriginal Community Consultation*

The copy of the Letter to Registered Aboriginal Stakeholders is evidence that there is no attempt to obtain from any of the registered stakeholders /Aboriginal community groups, known information on the cultural significance of the Dargues Reef study area.

This information should have been critical to the integrity of the field survey and should have been obtained prior to commencement of the field survey.

The Oxford Dictionary definition of consultation is (verb) 1. seek information or advice from; 2 seek permission or approval from; ORIGIN Latin *consultare*, from *consulere* 'take counsel'.

Given the devised and non culturally sensitive strategy by the consultant for the involvement of such a large number of Aboriginal community representatives as participants in the field survey it is difficult to understand how any one group who had rostered representatives present during the course of the field survey could have obtained an understanding of the development proposal and its potential impact upon Aboriginal cultural heritage.

The strategy for community consultation and involvement would have been better served whereby a small number of representatives, considered to be the most relevant to the study area, were given the opportunity to participate in the entire survey. This could then have been followed by a post field survey inspection of the other identified stake holders. Priority in choosing the most relevant group reps to attend the field survey would have been more appropriately established using community reps who identified specific cultural and physical knowledge of the study area and or the attended by reps of the statutory Aboriginal land council. The strategy employed by the consultant was clumsy and inappropriate for the above reasons. DECCW should not accept this below standard methodology.

### *Significance Assessment*

The consultant seems to be confusing Social Significance with the all encompassing term Cultural Significance. The consultant, whilst attempting rather clumsily and grossly inaccurately to define what cultural significance is for the purpose of his report, certainly appears to be totally unfamiliar with international cultural significance assessment criteria and protocols, that is ICOMOS or the Australian ICOMOS (the *Burra Charter*) standards, criteria and definitions in his section of the report on Significance Assessment.

The *Burra Charter* states that Cultural Significance is comprised of a number of assessable criteria:

- Social
- Aesthetic
- Scientific
- Historic

Aboriginal communities have right to a major interest in aspects of their cultural heritage. However the term cultural significance was never intended to be exclusive of the views and aspirations of the broader community.

The consultant attributes interest in Aboriginal cultural heritage only to the Aboriginal community. His extremely poor grasp and confusion of the *Burra Charter* provisions for assessing Cultural Significance is clearly displayed when he excludes the remainder of the broader non-indigenous community from attributing cultural significance to aspects of Aboriginal archaeological heritage.

Doing so denies that highly significant Aboriginal archaeological sites in Australia have any value to the broader lay community, except for the scientific and educational values of the sites. Whilst the value of Aboriginal archaeological sites for their scientific and educational significance is not denied, intrinsic value is something which many of the broader community attach to such highly significant entities, regardless of the details of the scientific or educational value.

This is evidenced by much of the tourist information of the area in which Aboriginal cultural heritage seems to be of high interest to the broader community.

Nevertheless the significance assessment for the artefacts was not conducted due to an unsubstantiated claim that 'no Aboriginal Objects would be impacted as a result of the development proposal'.

It seems the consulting archaeologist did not enter into any discussion of the overall significance of the Dargues Reef study area to the Aboriginal community with the relevant Aboriginal community groups, or even attempt to put the discovery of the recorded 'sites' in any Aboriginal cultural context.

It would appear that the Assessment Report fails to address this aspect of 'significance assessment'.

#### *Aboriginal Site Management*

Whilst it would appear that there is no proposal to impact 'known' Aboriginal sites (objects) there are no formal protective measures described within the report such as fencing, flagging and protective buffer zones around recorded Aboriginal sites within the study area.

How does the proponent intend to ensure that 'accidental' impact does not occur ?

Whilst there is mention in the assessment of areas of PAD in the survey area there was no material relating to this matter in the Assessment Report. The existence of PADs is a major issue in such a large area survey and especially where surface visibility might impede effective surface coverage.

The comment that PADs are not recorded as sites on the DECCW AHIMS register is erroneous. DECCW accepts PAD recordings on the database.

There seems to be no scientific data or justification in the material of the Assessment Report to support the view that there are no areas of PAD in the study area.

In conclusion once an item of Aboriginal cultural heritage is destroyed, it is lost forever.

## Conclusion

The greenhouse gas emissions of the project have not been off-set in any way. The authors state this proposal triggers the precautionary principle. The Precautionary Principle is Principle 15 of the *Rio Declaration*:

Where there are threats of serious or irreversible environmental damage full scientific certainty should not be used as a reason for postponing a measure to prevent degradation of the environment.<sup>31</sup>

As McClellan CJ stated:

Thus, the inherent uncertainty or bias in the scientific method combined with (generally speaking) a perennial lack of resources and a consequential lack of data to assist scientists, leads inevitably to the conclusion that there is likely to be an incomplete understanding of the full extent of the environmental impacts of any particular act or activity proposed. That prospect, supported by empirical observations gathered world-wide, led to the development of the precautionary principle as a commonsense approach to avoid or minimise serious or irreversible harm to the Environment.<sup>32</sup>

Because of the above stated reasons, we believe that this project should never have been considered and certainly should never be approved. As shown the cost to the environment far outweighs the minimal gain of employment. This form of mining relies more on the use of large machinery than large amounts of labour. Five years is very short period of time therefore any job benefits are not all that impressive thus the amount of financial benefit to the community will be minimal.

Of note is that once a year, every year, the community of Majors Creek hosts a music festival. This festival brings in a great amount of financial benefit to the community. Certainly this mining project will halt the festival. Therefore this project will leave the community in deficit.

The Assessment Report does not usefully contribute to the debate as it fails to adequately address a wide range of public health problems. Additional to the dust concern is the health risk associated with exposure to arsenic in mine tailings, especially for children. To allow the proposal to proceed under these health concerns with the proponent self-regulating and monitoring would be negligent.

Other voiced concerns have focussed on an increase in stress due to noise, vibration, loss of property values, harassment and disruption of general lifestyle and amenity. The proposal has already caused anxiety and depression in Majors Creek's close-knit rural community.

In addition, the Assessment Report states the company will clear valuable forest on which fauna and flora rely.

The gold mining industry is a powerful lobby group. The industry justifies its assault on communities and the destruction of the environment with the promises of jobs and economic benefit, but at the conclusion invests its profits elsewhere and leaves the community with a dangerous mess. When the mine closes a further risk is the large and dangerous void, which will have to be made secure for hundreds of years.

Furthermore, with what is current scientific knowledge on the effects of climate change nothing about this proposal can be seen to have any mitigating factors and in fact will help exacerbate the effects of climate change.

South East Forest Rescue would recommend that this proposal be rejected.

---

<sup>31</sup> The Rio Declaration, *Convention on Biological Diversity*, Rio de Janeiro, 5 June 1992, Entry into force for Australia: 29 December 1993, Australian Treaty Series 1993 No 32.

<sup>32</sup> In *BGP Properties Pty Limited v Lake Macquarie City Council* [2004] NSWLEC 399 citing Trenorden J et al in *Conservation Council of South Australia v Development Assessment Committee and Tuna Boat Owners Association* (No 2) [1999] SAERDC 86.







**'Small' Underground Gold Mine- Jundee**



## Appendix A

### List of Species of the Area: Results of On-Ground Monitoring

#### *Rare and Endangered Species Within a Three Kilometre Radius of the Dargues Reef Gold Mine Project*

Species	Comment	Listing Status
Araluen Gum ( <i>Eucalyptus kartzoffiana</i> )		
Powerful Owl ( <i>Ninox strenua</i> )	These regularly nest within one to two kilometres of the mine.	vulnerable
Barking Owl ( <i>Ninox connivens</i> )		vulnerable
Araluen Zieria ( <i>Zieria adenopora</i> )	The only wild specimens of these are within five kilometres of the proposed mine project	critically endangered
Majors Creek Leek Orchid ( <i>Prasophyllum</i> sp. Majors Creek)		endangered
New Holland mouse ( <i>Pseudomys novaehollandiae</i> )		vulnerable
Button Wrinklewort ( <i>Rutidosis leptorrhynchoides</i> )		endangered
Grey Deua Pomaderris ( <i>Pomaderris gilmourii</i> var. <i>cana</i> )		vulnerable
Spotted tailed Quoll ( <i>Dasyurus maculatus</i> )		endangered
Brush tailed Rock Wallaby ( <i>petrogale penicillata</i> )	The existence of this species in the Majors Creek gorge, one to two kilometres from the mine site, was verified by DNA testing by Steve Dovey of the NSW National Parks and Wildlife Service, as well as on ground observation.	critically endangered
Gang gang Cockatoo	These are transitory, visiting the area within two kilometres of the mine, usually for four to six weeks each autumn.	threatened
Red tailed Black Cockatoo	Transitory, visiting the Majors Creek gorge area usually for two to three weeks in December or early January.	endangered
Spotted Quoll	These were last sighted seven years ago. They may well be locally extinct	endangered
Bettong	Nesting sites last observed two years ago	
Red Goshawk	These live and nest within the gorge and cliffs just below the mine site	endangered
Grey headed Flying fox ( <i>Pteropus poliocephalus</i> )		threatened
Little Pied Bat	Present in small colonies	vulnerable
Eastern Bentwing bat ( <i>Miniopterus schreibersii oceanensis</i> )	Only one confirmed capture in the four kilometres downstream from the mine. More study on bat species here is needed.	vulnerable
Squirrel Glider ( <i>Petaurus norfolcensis</i> )		vulnerable
Araluen Rock Python Status	It has none of the markings of the Southern Rock Python and is visually dissimilar to any recognised species. It exists only within the Majors Creek gorge, four to six kilometres downstream from the proposed mine site	once identified would be critically endangered

#### *Endangered Ecological Communities*

\*Natural Temperate Grasslands of the Southern Tablelands (NSW and ACT).

\*The Araluen Scarp Grassy Forest has been listed as an endangered ecological community.

\*Ribbon Gum Snow Gum Grassy Open Forest: Tablelands Frost Hollow Grassy Woodlands in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South western Slopes Bioregions.



Many species exist locally only within the gorge below the mine site. These include:

- The southern most natural occurrence of Bunya Bunya nut trees.
- The southern most natural occurrence of *Ficus coronata*, or Sandpaper Fig: not endangered, but present in only two gullies in this region, both affected by the proposed Dargues Reef Mine Project.
- The southern most natural remnant of Cabbage Tree Palm.
- An otherwise unknown pink subspecies of the common brown snake
- *Backhousia myrtifolia* or Grey Myrtle: one of the few remaining remnants of backhousia dry rainforest canopy left.
- *Notothixos subaureus*: parasitic mistletoe.
- *Dodonaea viscosa*: a local subspecies, not yet positively identified.
- *Adiantum formosum*: giant maidenhair not endangered but this is the only area locally where it appears.
- An unnamed stringybark (possibly a hybrid of the red and yellow stringybarks): still to be positively identified.
- *Macropus rufogriseus*: Red necked Wallaby: not threatened, but almost extinct in this district. This appears to be the single surviving local population.

*Other species:*

These include 127 species of birds, eight species of snake of which some examples are the Common Wombat, Eastern Grey Kangaroo, New Holland Mouse, echidna, Black-tailed Wallaby, Wedge-tailed Eagle, *Aquila audax*, lyrebird, Pretty-faced Wallaby, Brushtail Possum, Ringtail Possum and Sugar Glider. The Wedge-tailed Eagle, *Aquila audax* is listed as a declining species in this area, Crimson Rosella *Platycercus elegans*, Eastern Yellow Robin and Grey Fantail.

Appendix One and Appendix Two of the Assessment Report Ecology Section 2, although mis-named, contain lists of species found within the site. This should be proof of the biodiversity contained within the area. As seen many species are water dependent or ground dwelling.

*Species recorded in EA survey by their own admission*

- Echidna *Tachyglossus aculeatus*
- Eastern Grey Kangaroo *Macropus giganteus*
- Swamp Wallaby *Wallabia bicolor*
- Ringtail Possum *Pseudocheirus peregrinus*
- Sugar Glider *Petaurus breviceps*
- Wombat *Vombatus ursinus*
- Verreaux's Tree Frog *L. verreauxii*
- Bleating Tree Frog *Litoria dentata*
- Spotted Grass Frog *Limnodynastes tasmaniensis*
- Peron's Tree Frog *Litoria peroni*
- Lesueur's Tree Frog *Litoria lesueurii*
- Common Eastern Froglet *Crinia signifera*
- Striped Marsh Frog *Limnodynastes peroni*
- Southern Green Stream Tree Frog *Litoria nudidigata*
- Eel *Anguilla australis*
- Mountain Galaxias *Galaxias olidus*(fish)
- Gippsland Water Dragon *Physignathus lesueurii howitti*
- Eastern Bluetongue Skink *Tiliqua scincoides*
- Three Toed Skink *Hemiergis decresiensis*
- Weasel Skink *Saproscincus mustelina*
- Southern Cunningham's Skink *Egernia cunninghamiana*
- Gippsland Water Dragon *Physignathus lesueurii howitti*

- Southern Water Skink *Eulamprus heatwolei*
- Red-bellied Black Snake *Pseudechis porphyriacus*
- Chocolate Wattled Bat *Chalinolobus morio*
- Large Forest Bat *Vespadelus darlingtoni*
- Southern Forest Bat *Vespadelus regulus*
- Little Forest Bat *Vespadelus vulturnus*
- Gould's Long-eared Bat *Nyctophilus gouldii*
- Lesser Long-eared Bat *Nyctophilus geoffroyi*
- White-striped Mastiff Bat *Tararida australis*
- Agile Antechinus *Antechinus agilis*

*Ptilonorhynchus violaceus* Satin Bowerbird

*Anthus novaeseelandiae* Richards Pipit

*Neochmia temporalis* Red-browed Firetail

*Stagonopleura guttata* Diamond Firetail

*Hirundo neoxena* Welcome Swallow

*Hirundo nigricans* Tree Martin

*Cincloramphus cruralis* Brown Songlark

*Coturnix ypsilophora* Brown Quail

*Cygnus atratus* Black Swan

*Tadorna variegata* Australian Shelduck

*Chenonetta jubata* Australian Wood Duck

*Anus superciliosa* Black Duck

*Anus rhynchos* Australasian Shoveler

*Anus gracilis* Grey Teal

*Anus castanea* Chestnut Teal

*Aythya australis* Hardhead

*Tachybaptus novaehollandiae* Australasian Grebe

*Tachybaptus poliocephalus* Hoary-headed Grebe

*Phalacrocorax melanoleucos* Little Pied Cormorant

*Phalacrocorax sulcirostris* Little Black Cormorant

*Pelecanus conspicillatus* Australian Pelican

*Egretta novaehollandiae* White Faced Heron

*Egretta garzetta* Little Egret

*Ardea pacifica* Pacific Heron

*Threskiornis molucca* Australian White Ibis

*Threskiornis spinicollis* Straw-necked Ibis

*Platalea flavipes* Yellow-billed Spoonbill

*Elanus axillaris* Black-shouldered Kite

*Accipiter fasciatus* Brown Goshawk

*Aquila audax* Wedge-tailed Eagle

*Hieraaetus morphnoides* Little Eagle

*Falco berigora* Brown Falcon

*Falco longipennis* Australian Hobby Hawk

*Falco subniger* Black Falcon

*Falco peregrinus* Peregrine Falcon

*Falco cenchroides* Nankeen Kestrel

*Gallinula tenebrosa* Dusky Moorhen

*Fulica atra* Eurasian Coot

*Actitis hypoleucos* Common Sandpiper

*Elseyornis melanops* Black-fronted Dotterel

*Vanellus miles* Masked Lapwing

*Macropygia amboinensis* Brown Cuckoo-dove  
*Phaps chalcoptera* Common Bronzewing  
*Ocyphaps lophotes* Crested Pigeon  
*Leucosarica melanoleuca* Wonga Pigeon  
*Calyptorhynchus funereus* Yellow-tailed Black-cockatoo  
*Callocephalon fimbriatum* Gang-gang Cockatoo  
*Cacatua roseicapilla* Galah  
*Cacatua sanguinea* Little Corella  
*Cacatua galerita* Sulfur-crested Cockatoo  
Psittacidae *Alisterus scapularis* Australian King Parrot  
*Platycercus elegans* Crimson Rosella  
*Platycercus eximius* Eastern Rosella  
*Cacatua roseicapilla* Galah  
*Cacatua galerita* Sulfur-crested Cockatoo  
Cuculidae *Cuculus pallidus* Pallid Cuckoo  
*Cacomantis pyrrhophanus* Fan-tailed Cuckoo  
*Cacomantis variolosus* Brush Cuckoo  
*Ninox novaeseelandiae* Southern Boobook  
*Podargus strigoides* Tawny Frogmouth  
*Hirundapus caudacutus* White-throated Needletail  
*Apus pacificicus* Fork-tailed Swift  
*Dacelo novaeguineae* Laughing Kookaburra  
*Todiramphus sancta* Sacred Kingfisher  
*Eurystomus orientalis* Dollarbird  
*Climacteris leucophaea* White-throated Treecreeper  
*Malurus cyaneus* Superb Fairy-wren  
*Pardalotus punctatus* Spotted Pardalote  
*Pardalotus striatus* Striated Pardalote  
*Sericornis frontalis* White-browed Scrubwren  
*Gerygone olivacea* White-throated Gerygone  
*Acanthiza reguloides* Buff-rumped Thornbill  
*Acanthiza chrysorrhoa* Yellow-rumped Thornbill  
*Acanthiza pusilla* Brown Thornbill  
*Acanthiza nana* Yellow Thornbill  
*Acanthiza lineata* Striated Thornbill  
*Smicrornis brevirostris* Weebill  
*Anthochaera carunculata* Red Wattlebird  
*Anthochaera chrysoptera* Little Wattlebird  
*Philemon corniculatus* Noisy Friarbird  
*Manorina melanocephala* Noisy Miner  
*Meliphaga lewinii* Lewin's Honeyeater  
*Melithreptus lunatus* White-naped Honeyeater  
*Lichenostomus chrysops* Yellow-faced Honeyeater  
*Lichenostomus leucotis* White-eared Honeyeater  
*Melithreptus brevirostris* Brown-headed Honeyeater  
*Phylidonyris novaehollandiae* New Holland Honeyeater  
*Acanthorhynchus tenuirostris* Eastern Spinebill  
*Microeca leucophaea* Jacky Winter  
*Eopsaltria australis* Eastern Yellow Robin  
*Petroica boodang* Scarlet Robin  
*Petroica phoenicea* Flame Robin  
*Psophodes olivaceus* Eastern Whipbird

*Cinclosoma punctatum* Spotted Quail-thrush  
*Pachycephala pectoralis* Golden Whistler  
*Pachycephala rufiventris* Rufous Whistler  
*Colluricincla harmonica* Grey Shrike-thrush  
*Rhipidura fuliginosa* Grey Fantail  
*Rhipidura leucophrys* Willie Wagtail  
*Grallina cyanoleuca* Magpie Lark  
*Monarcha melanopsis* Black-faced Monarch  
*Coracina novaehollandiae* Black-faced Cuckoo-shrike  
*Lalage sueurii* White-winged Triller  
*Artamus cyanopterus* Dusky Woodswallow  
*Cracticus torquatus* Grey Butcherbird  
*Gymnorhina tibicen* Australian Magpie  
*Strepera graculina* Pied Currawong  
*Strepera visicolor* Grey Currawong



## Appendix B

ACF Newsletter August 1986

**The Chemical Threat**

# Mercury - A Resurrected Problem

**Mercury as a serious toxic pollutant** became notorious in the Minamata Bay disaster in Japan, when a factory discharge of mercury into the bay caused a serious outbreak of poisoning with many deaths and permanent crippling in survivors. To disturb, or remove, stream sediments can, as Dr P.S. Lake put it in a personal communication, "sometimes release concentrated mercury and create a new pollution hazard". As to possible methods of recovering it, these have not been made clear in the available literature. But in an environmental study produced by a NSW firm, Mobilis Pty. Ltd., the proposal was made to separate it from the gold by "handwashing" and to bottle the mercury for resale. This proposal was described by Dr Lake as "an incredible admission in that it reveals that there must be, in the areas to be mined, an enormous amount of mercury." He points out that

the recent return to prominence of gold mining in Australia which is predicted to increase to the level of, perhaps an achievement for Australian production, of third place in the world! within a few years, has turned the industry's attention to the old fields where new methods of production could result in as much gold being recovered as was taken in the first place. However, the occurrence of great amounts of mercury mixed with, or in proximity to, the new-found gold, has given rise to fears for human quality of life and for fisheries. Australian gold production has kept steadily from 40 tonnes in 1964 to a projected 100 tonnes for 1987. Most if not all old gold fields lie in river valleys and stream catchments. Since water, not gold, is Australia's most precious resource, considerable conflicts loom ahead between water users and miners.

The amount of potential contamination from mercury 'lost to the environment' as authorities delicately put it, may be estimated from the

weight of mercury contained in the amalgamation process is of the same order as the weight of gold recovered. For instance, the amount of mercury potentially released to the environment from the Bendigo field, one of the oldest early fields in Victoria, would amount to about 500 tonnes. (2.2.)

Mercury, as a factor in the amalgamation process in the extraction of gold, is emerging again after many years during which the cyanidation process was used. At Tennant Creek mine, where Peko-Wallsend has been using mercury in extraction, the firm was recently heavily fined for exposing an immigrant worker to mercury poisoning. The stated attempt to extract and bottle mercury in the case of the New South Wales mine owned by Mobilis Pty Ltd near Mangrove, may be the beginning of a major attempt to bring old goldmined areas back into production while hushing up the danger it implies. Water quality, fisheries both commercial and amateur, oyster and other shellfish production, farm water supplies and livestock, and workers exposed to the dangers of mercury contact, may now all be at risk.

**Notes:**

1. Mercury Contamination of the Larderberg River, Victoria, Australia, from an Abandoned Gold Field, B.M. Byrnes, B.A.W. Collier, G.B. Deacon, G.J. Coleman & P.S. Lake. Environ. Pollut. Ser. A, 0143-1471/82/0022-0135\$02.75. Reprinted from Pollution Res. 1982, Printed in Great Britain.
2. Personal communication to Florentia Pys. Ltd., March 1986.
3. Personal communication to Judith Wright, 20 April 1986.
4. Wollongong Reef Project, Environmental Study, Aquatic Life, Consultants: Snowy Mountains Engineering Corporation in Association with New South Wales State Fisheries/Metrop. Water Sewerage and Drainage Board, Sydney, Feb. 1978.
5. The Australian Gold Book, compiled by A.C. Goodie & Co., Information Australia, 1985. Available from firm or publisher, \$120.
6. Damages by mercury poison victim, Andrew Bolt, The Age, Tuesday 2 April 1985, p. 6.

\* See Financial Review 7 June 1990: Australia now producing 10% of world gold, expected to rise to 12% this year prior introduction of gold!



## South East Region Conservation Alliance **SUBMISSION**

[www.secrca.org.au](http://www.secrca.org.au)  
[sercansw@gmail.com](mailto:sercansw@gmail.com)

PO Box 724 Narooma NSW 2546 AUSTRALIA

Reference Number 10 0054 - Proposed Gold Mine at Dargues Reef

SERCA Strongly Objects to the Proposed Mine at Dargues Reef for the following reasons:

1. The mine is being planned in an area that is only four kilometres directly upstream from residents. These people have only been able to access the Environmental Assessment two weeks ago and submissions must be received by 1 November, 2010.
2. Studies for the Environmental Assessment do not adequately consider the mine's effect on terrestrial and aquatic environments beyond the actual mine site. The proposed mine is extremely close to a Nature Reserve and a National Park. Endangered, critically endangered and threatened species in the gorge below the proposed mine site, including the Powerful Owl to the critically endangered Araluen Gum *Eucalyptus kartzoffiana*, have only been surveyed within the property held by the proponent. However, potential effects on the environment outside these properties of a regional reduction in the water table and the escape of contaminated tailings, either by wind or the activities of birds, have not been adequately considered.
3. The Dargues Reef Mine will require operational water of about 280 ML per year, about 100 ML of which might be reclaimed by decanting somewhat contaminated water after the processing of crushed ore. Three sources of water are proposed:
  - Water recovered by dewatering the active mine
  - Water captured in 8 surface dams constructed under the "harvestable rights" provisions of the Water Act 2000
  - Water pumped from old abandoned mines.

It is not clear that the water modelling has been based on an adequate understanding of how catchments work. There seems to be an un-stated assumption that the surface dams will fill by hortonian overland flow, unaffected by the draw-down in the regional water table due to dewatering the

mine. In fact, most run-off in these catchments will be due to baseflow, sub-surface stormflow or overland flow which is the result of exfiltration of interflow in saturated zones (see, for example, the review by Bonnell 1993, or original studies by Hewlett and Hibbert, 1967, O'Loughlin, Cheney and Burns, 1982, Topalidis and Curtis 1982)

Borefield studies undertaken by the proponents show that the regolith and granodiorite aquifers are tightly connected. Any surface dams constructed in the zone surrounding the mine which may be even slightly affected by the draw-down in the water table are unlikely to yield significant volumes of water.

While the decision to attempt to replace lost baseflow in Major's Creek with releases from the "harvestable rights" dams is welcomed, this strategy is unlikely to succeed due to the poor yield from these dams. A failure to secure the baseflow in Major's Creek will have adverse impacts on the valuable peach orchard production at Araluen and ultimately the urban water supply scheme for the Eurobodalla Shire due to the recent upgrade in extraction capability from the Deua River.

Alternate water sources are required if the mine is to proceed. These might include the purchase of entitlement from other water users or the capture of clean stormflow run-off from extensive roof areas that might be constructed over mine facilities such as the tailings stock-pile.

The use of water recovered from abandoned workings will definitely reduce the baseflow in Major's creek and lower the regional water table.

The water table currently supplies underground springs that provide drinking water for the local native animals and also keep the native flora watered. The dramatic drop in the water table would be a disaster for these native animals and their habitat.

4. There is no proposed secondary wall to be constructed in case the first wall of the tailings storage facility fails. The clean water diversion structure around the tailings storage facility appears to be a mainly a surface drain/bund. This will intercept hortonian overland flow but not intercept the interflow of subsurface water. In prolonged wet conditions, such interflow, concentrated in natural fissures, might threaten the integrity of the low-permeability layer of the tailings storage facility.

The chemical composition of the tailings has been assessed by analysis of just 3 samples of local granodiorite. There is likely to be considerable heterogeneity of the material actually mined (after all, gold is not uniformly distributed throughout the granidiorite so why should other elements, such as heavy metals, not be located in some of the ore to be mined?)



We are mindful of the failure of the tailings storage at Captain's Flat, which contaminated vast reaches of the Molonglo River with heavy metals, resulting in our National Capital having a water feature which is biologically poor. Should any fish happen to survive in Lake Burley Griffin, one would be advised not to eat it!

Greater scrutiny of the design of the tailings storage facility and the composition of tailings generated throughout the life of the mine are required.

5. Mining of hard rock and processing the ore and transporting the concentrate will all use considerable fossil energy. The greenhouse gas emissions of the project have not been off-set in any way.

6. Because of the above stated reasons, SERCA asks that this proposal as it currently stands be refused.

The gold price is currently at an historical high and, as Alan Kohler stated on ABC television this week, the gold market has all the characteristics of a "bubble" (i.e. retail investors investing and price increasing above historical trends). The gold price may collapse if a new international settlement on currency exchange rates is achieved soon. The Minister for Planning may be doing the proponents a big favour by refusing the proposal.

## References.

Bonnell M. (1993) Progress in the understanding of runoff generation dynamics in forests. *Journal of Hydrology*, 150, 217-275.

Hewlett J D and Hibbert A R (1967) Factors affecting the response of small watersheds to precipitation in humid areas. *International Symposium on Forest Hydrology*. The Pennsylvania State University, 29 August to 10 September, 1965. Pergamon, Oxford, pp 275-290.

O'Loughlin E M, Cheney N P and Burns J (1982) The Bushrangers experiment: Hydrological response of a eucalypt catchment to fire. *Proceedings of the First National Symposium on Forest Hydrology*. National Conference Publication No. 82/6. Institution of Engineers of Australia .

Topalidis S and Curtis A.A, (1982). The effect of antecedent soil water conditions and rainfall on runoff generation in a small eucalypt catchment. *Proceedings of the First National Symposium on Forest Hydrology*. National Conference Publication No. 82/6. Institution of Engineers of Australia . Page 45.