THE COASTWATCHERS ASSOCIATION INC.

SUBMISSION TO THE NSW DEPARTMENT OF PLANNING AND ENVIRONMENT

PART 3 MODIFICATION

10_0054 MOD3

DARGUES REEF MINE – MODIFICATION 3

The Coastwatchers Association Inc., **OBJECTS** to the NSW State Government approving the construction of a cyanide treatment plant at the Dargues Reef gold mine at Majors Creek, by Unity Mining Limited through its subsidiary Big Island Mining Pty Ltd.

26 August 2015

Coastwatchers Association Inc.,
PO Box 521
Batemans Bay NDE 2536

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1. COASTWATCHERS ASSOCIATION INC.

The Coastwatchers Association Inc. (Coastwatchers) is an incorporated association based at Batemans Bay NSW. It represents community members on the South Coast of NSW, who have concerns about local environmental issues. The Association has successfully represented its members for 30 years.

Its' principal aims are:

> *To take action to protect the natural environment and preserve the integrity of ecological systems in the Eurobodalla and Shoalhaven areas of New South Wales*
>
> *To oppose the unnecessary destruction and degradation of natural systems, unbalanced development, and pollution.*

The Association opposed the 2010 Development Application to develop the Dargues Reef mine by Big Island Mining Pty. Ltd., then a subsidiary of Cortona Resources Limited.

2. UNITY MINING PTY LTD

Unity Mining Pty Ltd (Unity) is an Australian company, listed on the Australian Stock Exchange on 19 December 1985. It was previously known as Bendigo Mining Limited. Its registered address is in Melbourne, Victoria. Its interests are as:

> *"..an Australian gold producer, developer and explorer which owns and operates the Henty Gold Mine on the West Coast of Tasmania and is working to develop the Dargues Gold Mine in New South Wales. Unity is also involved in gold exploration in West Africa through its investment in GoldStone Resources Limited. Unity holds tenure over the Bendigo Goldfield in Victoria where it is pursuing the sale of its Kangaroo Flat gold plant and Bendigo exploration tenements."*

Unity has five subsidiary companies. These subsidiaries together with Unity are all parties to a **"Deed of Cross Guarantee"**, where each entity guarantees the debts of the others. The subsidiaries are:

Big Island Mining Pty Ltd (mining and exploration)
Henty Gold Limited (employee and property services)
(formerly Barrick Henty Ltd acquired on 01/07/2009)
Dargues Gold Pty Ltd (employee and property services)
Wombold Gold Pty Ltd (dormant)
Bendigo Mining Pty Ltd. (dormant)

The "Deed of Cross Guarantee" is a legal document, with implications regarding accounting procedures and practices. Just as easy as it is to establish such a Deed, it is equally easy to abolish or change it, and say remove one company from the

group. That may occur if for example, one subsidiary was facing legal issues, administration or bankruptcy. No guarantees can be given that this existing Deed will exist into the future. This establishes a significant corporate and financial weakness to this application.

Big Island Mining Pty Ltd (Big Island) was established in 2005 as a subsidiary of Moly Mines Limited. In July 2007, it became a subsidiary of Cortona Resources Limited (Cortona). Unity merged with Cortona in January 2013, and Big Island became a subsidiary of Unity.

The Mining Lease (ML 1675) over the Dargues Reef Gold mine , has been held by Big Island since April 2012. It is surrounded by an Exploration Licence (EL 8372), which was granted to Big Island in May 2015.

Prior to the issue of ML 1675 (previously ML 103) in 2015 to Big Island, the history of ownership of the Mining Lease ML 103 was:

Alan Jordan	1975 to 1989
Horizon Gold NL	1989 to 2004 (name change to Ominco Mining NL in 1998)
Hibernia Gold Ltd	2004 to 2006 (name change to Moly Mines Limited in 2005)
Big Island Mining Pty Ltd	2006 to 2015 when ML 103 became ML 1675

While all of this detail may seem irrelevant to this submission, it highlights the musical corporate chairs, which characterise the mining industry. This fact is highly relevant because it indicates the dynamic nature of the corporate movements, and in turn the implications on business management and administration. A guarantee, arrangement or undertaking between say the community with Unity or one of its subsidiary companies, or its management team one day, may be in tatters the next as a new corporate team arrives or the company is subject to a takeover. This is another major risk factor to consider, when assessing the approval of this cyanide processing plant at Majors Creek.

A further example of the corporate merry-go-round, relates to the Timbarra Mine at Tenterfield, which had tailings dam environmental spills in 2001. The mine was developed by Ross Mining NL in the late 1990s, but was soon put into 'care and maintenance' and closed. In May 2001 Delta Gold acquired Ross Mining NL, and later in 2001, the tailings that were meant to be in 'care and maintenance', overflowed into the Clarence River following a severe weather event. Placer Dome (Canada's largest gold miner) then acquired Delta Gold, and undertook a major rehabilitation of the site. In turn, Placer Dome was acquired in 2006 by Barrick Gold, the world's largest gold miner. The lease expired. Jump a few years and Precious Metal Resources Ltd has recently applied for an exploration licence over the old Timbarra mine area. In April 2015, Precious Metals changed its name to Frontier Capital Group Ltd. It is difficult to keep track.

A further factor to consider with any mining venture is the financial capacity of the company. According to the Unity's Annual Report for the 2013-14 FY, Unity

had sales of $55 million and a cash balance of about $7 million as at 30 June 2014. That cash balance should improve in the 2014-15 FY to over $30 million. Apparently, Unity has no debts at the moment but will need to raise capital if the Dargues Reef mine processing plant receives approval. And in the current Australian and world economic climate, that may be extremely difficult.

Their Bendigo mining operation is in 'care and maintenance' with costly rehabilitation needing to be undertaken unless it is sold, and the Henty Mine in Tasmania is scheduled to cease mining at the end of 2015. That places Unity in a difficult financial position where its cash flow will dry up, and the Victorian Government may order it to commence rehabilitation at Bendigo. The financial pressure on Unity will increase, as will the pressure to cut corners at Majors Creek if the cyanide plant construction plant is approved.

While the NSW Government should consider these financial capacity issues, they don't. So if a major disaster occurs, there needs to be financial capacity of any miner to clean up the spills or pollution. When the Timbarra mine overflowed, it was the NSW Government, which ended up undertaking the cleanup. In the event of a disaster at Majors Creek, it is an open question whether Unity would have the financial resources to undertake a thorough environmental cleanup. The mining rehabilitation bond covering the Dargues Reef site is only $730,000 and is held in the form of a "Deed of Security Deposit Bond". This bond could not be utilized to cover environmental cleanup, away from the mine site. Unity has claimed that the bond is currently $3.4 million. That is incorrect and a misrepresentation of the actual position. It is $730,000 as stated above.

The NSW Department of Industry, advised Coastwatchers on 24 August 2015:

> *"The Department currently holds a bank security certificate in the amount of $730,000 on Mining Lease 1675. This amount was revised down from $2,661,000 in 2013 following Unity Mining placing the mine on care and maintenance. This revised amount was permissible since the majority of the originally approved site facilities had not yet been constructed. The current security held is expected to cover the rehabilitation of the currently existing, partially constructed mine facilities. A further security calculation will be required to be submitted to the Department prior to the re-commencement of previously approved activities or prior to commencement of modified activities, if approved."*

The cost of any environmental spill of cyanide, heavy metals and toxic waste water is massive. In 1992 at the Summitville Mine in Colorado US, there were major leaks of cyanide and heavy metals into the environment, and in addition there were 160 million gallons of stored toxic water needing treatment. The mine's owner Galactic Resources, declared itself and an its subsidiary bankrupt leaving the US Environmental Protection Agency to clean up the damage at the cost of $US 176 million.

Last year (2014) at the Mount Polley Mine in British Columbia, Canada, the 4 square km tailings dam collapsed and discharged 10 million m^3 of water and 4.5

million m^3 of toxic slurry into the environment. The spill destroyed a 9 km creek and endangered salmon the town of Likely. Mine safety experts have called the spill one of the biggest environmental disasters in modern Canadian history. The matter is still under investigation, and issues such as legal liability, clean up costs and fines, will take years to determine. One year later, the Mount Polley mine is operating again, this time with a conditional permit and no long-term plan to deal with the excess tailings.

Even with expensive insurance, the financial resources needed for a major environmental cleanup are huge, and no doubt well beyond the capacity of small gold mining companies. To be able to self-fund such a cleanup, would require the financial strength of a company such as Barrick Gold, BHP or RIO.

Without that financial strength, the cost of cleanup and rehabilitation will fall on Government at all levels, in other words on the community.

3. THE APPLICATION

3.1 The "Creep" Approach

This modification application appears to be following the classical textbook "creep" strategy, common in the mining industry. At the beginning, there is a relatively straightforward development application, essentially to reopen the mine, with assurances that there will be no processing on-site. Cortona stated at in 2010, that there were inherent dangers and risks with on-site processing using cyanide at Dargues. They assured the community, there would be no on-site processing, and off-site processing would be conducted at Parkes in central NSW, or Bendigo in Victoria.

Then further modifications were lodged and approved. These modifications were a further stage of the "creep" process, no doubt trying to lull the community into complacency. The modifications were relatively benign, and the community continued to accept Cortona's assurances of no on-site processing.

The "creep" continued. With the fall in gold prices, and the reluctance to use Parkes or Bendigo for processing, Unity introduces the modification to achieve what was most probably intended in the first place, and that was to have an on-site processing facility, using cyanide. The third modification also raised the possible threat of bringing in gold ore for processing from other mines.

It is obvious that the "creep" does not have an end. So if this processing plant proceeds, the life span of the operation will not be 5 years, which was economically unlikely in the first place given the many tens of millions it will cost to establish the cyanide processing plant. The mines life will be extended for decades, with ore transported to this site from other mines (presumably a Modification No 4 will be needed). Instead of the ore concentrate rolling north along the Kings Highway, it will be rolling south to Dargues. Either way Braidwood and road users will be the losers.

Big Island has interests at "Booths Reward" at Coolac, about 250 km from Dargues and at "Christmas Gift" at Cootamundra, about 275 km from Dargues. These may be opportunities, which Unity may wish to advance if the Majors Creek processing plant was approved. The distances are only minor compared to the distances Unity was prepared to transport ore from Majors Creek to Parkes in NSW (about 600 km) or Bendigo in Victoria (about 750 km) to meet the now fictional guarantee of off-site processing.

3.2 New Development Application v Modification

From the beginning of this planning process, the Coastwatchers have been highly critical of the NSW Government's decision to allow this application as a Modification rather than a new Development Application. The modification should never have been allowed because of the significance of the proposed changes, which dwarf the impacts of the original development application and EIS. It has been stated that this Modification includes land outside the original site boundary approved in the initial Development Application, which raises interesting legal questions.

3.3 Lack of EIS for the Majors Creek to the Batemans Marine Park

In any major mining development such as at Majors Creek, a full Environment Impact Statement woulds normally be required, and not confined to a small area around the mine development. The EIS would have to consider matters to the geographic limits that the development could impact. Unfortunately, with this proposed processing plant and associated earthworks, the Government only required a restricted Environmental Assessment in the area around the mine.

The Government failed to require consideration and the impacts of a complete tailings dam disaster, when there is a history not only in Australia but throughout the world of successive major tailings dam disasters. An EIS should have been compulsory and covered the area downstream from Majors Creek to the coast at Moruya, particularly potential impacts on the Deua National Park and the Batemans Marine Park some 60 km to the east of the mine. The impacts on the landowners along the river and of most importance the fresh water supply of the Eurobodalla Shire, have been all but been ignored. This is an abrogation of duty and responsibility.

The environmental impacts considered in the original EIS and the earlier EAs in previous Modifications, were minor compared to the possible environmental impacts of a cyanide treatment plant not only during its operation, but also over the next 100 years when is in 'care and maintenance. The risks are enormous, yet these issues were all but been ignored. The Minister should have insisted on a new Development Application and a new Environmental Impact Statement, but failed to do so.

One of the worrying aspects of this modification is that it gives the impression that it has been prepared "on the cheap". Further, that the bare minimum standards have been proposed for the processing plant, to no doubt keep capital and operating costs to a minimum. That is unacceptable.

As a general observation, the big mines owned by Barrick or BHP, appear to over engineer their plant and equipment because they are protecting their massive financial reserves. Miners with little financial backing appear to do the opposite and under engineer and take greater risks, because they have little to lose and can go into administration or bankruptcy overnight. That is not an immediate option for Barrick or BHP.

3.4 Pollution

The application only identifies Cyanide as a problem. There is little or no mention off the far more significant heavy metals and toxic waste water contamination that is possible, with potentially serious if not catastrophic consequences, if the tailings dam fails or more likely overflows. This has been demonstrated almost annually somewhere in the world, when tailing dams collapse or overflow.

It is also a major issue once the mine closes. The question is how is the dam to be remediated so there is absolutely **no** environmental risk to the area? What is the cost of the remediation? It will certainly be multiple times the State Government bond. The general approach of so many mines world wide, is for the miner to walk away or become insolvent. The miner takes the profits and the community bears the legacy.

This application has failed to identify the potential hazards to the community, and the environment. As the design develops, these hazards must be managed to minimize the chance of them being realized. If they are not identified early or not acknowledged as a potential problem, then mitigating solutions will not be integrated into the design, with the consequence they will definitely not be well managed and will become a reality.

4. EUROBALLA'S WATER SUPPLY

One of the principal concerns for the Coastwatchers, is the continuation of the ongoing guarantee of a clean water supply to the Eurobodalla Shire and other river users. The proposal in this Modification totally ignores that guarantee. The community must know that their water supply will never be polluted from a cyanide processing plant. The only way that guarantee can be met is not to have the cyanide plant at Majors Creek in the first place.

This river is about 60 km in length, from Majors Creek, though the Deua National Park, past Moruya, finishing in the Batemans Marine Park. The Deua provides about 85% of the water supply to the 70,000 permanent residents of the Eurobodalla Shire and more in holiday periods when the population swells to over 100,000.

This Modification directs any spills to the east following the natural contours into the Spring Creek, then into the Deua River. With a little bit of adjustment, any toxic flows from the mine site could be directed to the west, to the Shoalhaven River, but that option will never be permitted because that area is part of the

Sydney Water Catchment, and pollution could impact on 5 million people in Sydney instead of just 100,000 to the east. In addition, the regulations applying to the Sydney Water Catchment are more stringent and expensive to implement. To the residents of Eurobodalla the same standards should apply. There is simply no justification for discriminatory regulations.

No matter what assurances Unity or their consultants make, the introduction of a cyanide processing plant at Majors Creek will introduce higher and unacceptable risks, and make it absolutely impossible to guarantee the existing level of water puity. This is not only just for the present, but also for all future generations over at least the next 100 years. When the mine is in 'care and maintenance", that will be a period of great risk, because the mine will be more vulnerable than when it is operational, as there will be no employees present to activate emergency plans in the event of a disaster.

A review of many mining accidents, which have occurred over the past 30 years, are detailed in Appendix A. There are general characteristics, which emerge from these disasters namely:

1. Despite assurances from miners, mining accidents do occur and their effects can be devastating on the environment and the people down stream. It is not just the cyanide, which is of concern, but mainly the heavy metals, sludge and toxic water, which are discharged. Those impacts are both in the short and long term.

2. The impact of the accidents will vary with the type of disaster. They may be contained within a short distance of the mine site, but that is unlikely at Majors Creek given the waterfall a few kilometres from the mine site. If there was a massive spill, the toxic plume could reach all the way from Majors Creek to the Batemans Marine Park in a very short period.

3. Most companies, unless the size of Barrick Gold or BHP, have little financial capacity to clean up after any disaster. Many find it easier, simply to go into bankruptcy.

The major water source in the Eurobodalla Shire is the Deua River, which supplies about 85% of the Eurobodalla's water supply. The Tuross River supplies the remainder. There are pumping stations on both rivers. When droughts occur, the Tuross River normally "dries up" and the Deua then supplies 100% of needs.

The Eurobodalla Shire manages this integrated water supply system. There is a water pipe reticulation system running from north of Batemans Bay to Tilba in the south, about 100km in length. There is only one other minor source for water, and that is Buckenbowra River, which arises near the Clyde Mountain. At best, that source can supply a fraction of domestic demand, because of the low capacity of the pipe.

There are storage tanks at strategic points along the reticulation system and a holding dam, Deep Creek Dam, about 5 km south of Batemans Bay. The Deep

Creek Dam is sourced only from the Deua and Tuross rivers - it is not a catchment dam.

Significant water users in the Eurobodalla are:

domestic users (about 80-85%),
the Shire's sewerage system,
the abattoir at Moruya,
caravan parks along throughout the Shire,
aged care facilities throughout the Shire,
hospitals at Moruya and Batemans Bay,
sporting venues,
clubs, hotels and motels,
industrial estates at Batemans Bay, Moruya and Narooma, and
retail business sector,

Along the two rivers there are farmers who irrigate crops and orchards, and who utilize water for domestic purposes and stock watering.

5. OTHER RISK FACTORS

5.1 Transport of Cyanide

Spillage of cyanide is a problem that appears to been superficially covered in this modification. Appendix B to this submission lists a series of transport accidents that have involved cyanide. Just because Orica has not had an accident in 20 years, does not mean that they cannot have two major accidents later this year.

The modification is silent on what happens if there is a fire when cyanide is being hauled on the roads or shifted on site. The impact can be devastating as demonstrated most recently in Tianjin, China in August 2015. A city block was obliterated, and over a 100 people died. And as the fire and emergency crews wash the cyanide into unrestrained gutters, the impact on the environment and the oceanic bay, will add a new dimension to the overall catastrophe.

5.2 Employee Poisoning

Handling of cyanide is a very dangerous process and has a history of problems and accidents. The Modification is silent as to what procedures Big Island will be adopting to avoid problems for its employees. In many cases employees have been poisoned though intimate contact with the cyanide. It is not possible to ascertain how Big Island is planning to address this issue.

5.3 Cyanide Deterioration

Cyanide breaks down rapidly when it leaks. Studies have found that this can happen within 300 to 400 meters of the spill. As the volume of water increases from other tributaries, harmful effects will be reduced. However, this only applies to small leaks.

While any leak is unwelcome, major leaks or catastrophic dam failures have had devastating impacts for many, many kilometres downstream from mines. The impact is not simply the cyanide but also the heavy metals and sludge and waste water that is released. A review of Appendix A, highlights the regularity and devastation that mining accidents impact on the environment. But this application is silent on these matters. A few examples are listed.

The impact of BHP's mining at **Ok Tedi** in PNG impacted the environment for 100s km to the ocean. Similarly, the 1995 Omai Mine disaster in Guyana (a release 4 million m^3 of cyanide waste) impacted downstream for over 80 km. The 1996 Mt Tapian disaster in the Phillipines (a release of 1.6 million m^3 of cyanide waste) impacted on 27 km of river before dissipating at the ocean.

In 2000, the tailings dam in the **Baia Mare** mine in Romania burst releasing 100,000 m^3 of waste into local rivers, then into the Danube ending in the Black Sea. The spill travelled for well over 100km. It was described as the worst environmental disaster in Europe since Chernobyl.

Last year in 2014 at the **Mt Polley** mine, a tailings pond breached and released 4.5 million m^3 of toxic slurry and 10 million m^3 of toxic waste water. This tailings dam was 4 sq km in area and ended up in lakes miles downstream. Mine safety experts have called the spill one of the biggest environmental disasters in modern Canadian history.

If there was to be a catastrophic failure at Dargues Reef mine, major impacts could not be avoided as Majors Creek is only 50-60 km to the coast, and the mine at Majors Creek is at 424 m above sea level and a tailing dam breach will naturally flow to the ocean.

The modification only acknowledges the possibility of small leaks, which will be diluted by the time they reach the coast. It ignores they fact that history is littered with catastrophic accidents whose impacts have extended for a 100km or more. Unity has not, and cannot demonstrate that they are exempt from such devastations. Unity has talked of fatalities, but that is simply a red herring. Very few people appear to die when these accidents occur. Certainly they get sick from drinking the water, but it is the collateral damage to the environment, drinking water and farms, that make the real impact, and that has been ignored.

Clean water and clean air are rights fundamentally accepted in modern Australia, and activities, which can compromise those rights, must be addressed very, very carefully. The Eurobodalla community has its existing fresh water supply, and that is an absolute and fundamental right in to our community. Unity or any other miner has no right but to respect and guarantee that clean water, and that can only be achieved by having no cyanide processing at Majors Creek.

5.4 Cyanide Storage

There is a major concern with the size of the containment area where the tanks of cyanide liquor are stored. Provision has been made for one tank to be damaged. That is unacceptable. In an event such as failure of pumps or tanks, or some

other external cause leading to more than one tank breaching, it is insufficient to limit the containment to 110% (ie one tank) when more than one tank could be undermined and spill. Either a larger containment area is required with sufficient room for containment of all tanks, or a double containment area with capacity to hold the liquid from however many tanks are in the containment area. If an issue arose in a major weather event, the size of the containment area would need to be assessed against such an event and that has not been undertaken.

5.5 Dam Storage

A common feature of all mining operations using tailings dams to contain the waste from the processing plant, is that they have to be very well designed to avoid wall failure, and particularly failures where the dam interacts with the natural ground levels. Even if the design is perfect, dams need to be very well managed so that a major weather event doesn't occur when the dam is temporarily over full (for essential process reasons). This can lead to a spill into adjoining water courses when the weather event washes the waste over the spillway and down into the nearest tributary. Failure to manage the operation of dams is common, with temporary overfilling being the ongoing issue. This application is silent on this matter.

5.6 Recycling Cyanide

It is proposed in the Modification that the cyanide will be recycled as much as possible. However, some cyanide will inevitably end up in the waste. The continuous cyanide destruction system, must be managed to a very high level, with continuous measurement and monitoring. The Modification gives little advice on these matters.

The cyanide destruction system must rely on a number of things to succeed:

(i) The skilled maintenance of the system so it is always functional.

(ii) Independent alarms to identify when it fails and an action plan, other than phoning the neighbours to let them know the water may be contaminated.

(iii) What happens in a power failure?

(iv) Are critical instruments and controls on a backup system?

(v) What happens in a bush fire or major weather event if there is no access to the operation to ensure cyanide isn't being dumped in the dam?

(vi) There has to be a robust management system in place to ensure the security of the cyanide circuit at all times.

(vii) The dam will also contain heavy metals in various forms, how is this to be managed if there is an overflow?

5.7 Solid Waste Storage

The Modification indicates that it is proposed to store some waste solids in the underground mined out area and some will go to the tailings. There are no details as to this split. There are also no details as to the composition of the waste and how Unity can be sure that there will be no leakage of hazardous material into the ground water. After all, the mine is at Majors Creek for one reason, and that is because of the gold bearing geological fault running under the mine. It is inevitable that there will be leaching of stored waste into lower streams.

5.8 Rainfall Runoff

The Modification is not clear on how rainfall run-off in the region of the process plant, workshops, reagent storage and facilities area is to be contained, collected and directed. The extent of bunding is not identified. Where is the run-off collected and directed? Is the area bunded sufficiently to contain an extreme rainfall event?

5.9 Miscellaneous Questions Needing Clarification

(i) Has the oily water separator being designed to include an allowance for extreme rainfall events?

(ii) The design is based on an adequate supply of Zone A low permeability soil. Confirmation of its availability on site is necessary.

(iii) Knight Piesold advice includes allowance for rainfall runoff from the process plant area, but the extent of bunding in the plant is not identified.

(iv) There needs to comments in the Modification as to how the five embankment lifts will be constructed either by the mines staff or contractors, and the quality control measures which will be implemented during construction.

(v) The modification appears to be silent on the tailings pipeline design. If it is above ground it may be preferable for it to be contained within bunds to contain spillage in the event of a pipe failure and for pressure transducers to be fitted to the pump discharge to shut down the tailings pump in the event of a pipeline failure.

5.10 Management

The entire case for the use of the highly dangerous cyanide leach processes at the mine site relies on a highly skilled and expert management team, highly efficient structures and first rate systems, that will always work, and management. The

track record of Unity has so far been lacking, and they cannot expect the community to trust and respect them! That has to be earned.

They promised never to have a cyanide processing on site. **BROKEN PROMISE**.

There were three drainage discharges from the mine site in February- March 2013, (see Appendix C) polluting streams away from the mine. The EPA prosecuted in the Land and Environment Court resulting in fines and penalties of $196,000. **BAD MANAGEMENT**

A further discharge occurred in April 2013. **BAD MANAGEMENT**

Later in 2013 Unity used unregistered flocculants, which discharged into the creeks and river. Unity failed to notify affected landowners leaving it to the EPA to contact impacted landowners. **DISGRACE**

There needed be more emphasis in the application on the need for comprehensive Management systems to be developed and in place before the operation proceeds much further. Unity already have demonstrated that they are not well set up to manage a potentially environmentally hazardous operation with their earlier failures. What is to indicate that they have learned anything from the earlier failures?

The project must be managed in accordance with environmental approvals, monitoring commitments and design assumptions. Employment of local staff should ensure any concerns relating to environment issues are identified before they become a problem and corrective action implemented to avoid the identified potential problems. Only through this level of diligence can community respect be improved.

Experience in mining particularly, and business in general, shows that under capitalised companies, or cost cutting particularly when commodity prises decline or debt costs increases, face the real prospect of poor management and administrative inefficiency. Depreciation of infrastructure or the use of second hand equipment is not addressed. All these issues increase risks.

5.11 'Care and Management'

There does not appear to be any substantial information in the Modification as to what will happen when the ore runs out and the mine put into 'care and maintenance'. This is a serious matter and needs to be addressed in full detail before any approval proceeds.

Who will ensure its security from failure in the longer term or from being overrun by a major weather event or ongoing site contamination? The liners used can deteriorate after 30 years, and the liner seals can part.

Most news agencies recently carried reports of an incident in the US where the Animus River turned yellow for 60 km. Industry experts refer to these hundreds of toxic storages as "ticking time bombs".

In August 2015 the Gold King mine near Silverton US discharged about 3 million gallons toxic waste in an accident into the Animas River. The ex mine was to be plugged so that acid mine drainage would stop spilling into the river system. It had been leaking toxic water at the rate of 50-250 gallons a minute for years.

The discharge turned the clear waters of the Animas deep orange for about 60 miles. The river was closed to all recreational activities while samples were taken. Municipal water suppliers, farmers and ranchers shut off taps and valves. The spill contained the toxic metals arsenic, cadmium and lead, as well as aluminum and copper. Agencies consider there may be other toxic heavy metals in the plume.

The requirements of HIPAP 3 Risk Assessment are not identified as being undertaken during the design phase and pre-operational phase of the operation. If the basic hazards are not identified early on they will not be adequately addressed.

In summary, this modification is full of omissions and gaps and needs to be rejected outright.

6. RAINFALL AND EVAPORATION DATA

The tailings dam to be constructed at Majors Creek, was designed to meet the standard of a 1:1,000 year storm event. The use of official rainfall and evaporation data from the closest weather station, is critical for making these calculations. If the rainfall and/or evaporation data are incorrect, or the closest weather station has not been used, it follows that the determining of the size, operations and management of the tailings dam will not be correct.

The use of a defined standard such as a 1:1,000 year storm event, assumes that future weather events will be the same as past weather events, and that the past can be used to predict the future. In a period when many of the worlds leading scientists and governments talk about climate change, global warming and sea level rise, because of the ever increasing emissions of greenhouse gases, particularly carbon dioxide, the use of standards such as a 1:1,000 year storm event is highly questionable. Scientists predict weather will become far more extreme and unpredictable.

This is why miners and governments need to adopt not just talk about, a precautionary approach to setting and meeting standards that have been determined in earlier times. Given that the catastrophic consequences of a tailings dam collapse are so immense on the communities down river, as demonstrated throughout the world in Appendix A, it follows that the precautionary approach should be followed, and the tailings dam at Dargues should be constructed to achieve a 1 in 100,000 storm event maximum.

The submission from Dr Emmett O'Loughlin questioning the accuracy of Knight Piesold's rainfall and evaporation data casts enormous credibility over the entire application and future of the project.

Knight Piesold advised that even in extreme storm events the tailings pond capacity was adequate to avoid water discharging over the spillway. This assurance is now in question.

Dr O'Loughlin's submission points out that the rainfall and evaporation data are incorrect, and Knight Piesold used estimates of Braidwood data rather than the actual Bureau of Meteorology (BOM) data. The rainfall data was underestimated and the evaporation data over estimated resulting in a massive bias. As well they ignored using Majors Creek data where rainfall was 30% higher. The end result will be that the tailings dam will most probably be inadequate and will overflow regularly. There are site limitations to increase the dam size. The same problem occurred in 2010 with the initial DA, but was never identified because the data was privileged because of the legal case.

There will need to be a reassessment of all the data, preferably using a 1:100,000 year storm event, to determine what will happen in the event of water levels rising above design levels. Can the volume of excess water be controlled or will it simply flow over the spillway and into the creeks causing catastrophic pollution down stream on a regular basis.