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Our reference: 2136669C-LTR006Amj
EPA Reference: ISA658

9 April 2009

Mr Rob Lawrence
Director
Department of Environment and Resource Management
Mount Isa House
Corner Camooweal and Mary Street
MOUNT ISA QLD 4825

Dear Rob,

Environmental Protection Order – Lady Annie Mine

Parsons Brinckerhoff (PB) on behalf of Deloitte Touche Tohmatsu, Receivers and Managers for the companies associated with the Lady Annie Mine, provide this report detailing practical options for the remediation of all affected on-stream farm dams and sections of Saga and Inca Creeks to reduce sulphate concentrations to fulfil the requirements set by item 3 of the Environmental Protection Order (EPO) as issued on 20th March 2009.

1. Introduction

PB has been engaged to manage the sites compliance with the EPO and verify works undertaken on-site.

As a result of stormwater events on the 30th January 2009 and 7th February 2009, discharges of acidified, contaminated water from the Stormwater Ponds on the Lady Annie Mine site impacted the Saga and Inca Creeks.

Initial sampling conducted by the Department of Environment and Resource Management (formerly the *Environmental Protection Agency*) on 25th Feb 2009 identified exceedances of ANZECC 2000 guidelines for the protection of freshwater aquatic ecosystems (95% species protection level) in the following contaminants:

- metals (Cu, Al, Co, Ni, Cr, Mn, Zn)
- conductivity
- pH (low).

Elevated electrical conductivity (EC) was linked to an increase in sulphates, derived from the use of sulphuric acid at the mine for the purpose of leaching metals from material placed on the heap leach pads.

2. Item 3 Requirements

As soon as possible, and by no later than 5.00 pm (AEST) on Thursday 9 April 2009 identify practical options for treatment of all on-stream farm dams and sections of Saga and Inca Creeks, which have been affected by the discharge of contaminated waters from the mine site in January and February 2009, to achieve as a minimum for sulphate either ANZECC 2000 trigger levels for the protection of freshwater aquatic ecosystems (at the 95% level) or reference values. These options must:

- Be provided to the administering authority and a preferred remediation option nominated for each area identified including the remediation standard.
- Provide a map of the areas assessed and showing any contamination identified.
- Where an area has been impacted and no remediation is proposed provide justification for that proposal and identify the effect this will have on the impacted environmental values.
- Include a proposed schedule of remediation works.

2.1 Status/Plan

In order to meet the requirements of Item 3, PB and FRC Environmental travelled along Inca and Saga Creeks between Friday 27th March and Thursday 9th April 2009 to collect samples which are currently undergoing analysis at the laboratory.

For the purpose of this document, a review of electrical conductivity (EC) and preliminary sulphate levels have been assessed, and a close correlation between the two exist. Consequently, for the purpose of this document, EC is assumed to represent the highest likely concentration of sulphate, further assessments will be undertaken as sulphate data becomes available.

Based on the field information collected, EC ranged between the following:

- 392-4340uS in the tributary leading from the site to Sage Creek
- 2557-4858uS in the upper reaches of Saga Creek
- 17-2641uS in lower reaches of Sage Creek
- 363-1430uS in the upper reaches of Inca Creek
- 185-648uS in lower reaches of Inca Creek
- 290 uS at the confluence of Inca Creek and the Buckley River.

From these results we can estimate that the sulphate levels are likely to exceed both the ANZECC Guidelines for Livestock and 95% species protection at all locations from the site to the middle reaches of Inca Creek.

A review of remedial technologies for the treatment of sulphates, particularly associate with Acid Mine Drainage indicated the following treatment technologies as options:

1. Chemical treatment with mineral precipitation

   a. Lime ($Ca(OH)_2$) and limestone ($CaCO_3$) for the neutralization and removal of sulphate through precipitation of gypsum ($CaSO_4$ $2H_2O$). This technology is typically limited by the solubility of gypsum, which, depending on the composition and ionic strength of the solution, range from 1500 to 2000 mg/L. This process is generally only capable of reducing the sulphate concentrations to around 600mg/L-1500mg/L. Downfalls of this process is the need to treat large volumes of sludge's and detailed monitoring, whilst also being difficult to administer in a stream based environment.

   b. Barium Salts is highly insoluble and removes sulphate removal by precipitation. However, barium salts are expensive, whilst also not readily available. One other major downfall is the residual sludge's which require thermal reduction and disposal.

   c. SAVMIN is a process which requires extensive changes to the physiochemical properties of the water to facilitate the precipitation of hydroxides, gypsum crystals and ettringite. This process requires extensive infrastructure and cannot be established in the timeframes provided.

   d. Cost Effective Sulphate Removal (CESR) is a process is similar to the SAVMIN process in that it relies on the precipitation of ettringite to remove sulphate from water. This process generates large volumes of metal laden sludge's which require thickening and disposal.

      Limitations:

      With all the chemical treatment with mineral precipitation technologies, there are significant limitations in the application to the in-stream environment and would likely require physical extraction of all water within the stream for treatment at a central location. These treatment technologies also require extensive design and construction periods which exceed the timeframes permitted for this project.

2. Membranes

   a. Reverse Osmosis is a process whereby feed water is pumped into a closed vessel and forced under pressure to pass through a semi-permeable membrane. This process generates a concentrated effluent which requires treatment via other means. Maintenance requirements of these systems are typically high and effectiveness is limited by the sulphate and calcium concentration.

   b. Slurry Precipitation and Recycle Reverse Osmosis (SPARRO) is a modified form of Reverse Osmosis treatment and is effective in areas with high sulphate. Costs associated with these treatment systems are typically high.

c. Electrical Dialysis Reversal is similar to other membrane technologies, however sulphate is not effectively removed in this process

Limitations:

With all the membrane technologies, like the chemical treatment and precipitation, there are significant limitations in the application to the in-stream environment and would require physical extraction of all water within the stream for treatment at a central location. These treatment technologies also require extensive design and construction periods which exceed the timeframes permitted for this project.

3. Ion Exchange

GYP-CIX is an ion-exchange technology that is used to remove major ions from water. It is effective in the removal of dissolved sulphate, particularly where the feed water is close to saturation with gypsum. Modifications to this process have also been attempted with strong results, however several limitation with this technology exist.

Limitations:

With all the ion exchange technologies, there are significant limitations in the application to the in-stream environment and would require physical extraction of all water within the stream for treatment at a central location. These treatment technologies also require extensive design and construction periods which exceed the timeframes permitted for this project.

4. Biological Sulphate Removal

Biological sulphate removal systems generate energy for metabolic activity through microbes which transfer of electrons from electron-rich (reduced) substrates (e.g. organic matter) to electron-deficient (oxidized) species (e.g. sulphate). The process relies on the microbial use of sulphate as an oxidant and its subsequent reduction to hydrogen sulphide (HS -).

a. Bioreactors are a constructed treatment system designed to establish sulphate reducing cultures through anaerobic and aerobic stages. These systems are generally cost effective, however are not mobile or well suited to remote locations. This technology would require physical extraction of all water within the stream for treatment at a central location.

b. Constructed Wetland Treatment can be built in various designs, however successive alkalinity-producing systems (SAPS) are generally best suited to sulphate reduction. Two main types of SAPS include:

i. Anoxic limestone drains (ALD) consist of submerged beds of limestone sealed beneath a cap to limit ingress of oxygen. Feedwater passes through the bed with residence times of 1-2 days to facilitate the removal of sulphate.

ii. Vertical-flow systems (VFS) consist of a freestanding body of water overlying an soil capped organic substrate and limestone bed. Drainage pipes beneath the wetland encourage downward flows, with a residence time between 4hrs and 4 days.

c. Permeable Reactive Barriers are a reactive zone, traditionally installed within an aquifer and created through the addition of "reactive" material (eg $CaCO_3$) designed to interact with the contaminants as they pass through the barrier. The contaminants are either immobilized or degraded by the chemical reactions with the reactive elements of the barrier.

Based on the above review, the recommended treatment option recommended is the construction of a Vertical flow wetland in the middle reaches of Inca Creek (off stream).

#	Task	Progress/ Timeframe:	Complete by:
1.	Assess stream/ponds for size, location and access. Collect samples for pH and Metals (dissolved) along with water quality physical parameters.	90%	10 April 2009
2.	Analytical testing of the samples	50%	17 April 2009
3.	Location of wetland and survey	1 week	14 April 2009
4.	Cultural heritage clearance	2 weeks	4 May 2009
5.	Excavation and importation of organic matter and limestone	3 weeks	25 May 2009
6.	Construction of wetland system including monitoring points.	2 weeks	1 June 2009
7.	Commence pumping water from the raw water ponds.	4 weeks	29 June 2009
8.	Planting of vegetation, installation of monitoring probes and inoculation of vertical flow system.	1 week	6 July 2009
9.	Commence pumping water from the sediment dams.	4 weeks	27 July 2009
10.	Collection of validation samples along the stream	2 weeks	10 August 2009
11.	Collection of water samples for monitoring purposes once each 2nd second month until the end of the 2009/2010 wet season.	Ongoing	March/April 2010

2.2 Methodology

2.2.1 Wetland Construction

The wetland will be constructed offline from Inca Creek, at a location where a small spillway and low flow diversion into the spillway can be constructed to intercept flows of up to 20L/s. The wetland area will be excavated and base compacted prior to the installation of walls and treatment materials. Monitoring points will be installed throughout the wetland to monitor electrical conductivity and by inference sulphate concentrations.

Appropriate vegetation suitable for the area will be utilised to ensure that the wetland is suitable for long term operation.

2.2.2 Wetland Operation

In order to maintain flow through the wetland it is proposed that residual water that meets the Environmental Authority requirements is pumped into the tributary of Saga Creek at a rate of approximately 1.5ML per day. It is anticipated that up to 100ML would be fed into the creek system to generate flows through the wetland at between 5 and 10L/s. This flow is anticipated to mobilise any untreated metals, pH and both dissolved and soluble sulphate and transport to the wetland system for treatment. Regular monitoring will be undertaken both across the wetland system, including inflow and outflow, and 50m downstream of the wetland outlet.

Closure

We trust that this report provides appropriate information to satisfy the EPA's requirements.

If you have any questions regarding the works and results documented above, please contact either of the undersigned on 07 3854 6302 or Brian Fainton on 07 3854 6616.

Yours Sincerely

s.49 - Signature

Matthew Jeffs
Senior Environmental Engineer
Parsons Brinckerhoff Australia Pty Limited

s.49 - Signature

Brian Fainton
Senior Environmental Scientist
Parsons Brinckerhoff Australia Pty Limited

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9 April 2009

Mr Rob Lawrence
Director
Department of Environment and Resource Management
Mount Isa House
Corner Camooweal and Mary Street
MOUNT ISA QLD 4825

Dear Rob,

Environmental Protection Order – Lady Annie Mine

Parsons Brinckerhoff (PB) on behalf of Deloitte Touche Tohmatsu, for the companies associated with Lady Annie Operations Pty Ltd (Voluntary Administrators Appointed) (Receivers and Managers Appointed), provide this report outlining the measures taken and/ or proposed to be taken in order to comply with the requirements of the Environmental Protection Order (EPO) as issued on Friday 20th March 2009, and subsequently re-issued on Monday 30th March 2009.

1. Introduction

PB was engaged by Freehills, on behalf of the Receivers and Managers Appointed, on Friday 27 February 2009. PB's role is to manage the sites compliance with the EPO and verify works undertaken on-site.

Representatives from PB's Brisbane site were Mr Matthew Jeffs, Senior Environmental Engineer and approved Department of Environmental and Resource Management (formerly Environmental Protection Agency) "suitable qualified person", and Mr Brian Fainton, Senior Environmental Scientist.

The following is an account of the works undertaken to date and measures proposed to ensure compliance with the EPO issued on Monday 30th March 2009. It should be noted that the following outlines the mitigation measures planned to date, which may be subject to change following further review, design and feasibility of options. PB would be please to discuss the approach and any questions the DERM may have as per the details listed at the end of this report.

2. Environmental Protection Order

The following items form the basis of the EPO, which was finalised on 30th March 2009.

1	As soon as possible, and by no later than 5.00 pm (AEST) on Friday 22 April 2009, for those sections of Inca Creek and Saga Creek which exceed the ANZECC 2000 water quality guidelines for livestock drinking water quality, in consultation with the landowner, implement measures to prevent access by all livestock and minimise access by fauna.
2	Subject to obtaining approval for access from affected landowners, as soon as possible, and by no later than 5.00 pm (AEST) on Friday 1 May 2009, treat all on-stream farm dams and sections of Saga and Inca Creeks, which have been affected by the discharge of contaminated waters from the mine site in January and February 2009, to achieve as a minimum for metals and pH, either: a. ANZECC 2000 trigger levels for the protection of freshwater aquatic ecosystems (at the 95% level); or b. reference values.
3	As soon as possible, and by no later than 5.00 pm (AEST) on Thursday 9 April 2009 identify practical options for treatment of all on-stream farm dams and sections of Saga and Inca Creeks, which have been affected by the discharge of contaminated waters from the mine site in January and February 2009, to achieve as a minimum for sulphate either ANZECC 2000 trigger levels for the protection of freshwater aquatic ecosystems (at the 95% level) or reference values. These options must: a. Be provided to the administering authority and a preferred remediation option nominated for each area identified including the remediation standard. b. Provide a map of the areas assessed and showing any contamination identified. c. Where an area has been impacted and no remediation is proposed provide justification for that proposal and identify the effect this will have on the impacted environmental values. d. Include a proposed schedule of remediation works.
4	Treatment undertaken in Requirements 1-3 must not result in contamination or environmental harm to the receiving environment.
5	Treatment undertaken in Requirements 1-3 must ensure that water quality in the Buckley River directly downstream of the confluence with Inca Creek meets as a minimum, either a. ANZECC 2000 trigger levels for the protection of freshwater aquatic ecosystems (at the 95% level); or b. reference values.

6	As soon as possible, and by no later than 5.00 pm (AEST) on Friday 8 May 2009, assess the impact of the discharges of contaminated waters from the mine site in January and February 2009 on the environmental values of the receiving environment. The investigation must: a. Define the geographic extent of impacts b. Include identification of the environmental values c. Be in accordance with the ANZECC 2000 methodology and AUSRIVAS methodology. d. Include assessments on the impacts on: i. Water quality for surface and groundwaters; ii. Sediment quality; iii. Soils; and iv. Flora and fauna. e. Include a comparison and review of previous relevant studies undertaken. f. Include relevant reference sites.
7	As soon as possible, and by no later than 5.00 pm (AEST) on Friday 15 May 2009 identify practical options for remediation of any areas of contamination of ground water and land (including sediments) resulting from the January and February 2009 releases of contaminants from the mine site. These options must: a. Be provided to the administering authority and a preferred remediation option nominated for each area identified including the remediation standard. b. Provide a map of the areas assessed and showing any contamination identified. c. Where an area has been impacted and no remediation is proposed provide justification for that proposal and identify the effect this will have on the impacted environmental values. d. Include a proposed schedule of remediation works.

8	Develop a long term monitoring program by no later than 5.00 pm (AEST) on Friday 21 May 2009, to assess the recovery of the impacted environment identified under item 6. The program must include: a. sufficient spatial and temporal replication (including controls) to enable statistically valid conclusions to be made concerning any impacts of the release on receiving environment; and b. physical, chemical and biological assessment of sediment, water and habitat quality; and c. properly defined and accessible sampling locations which have regard to water use by downstream land owners; and d. consistent sample procedure and analysis; and e. a consistent range of analytes including dissolved and total metals at each location; and f. proper quality assurance procedures; and g. a timeframe for provision of reports regarding the recovery of the impacted environment to the Environmental Protection Agency; and h. Identification responsibilities and timeframes for each action
9	By no later than 5.00 pm (AEST) on Tuesday 9 April 2009, provide a report to the administering authority outlining the measures taken and/ or proposed to be taken in order to comply with the requirements of this Notice.
10	By no later than 5.00 pm (AEST) on Tuesday 30 June 2009, provide a report to the administering authority, from suitably qualified person certifying that Saga and Inca creeks have been decontaminated and rehabilitated.
11	For the receiving environment that has been affected by the discharge of contaminated waters from the mine site in January and February 2009, obtain prior permission from the respective landholders of those places, for entry to those places for the purpose of: o Inspecting, examining, measuring, testing photographing or filming o Taking samples o Recording, measuring testing or analysing things o Remediation works.

3. Item 1 Requirements

As soon as possible, and by no later than 5.00 pm (AEST) on Friday 22 April 2009, for those sections of Inca Creek and Saga Creek which exceed the ANZECC 2000 water quality guidelines for livestock drinking water quality, in consultation with the landowner, implement measures to prevent access by all livestock and minimise access by fauna.

3.1 Status/Plan

In order to meet the requirements of Item 1, Mr Gary Doran of Deloitte Touche Tohmatsu (Deloitte) and Mr Brian Fainton of PB visited each of the landowners on 2nd and 3rd April 2009 to commence

discussions. Based on these discussions specific areas have been identified to be fenced to restrict cattle movements. Discussions to arrange for these works to be carried out are in progress with landholders.

Works to minimise access to fauna is currently being assessed by FRC Environmental. It is anticipated that remedial works will be well underway prior to the installation of appropriate measures to minimise access, and therefore is not likely to be feasible.

#	Task	Timeframe:	Week ending
1.	Initial discussions with Land owners	-	27 March 2009
2.	Identification of areas to be fenced and methods	-	3 April 2009
3.	Review of appropriate contractors and consultation with traditional land owners.	-	10 April 2009
4.	Award Contracts to undertake works and ordering of appropriate fencing supplies.	-	17 April 2009
5.	Complete fencing.	~2 weeks	24 April 2009

4. Item 2 Requirements

Subject to obtaining approval for access from affected landowners, as soon as possible, and by no later than 5.00 pm (AEST) on Friday 1 May 2009, treat all on-stream farm dams and sections of Saga and Inca Creeks, which have been affected by the discharge of contaminated waters from the mine site in January and February 2009, to achieve as a minimum for metals and pH, either:

- ANZECC 2000 trigger levels for the protection of freshwater aquatic ecosystems (at the 95% level).
- Reference values.

4.1 Status/Plan

In order to meet the requirements of Item 2, PB and FRC Environmental travelled along Inca and Saga Creeks between Friday 27th March and Thursday 9th April 2009 to undertake the following tasks:

- Review of ecological status.
- Collection of sediment and water samples.
- Identification of ponds and volume estimation.

Based on the information collected from these investigations, a review has been undertaken to identify the most effective remedial strategies that are available which are subject to the following limitations:

- Treatments must not cause environmental harm downstream.
- Treatment must be rapid and able to be completed within or close to the timelines provided within the EPO.

- Treatment must be mobile enough to facilitate off-road access or alternative transport mechanism (eg pump, or flushing of water downstream).

Treatment options include the following:

1. Active Treatments are based on the principle that heavy metals are insoluble in alkaline conditions. By increasing the pH to 9.5, metals such as iron (Fe), zinc (Zn), and copper (Cu) are precipitated. Other metals such as nickel (Ni) and cadmium (Cd) require a higher pH, in the range of 10.5 to 11 to effectively precipitate the hydroxides. The precipitates principally for the sludge which required treatment or disposal at an alternate location.

   a. Limestone ($CaCO_3$) - limitation include:

      i. This treatment technology results in a concentrated metals laden sludge that is required to be treated.

      ii. Treated water requires pH to be reduced to within the neutral range.

      iii. Treatment infrastructure is generally not mobile and not suited to remote locations (i.e. discontinuous ponds).

      The application of this treatment method would be best applied through the use of open limestone channels; however the uncontrolled precipitates make this option unsuitable. Other alternatives include pumping of water bodies through limestone beds; however access and sludge's make these options unfeasible.

   b. Hydrated Lime (Ca(OH)2) - limitation include:

      i. This treatment technology results in large volumes (when compared to limestone) of metal laden sludge that is required to be treated.

      ii. Treated water requires pH to be reduced to within the neutral range.

      iii. Treatment infrastructure is generally not mobile and not suited to remote locations (i.e. discontinuous ponds).

      The application of this treatment method would be best applied through the use of a batch reactor; however the uncontrolled precipitates make this option unsuitable for all areas except large farm dams. Other alternatives include flushing water downstream, however, in the absence of large volumes of clean water on-site make these options unfeasible.

      Discussions with a number of suppliers have indicated that there are two options with these treatments:

         i. An in-situ treatment which includes extraction of water from the stream, mixing of lime slurry which is then applied to the ponds and finally sprayed into the pond to raise the pH. This method is less preferred than other treatment technologies.

         ii. An ex-situ treatment would include the construction of a lime saturator system with clarifier. This option is not mobile and not achievable prior to the commencement of the next wet season.

c. Soda Ash –Soda ash briquettes are effective for treating small acid mine drainage flows in remote areas. Major disadvantages are higher reagent cost (relative to limestone) and poor settling properties of the sludge.

Soda Ash is not considered appropriate for remedial purposes due to high costs and sludge's.

d. Caustic Soda liquid – Caustic soda is especially effective for treating low flows in remote locations and for treating acid mine drainage having a high manganese content. Major disadvantages are its high cost, dangers involved with handling the chemical, and poor sludge properties.

Caustic Soda liquid is not considered appropriate for remedial purposes due to manual handling issues, sludge's and costs.

e. Ammonia liquid (Anhydrous ammonia) - Effectively treats acid mine drainage where high ferrous iron and/or manganese content exists. However, ammonia is difficult and dangerous to use, and can affect biological conditions downstream from the mining operation. The possible off-site impacts are toxicity to fish and other aquatic life forms, eutrophication and nitrification. Fish species generally have low tolerance to un-ionized ammonia and toxicity levels can be affected by pH, temperature, dissolved oxygen and other factors. Ammonia is not considered to be an appropriate remedial option.

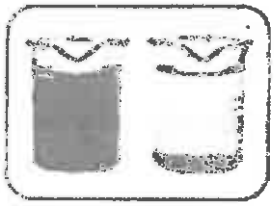
Ammonia liquid is not considered appropriate for remedial purposes due to manual handling issues, sludge's and potential downstream effects.

2. ViroMine Bauxsol Treatment

Treatment of pH and Metals via application of Bauxsol, which will increase the pH and both binds and precipitate metals. This is the preferred method of remediation as the technology has been proven to be effective, and on completion of the works the residual is a stable bio-unavailable sediment between 1 and 3 mm depth. At the initial application, the treated ponds/stream will appear red brown in colour, however after a period of approximately 2 hours, the Bauxsol will settle to the base of the stream along with the bound metals. It should be noted that the product is not soluble and has long term benefits such as the ability to bind metals after the treatment of the ponds are complete (IE surplus metal binding capacity). Further detail regarding this product is attached to this letter report.

Limitations of this technology is that the residual sediments remain in-situ and can be stirred up during periods of high flow in a similar manner to that of the natural sediments at the base of the stream. This has the potential to increase turbidity downstream, however, it should be noted that dispersive soils in the region are likely to contain similar bound concentrations of metals and

The following extract from ViroMine demonstrates the water clarity before and after treatment.



Acid Rock Drainage before and after ViroMine™ Technology treatment.

Limitations:

a. Treatment does not deal with sulphates

b. Requires access to most ponds along the stream to work effectively.

3. Passive Treatments

a. Constructed Wetland Treatment can be built in various designs, however successive alkalinity-producing systems (SAPS) are generally best suited to dealing with Acid Mine Drainage. Two main types of SAPS include Anoxic Limestone Drains (ALD) and Vertical Flow Systems (VFS). A spectrum of bacteria and archaea, in consortium with wetland plants, may be used to filter out heavy metals and raise pH. Anaerobic bacteria in particular are known to be capable of reverting sulfate ions into sulfide ions. These sulfide ions can then bind with heavy metal ions, precipitating heavy metals out of solution and effectively reversing the entire process. Limitations associated with these wetlands include:

i. It takes much time to completely cleanse an area (passive treatment).

ii. Are not capable of dealing with extensively polluted discharge.

iii. Wetland effluent often requires additional treatment to completely stabilize pH.

Anoxic limestone drains (ALD) consist of submerged beds of limestone sealed beneath a cap to limit ingress of oxygen. Feedwater passes through the bed with residence times of 1-2 days to facilitate the removal of sulphate.

Vertical-flow systems (VFS) consist of a freestanding body of water overlying a soil capped organic substrate and limestone bed. Drainage pipes beneath the wetland encourage downward flows, with a residence time between 4hrs and 4 days.

Based on the above review, the adopted treatment will include the application of Bauxsol from a land based All Terrain Vehicle. Areas of limited access will be assessed based on the location and downstream areas over treated to compensate for these impacts.

#	Task	Progress/ Timeframe:	Complete by:
1.	Assess stream/ponds for size, location and access. Collect samples for pH and Metals (dissolved) along with water quality physical parameters.	90%	10th April 2009
2.	Undertake laboratory trials of water treatment with various concentrations of Bauxsol reagent.	50%	10th April 2009
3.	Cultural Heritage Surveys	In negotiations	Awaiting feedback
4.	Place orders for Bauxsol and arrange delivery to the site.	TBC	24th April 2009
5.	Place orders for specialist equipment and delivery	TBC	24th April 2009
6.	Commence treatment of stream	TBC	1st May 2009
7.	Undertake validation monitoring	Periodically until the end of the 2009/2010 wet season.	

4.2 Methodology

4.2.1 Application of Bauxsol

The treatment of the water within the stream is likely to involve the mixing of a powder based Bauxsol compound into a wet slurry before being sprayed across the surface of the ponds at a rate of approximately 1-3g/L. Once in the ponds, the compounds increase the pH of the water and permanently bind heavy metals in the process.

Over a period of 2-3hours, the Bauxsol will settle out of the stream, forming a thin (1-3mm), non-toxic, stable sediment, which behaves the same manner as other fine sediments within the stream.

During the treatment process, the water will be monitored using field pH meters to ensure that the pH corrections are achieved and samples collected 24hrs post treatment to confirm the metals content has reduced to acceptable levels. Analysis of samples will be undertaken on-site to provide an indicative analysis of concentrations prior to the collection of validation samples.

4.2.2 Validation of remedial works

Validation samples will be collected one week following the completion of the water treatment activities. Samples will be collected in general accordance with the following:

- National Environmental Protection (Contaminated Land) Measures (NEPM), 1999.
- Queensland Environmental Protection Agency, May 1998, Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland.

- Australian Standard AS4482. 1-2005 Guide to Sampling and Investigation of Potentially Contaminated Soil – Part 1: Non-volatile and Semi-volatile compounds.

For the purpose of assessing surface water contaminant levels, the criteria outlined in the following documents will be used:

- ANZECC (2000) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* – Trigger values for freshwater species with a 95% level of protection.

Where no criteria are present for analytes in the above criteria, the following criteria have been adopted:

- Netherlands Ministry of Housing, Spatial Planning and Environment (2000) *Circular on Target Values and Intervention Values for Soil Remediation* – Dutch Intervention Levels.

All data will be collected using calibrated instruments for field data collection purposes, while all analyses will be undertaken at NATA accredited laboratories. PB's sampling procedures and protocols will be followed for all works to ensure consistent and accurate results are achieved, under the supervision/direction of a suitable qualified person.

5. Item 3 Requirements

As soon as possible, and by no later than 5.00 pm (AEST) on Thursday 9 April 2009 identify practical options for treatment of all on-stream farm dams and sections of Saga and Inca Creeks, which have been affected by the discharge of contaminated waters from the mine site in January and February 2009, to achieve as a minimum for sulphate either ANZECC 2000 trigger levels for the protection of freshwater aquatic ecosystems (at the 95% level) or reference values. These options must:

- Be provided to the administering authority and a preferred remediation option nominated for each area identified including the remediation standard.
- Provide a map of the areas assessed and showing any contamination identified.
- Where an area has been impacted and no remediation is proposed provide justification for that proposal and identify the effect this will have on the impacted environmental values.
- Include a proposed schedule of remediation works.

5.1 Status/Plan

A report will be provided separate to this letter to fulfil the requirements of this item.

6. Item 4 Requirements

Treatment undertaken in Requirements 1-3 must not result in contamination or environmental harm to the receiving environment.

6.1 Status/Plan

The Environmental Protection ACT *1994* defines "Environmental harm" as any adverse effect, or potential adverse effect on an environmental value, and includes environmental nuisance. An Environmental Value is defined as:

- Quality or physical characteristic of the environment that is conducive to ecological health or public amenity or safety.
- Another quality of the environment identified and declared to be an environmental value under an environmental protection policy or regulation.

The *Environmental Protection (Water) Policy 1997* further defines Environmental Values as:

- The biological integrity of an aquatic ecosystem that is affected adversely to a relatively small but measurable degree by human activity.
- Suitability for—
  - i. primary recreational use.
  - ii. secondary recreational use.
  - iii. visual recreational use.
- Suitable for minimal treatment before supply as drinking water.
- Suitable for agricultural use and industrial use.
- The cultural and spiritual values of the water.

Based on the above definitions it is understood that the environmental values that must be protected include, but are not limited to the following:

- The biological integrity of the aquatic ecosystem, including fauna and flora that relies on the ecosystem within the Saga and Inca Creeks, and within the Buckley River. It should be noted that this event is likely to have impacted on fauna and flora, and consequently the levels of protection are reduced currently, but is expected to increase as the area is rehabilitated.
- Suitable for primary, secondary and visual recreational use, including direct contact with water within the stream, by meeting the "Guidelines for recreational water quality and aesthetics" as presented in the Australian Water Quality Guidelines for Fresh and Marine Waters (ANZECC 2000).
- Suitable for minimal treatment before supply as drinking water, by meeting typical reference values or Water Quality Guidelines as described in the Australian Water Quality Guidelines for Fresh and Marine Waters (ANZECC 2000) as being for 95% species protection in freshwater ecosystems.
- Suitable for agricultural use and industrial use, by meeting Livestock Drinking Water Quality Guidelines as presented in the Australian Water Quality Guidelines for Fresh and Marine Waters (ANZECC 2000).

- The cultural and spiritual values of the water, where indigenous communities have sacred or sites of cultural significance by meeting the "Guidelines for recreational water quality and aesthetics" as presented in the Australian Water Quality Guidelines for Fresh and Marine Waters (ANZECC 2000).

A review of the water quality results obtained to date confirm that water impacts are predominately:

- pH and acidity – derived from the use of acids (H_2SO_4) on site for processing activities.
- Heavy metals – derived from:
  - on-site operations through contaminated discharge
  - off-site sediments mobilising metals due to low pH.
- Sulphate – derived from the use of sulphuric acid (H_2SO_4) on site for processing activities.

In order to protect the environmental values, a number of measures are proposed:

Firstly, in stream monitoring is proposed to be installed in the form of a multi parameter probe, fitted with logging and remote telemetry capability (subject to availability of communications to these areas). This setup will be installed in two locations, the first approximately 300m upstream of the Buckley River/Inca Creek confluence, and the second within the middle reaches of Inca Creek. The probes will incorporate alarms to notify PB of any exceedance in pH or Electrical Conductivity (sulphate by inference).

In addition to these probes, physical parameters will be collected on a monthly basis from approximately 15 sample points along the Inca Creek and Saga Creeks, and the Buckley River/Inca Creek confluence. These same locations will also be sampled every second month for a selected suite of analytes, until the end of the 2009/2010 wet season, or remediation is confirmed to be complete (which ever occurs latest).

Specifically in relation to Item 1, fences will be erected to minimise access by livestock and fauna (where practical, and agreed with landowners). Fences will be constructed using steel pickets and barbwire as is conventionally used in these areas. The fence lines may require light clearing works to be undertaken, however these works are not anticipated to be extensive, and if ground clearance is likely to result in the potential for erosion or loss of sediment, appropriate controls will be put in place.

Remediation proposed under Item 2 is a ViroMine technology. Application of this technology is likely to cause turbidity within the treated areas for approximately 2-3 hours before settling out of solution. The residual stable compound is likely to be stirred up again during turbulent flow, however it is anticipated that this will be similar to sediments that are already present at the base of the stream. Metals impacts will be rectified through the process and unable to cause downstream impacts due to the binding process. Sediment samples will be collected of both the residual from the treatment and natural sediments. Samples will then be submitted for a Toxicity Characteristic Leachate Procedure (TCLP) under acidic and neutral conditions to identify if leachable concentrations are likely to cause impacts downstream to any of the environmental values.

A paper presented by the School of Environmental Science and Management, Southern Cross University, Lismore, Australia, entitled "*Bioaccumulation of metals in Eisenia fetida after exposure to a*

metal-loaded bauxsol reagent", was published in "Environmental toxicology and chemistry" (2005 Mar;24(3):554-63). The following is an extract that demonstrates stability of the treatment residue:

> *The present study investigated the acute toxic effects of a metal-loaded Bauxsol reagent (MLBR), containing more than 6,450 mg kg(-1) of bound metal, on the earthworm Eisenia fetida. Bauxsol is manufactured by Virotec Global Solutions of Gold Coast, Queensland, Australia. The E. fetida were exposed to 0, 10, 20, 40, 60, and 80% treatments of MLBR plus cow manure for 28 d. Good motility and no mortality of E. fetida were found in all treatments after 28 d of exposure. The greatest bioaccumulation of metals by E. fetida occurred in the 20 and 40% MLBR treatments. The bioaccumulation of metals in the worms and bioaccumulation factors (BAFs) were less than the reported toxicity thresholds to cause mortality and less than the reported BAF for moderately contaminated soils, indicating that metals bound to Bauxsol reagents are mostly non-bioavailable. Analyses of the 20% MLBR treatment at 28 d using a sequential extraction procedure showed that more than 95% of the metals are bound within the Fe/Mn oxide fractions. However, changes occurred in metal fractionation after exposure to E. fetida for Cd/Cr, and Fe/Mn. The data also showed that the exchangeable (1 M MgCl2) and the toxicity characteristic leaching procedure extractant are useful as indicators of metal bioavailability from MLBR to E. fetida.*

In addition to the above two document describing this treatment method are attaché to the end of this letter report. One of the document discuses the stability of this product.

Sulphate treatment is proposed to be undertaken with a wetland vertical flow system, whilst this is not anticipated to cause any downstream effects, it is anticipated that excess alkalinity will be generated by the system after a short period of time. Monitoring of the wetland will be undertaken with the use of data logging EC meters, fitted strategically throughout the wetland system to monitor effectiveness.

#	Task	Timeframe:	Week ending
1.	Assess feasibility and options for remote sensors	1 week	17th April 2009
2.	Design and construction of sensor system	1 week	24th April 2009
3.	Water Sampling – Physical parameters	1 week	Every month
4.	Water Sampling – Analytical testing	1 week	Every second month
5.	TCLP testing – to be undertaken as part of the remediation process.	TBC	TBC

7. Item 5 Requirements

Treatment undertaken in Requirements 1-3 must ensure that water quality in the Buckley River directly downstream of the confluence with Inca Creek meets as a minimum, either

- ANZECC 2000 trigger levels for the protection of freshwater aquatic ecosystems (at the 95% level).
- Reference values.

7.1 Status/Plan

Refer to Item 4 (section 6.) above.

In the event that contamination in excess of the guidelines is detected at the confluence of the Buckley River and Inca Creek, a dam will be constructed approximately 100m south of Flora Downs Bore (#2) and upstream of the confluence. Once the dam has been constructed, a limestone drain diversion will be placed around the dam wall to facilitate treatment until such time as concentrations return to normal. On completion of the treatment, the wall and limestone will be removed, along with the surface layers of soil/sludge to ensure that all residual metals are removed and placed within an appropriate storage area prior to compaction and revegetation.

#	Task	Timeframe:	Week ending
1.	If required – construct dam	Within 24hrs	NA
2.	If required – construct limestone diversion drain	Within 24hrs –limestone to be sourced from SWP1&2 spillways until external delivery is arranged.	NA
3.	If required – undertake sampling	Weekly until after ANZECC 2000 trigger levels achieved	NA
4.	If required – excavation and capping of dam wall and limestone drain	Within 1 month from completion of Task 3.	NA
5.	Revegetation of capped material	Within 1 month from completion of Task 4.	NA

8. Item 6 Requirements

As soon as possible, and by no later than 5.00 pm (AEST) on Friday 8 May 2009, assess the impact of the discharges of contaminated waters from the mine site in January and February 2009 on the environmental values of the receiving environment. The investigation must:

- Define the geographic extent of impacts.
- Include identification of the environmental values.
- Be in accordance with the ANZECC 2000 methodology and AUSRIVAS methodology.
- Include assessments on the impacts on:
  - *i. Water quality for surface and groundwaters;*
  - *ii. Sediment quality;*
  - *iii. Soils; and*
  - *iv. Flora and fauna.*
- Include a comparison and review of previous relevant studies undertaken.
- Include relevant reference sites.

8.1 Status/Plan

In order to meet the requirements of Item 6, PB and FRC Environmental commenced an investigation to assess the impacts along Inca and Saga Creeks between Friday 27th March and Thursday 9th April 2009.

In order to assess the Geographical extent of the impacts, the following works have commenced and are on-going:

- Collection of water samples from along the stream and/or discrete pools for physical properties and chemical analysis.
- Collection of sediment samples above and below the water line for chemical analysis.
- Collection of water samples from available groundwater bores, where located within 500m from the areas of interest.

This information is currently being assessed and analysed in preparation for appropriate plans to be developed.

The identification of Environmental Values will be undertaken by FRC Environmental, who have provided the following:

> *We will review the available literature and other sources of data to provide a broad-based description of the aquatic habitats and floral and faunal communities of the permanent and ephemeral rivers, streams and wetlands of the study area. This will comprise searches of published literature, a search of aquatic vertebrates from the Commonwealth's Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) online Protected Matters Search Tool database, and an examination of data from the Queensland EPA's Wildlife Online database. Any mine-related EIS or monitoring reports will also be studied. This information will provide the study team with details of: endangered, rare or vulnerable (EVR) fauna species; ecologically significant habitat and communities; habitat and communities particularly sensitive to disturbance; and species and communities of scientific, educational, cultural and historical interest. We will also identify the likely occurrence and distribution of exotic and weed species.*
>
> *We will identify known distributions of EVR flora and fauna, critical habitat, and current and relevant international, Australian, State and local government policy, legislation and guidelines regarding aquatic ecology, and the implications of these for the project.*
>
> *We will also evaluate the reliability and relevance of information sources, and identify key knowledge gaps. This knowledge will flag potential key constraints and inform the need for focused field surveys.*
>
> *Recognised environmental values and ecosystem will be described.*

An Aquatic survey and sampling works are being undertaken by FRC Environmental, who proposed the following:

Our 'survey and sampling plan' will seek to cover the geographic extent of ecologically significant contamination and locate sites both in waterways and dams understood to have been impacted, but also in waterways and dams unlikely to have been impacted (control or comparative sites). We will be guided by the EPA's water quality monitoring program.

We will survey seven 'impact' sites (chosen from the EPA monitoring locations) and seven 'control' sites. Control sites will be primarily located along the Gregory Downs Camooweal Road and Barkly Highway. The number of nominated control sites recognises both the inherent variability of ephemeral waterways and the opportunity to optimise statistical power through a balanced design.

The scope of our survey and sampling work will include, but not be limited to the sampling of sediments (for laboratory analysis), AusRivAS physical habitat assessments, quantitative description of macrophyte communities, AusRivAS-based qualitative sampling of macroinvertebrates, quantitative sampling of macroinvertebrates (essential to support monitoring), and sampling of fishes, macro-crustaceans and turtles.

Sediment analyses

At each site, two sediment samples will be collected from the top 0.5 m of the sediment, for analysis of heavy metals by external laboratories.

AusRivAS physical assessment, water quality and macrophytes

We will collect data on the condition of the waterways using AusRivAS physical assessment protocols, and water quality parameters including turbidity, pH, dissolved oxygen, temperature and conductivity.

At each site, we will visually assess habitat using field data sheets from the Queensland AusRivAS Sampling and Processing Manual (DNRM 2001). We will describe and summarise the in-stream habitat condition at the time of survey, based on the AusRivAS protocol, including:

- *the type and condition of riparian vegetation*
- *habitats (pools, riffles, runs, etc)*
- *water depth, mean and max*
- *water velocity, mean and max*
- *substrate and the presence of bars*
- *the presence of snags (large woody debris), overhangs, undercuts, and other forms of shelter, and*
- *any physical barriers to fish passage.*

At each site, aquatic macrophytes would be surveyed over a 50 – 100 m reach. We will visually estimate the percent cover of floating, emergent and submerged macrophytes by species, noting exotic (and declared noxious) species.

We will assess the fisheries values of the area, and the likely presence of turtles and other aquatic vertebrates.

Macroinvertebrate survey and analysis

We will collect macroinvertebrate samples from available habitats (edge, macrophyte, riffle or pool/bed) at each site. Each replicate will be collected in accordance with AusRivAS protocols.

Laboratory analysis

Samples will be frozen and returned to frc environmental's Brisbane laboratory to be sorted; and invertebrates will be counted and identified to the lowest practical taxonomic level (in most instances family) to comply with methods described in Chessman (2003).

Calculation of indices

We will calculate a range of indices based on the data, to provide a rapid assessment of ecosystem health. We will calculate taxonomic richness, PET richness and Signal 2 scores for each of the samples collected. We will also include a rapid assessment of the presence/absence of different macroinvertebrate families that are indicative of good quality habitat, or habitat degradation, and compare the data collected to DNRM data sets for similar sites in the region.

Statistical analyses

Multivariate analyses will be used to provide information on the similarities in the entire community structure between locations. Analyses likely to be used include: ANOVA, ANOSIM, non-metric MDS (multidimensional scaling), and SIMPER.

Fish, macrocrustaceans and turtles

Fish fauna of the region is poorly described. Fish and macrocrustaceans (yabbies, shrimp and crabs) will be surveyed using a combination of electrofishing, seining and baited traps (not all methods will be used at all sites). The species present, the abundance of each species by life history stage (juvenile, intermediate, adult), and the apparent health of individuals will be recorded. Data will be analysed to determine species richness, abundance and the percentage of exotic fish at each site, and the life history stages will be discussed.

Turtles will be surveyed in accordance with current best practice and EPA protocols, using set custom-made (baited) turtle traps at each site, and also seine nets and snorkelling where appropriate. At each site, we will record the species present and the abundance of each species by life history stage (juvenile, intermediate, adult).

Riparian flora and fauna

The reported contamination of surface waters may result in morbidity or mortality of riparian flora. Consumption of contaminated aquatic fauna (or flora) by riparian fauna, may result in bio-accumulation of contaminants and consequent morbidity or mortality.

We will assess the health of riparian flora at the 7 impact and 7 control sites nominated above; and record the incidence of dead fauna.

Definition of the extent of impacts and assessment of nature of impacts

We will use ANOVA and non parametric statistics to compare habitat condition and floral and faunal community composition among sites in order to describe the geographic extent of impact and the nature of impact over that extent (likely to be a gradation). We will also draw on the review of relevant studies to discuss the potential and likely impacts, comparing this to what we have recorded on site.

Impacts to the water quality, sediment, soils and groundwater are being assessed against ANZECC 2000 guidelines. Samples have been collected and currently undergoing analysis.

Available literature and other sources of data will be reviewed from:

- Reports supplied by the DERM.
- Reports prepared for the site prior to commencing operations.
- Other reports and data from the Department of Natural Resources and other regulatory bodies.

9. Item 7 Requirements

As soon as possible, and by no later than 5.00 pm (AEST) on Friday 15 May 2009 identify practical options for remediation of any areas of contamination of ground water and land (including sediments) resulting from the January and February 2009 releases of contaminants from the mine site. These options must:

- Be provided to the administering authority and a preferred remediation option nominated for each area identified including the remediation standard.
- Provide a map of the areas assessed and showing any contamination identified.
- Where an area has been impacted and no remediation is proposed provide justification for that proposal and identify the effect this will have on the impacted environmental values.
- Include a proposed schedule of remediation works.

9.1 Status/Plan

In order to meet the requirements of Item 7, land, including sediments and groundwater are currently being assessed as per item 6.

In the event that groundwater is identified as potentially impacted, a program including the installation of groundwater monitoring wells will be commenced to determine the full extent of groundwater impacts. This information will then be utilised to determine an appropriate remedial and containment strategy.

Sediments are expected to contain some residual metals and sulphate concentrations which will be remediated as part of the stream remediation. The first treatment pass will include the use of Bauxsol to neutralise acidity and bind/precipitate metals. Over treatment of the ponds will result in excess binding and neutralising capacity remaining in the sediment, which due to –ve charges will attract any metals that are remobilised in the stream or in close proximity to the reagents. In addition to this, and metals mobilised in water within the stream from the upper reaches of the catchment will be flush through the constructed wetland which has the capacity to treat low metals concentrations. This process will occur during the treatment of sulphates. Downstream of the wetlands, water sampling within these streams will detect increases in metals concentrations and trigger the construction of a dam wall and limestone drain for treatment purposes.

10. Item 8 Requirements

Develop a long term monitoring program by no later than 5.00 pm (AEST) on Friday 21 May 2009, to assess the recovery of the impacted environment identified under item 6. The program must include:

- Sufficient spatial and temporal replication (including controls) to enable statistically valid conclusions to be made concerning any impacts of the release on receiving environment.
- Physical, chemical and biological assessment of sediment, water and habitat quality.
- Properly defined and accessible sampling locations which have regard to water use by downstream land owners.
- Consistent sample procedure and analysis.
- A consistent range of analytes including dissolved and total metals at each location.
- Proper quality assurance procedures.
- A timeframe for provision of reports regarding the recovery of the impacted environment to the Environmental Protection Agency.
- Identification responsibilities and timeframes for each action.

10.1 Status/Plan

A long term monitoring program will be implemented based on the findings of the investigations and success of the remedial programs. At this stage monitoring is expected to include the following, which will be re-assessed once assessments are completed:

- Ecological/habitat monitoring every second month until the end of the 2009/2010 wet season.
- Physical assessment of water quality on a monthly basis until the end of the 2009/2010 wet season.
- Chemical and biological assessment of sediment, water and habitat quality; every second month until the end of the 2009/2010 wet season.

Reports will be provided to the DERM on a quarterly basis to provide on-going updates on progress, with a final report provided at the end of the project.

11. Item 9 Requirements

By no later than 5.00 pm (AEST) on Tuesday 9 April 2009, provide a report to the administering authority outlining the measures taken and/ or proposed to be taken in order to comply with the requirements of this Notice.

11.1 Status/Plan

This report forms the basis of this EPO Requirement.

12. Item 10 Requirements

By no later than 5.00 pm (AEST) on Tuesday 30 June 2009, provide a report to the administering authority, from suitably qualified person certifying that

12.1 Status/Plan

PB will provide a detailed report to the DERM on Tuesday 30 June 2009 providing confirmation that Saga and Inca creeks have been decontaminated and rehabilitated. In the event that works are continuing, an update report will be provided with estimated timeframes until completion is achieved.

13. Item 11 Requirements

For the receiving environment that has been affected by the discharge of contaminated waters from the mine site in January and February 2009, obtain prior permission from the respective landholders of those places, for entry to those places for the purpose of:

- Inspecting, examining, measuring, testing photographing or filming.
- Taking samples.
- Recording, measuring testing or analysing things.
- Remediation works.

13.1 Status/Plan

PB has met with the landholders to seek permission to access landholders' properties, this will continue for the duration of the project. In addition to this, the native title holders have been consulted and negotiations are on-going.

14. Closure

We trust that this report provides appropriate information to satisfy the EPA's requirements.

If you have any questions regarding the works and results documented above, please contact either of the undersigned on 07 3854 6302 or Brian Fainton on 07 3854 6616.

Yours Sincerely

s.49 - Signature

Matthew Jeffs
Senior Environmental Engineer
Parsons Brinckerhoff Australia Pty Limited

s.49 - Signature

Brian Fainton
Senior Environmental Scientist
Parsons Brinckerhoff Australia Pty Limited

513/2

Prepared by:	Oskar Kadletz Manager, Mining Industry Liaison Unit Statewide Services Northern Region 4760 7409 Date: 9/06/09
Submitted through:	Luke Croton Regional Director Statewide Services Northern Region 4760 7434 Date: 10/06/09
Cleared by:	Dermot Tiernan A/Executive Director Statewide Services Tel: 322 78380 Date: 12/06/09
Cleared by:	Alan Millis Deputy Director-General Policy and Operations Tel: 322 42191 Date: 13/6/09
MO clearance:	22/6 SLD Date:

BF completed 25/6

BETTY KIERNAN MP

Working for the Outback

74 Camooweal Street / PO Box 2332
Mount Isa Qld 4825
Ph: (07) 4743 5149 1800 618 824 Fax: (07) 4743 3386

Cloncurry Electorate Office:
Unit 1/27 Ramsay Street, Cloncurry Qld 4824
Ph: (07) 4742 2530 1800 801 569 Fax: (07) 4742 2524

Tuesday, 26 May 2009

Hon Stephen Robertson MP
Minister for Natural Resources, Mines & Energy and
Minister for Trade
PO Box 15216
CITY EAST QLD 4002

Regarding Mine Overflows - North West 2009 Floods

Dear Minister

There is little doubt that a great deal of past mining practices have impacted severely on the environment and industry during the 2009 floods.

While appropriately a whole of government approach has now been taken during this current period to clean up the worst and immediate damage to waterways involving your department the EPA and that DPI are assisting landholders, there is clearly a need for guidelines to be stringently assessed to ensure that new mines and indeed current operating mines are risk assessed for prevention of such incidents in the future.

Mining along with the pastoral industry is our life blood and while I cannot redress the past I can however expect that on my watch we develop clear guidelines and safety measures involving communication, adequate bonds and ensure that Miners cannot walk away and leave mines unstable and indeed at risk to our environment or pastoral concerns.

I look forward to working with you into the future.

Kind regards

s.49 - Signature

BETTY KIERNAN MP
Member for Mount Isa

cc Premier of Queensland

563/3

DocTrak Response Document

No Further Action / Other Action

Completed 9/7

Explanation of why no further action is needed, or alternative action:

- Please finalise MC4032 as it is a duplicate of MC3930 (ME/09/1528) which has already been responded to and letters signed and sent by the Minister's Office.

Name:	Angela Schulz
Position:	Executive Assistant
Telephone:	3224 2636
Date:	29/06/09
DocTrak ID Number:	MC4032
Minister's Office Reference No:	ME/09/1662
File Number:	

E-MAILED 29.6.09

DLO FOR APPROVAL

s.49 - Signature

NW MINE FLOODING

approved by DLO √Done

s.49 - Signature

MC4032

Office of the Premier

ME/09/1662

RECEIVED
19 JUN 2009
JD
22 6 09

RECEIVED
23 JUN 2009
BNE CORRO

Executive Building
100 George Street Brisbane
PO Box 15185 City East
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Telephone +61 7 3224 4500
Facsimile +61 7 3221 3631
Email ThePremier@premiers.qld.gov.au
Website www.thepremier.qld.gov.au

Please quote: MCU
TF/09/15301

17 JUN 2009

Ms Betty Kiernan MP
Member for Mt Isa
PO Box 2332
MOUNT ISA QLD 4825

Dear Ms Kiernan

Thank you for forwarding the Premier a copy of your letter of 26 May 2009 addressed to the Honourable Stephen Robertson MP, Minister for Natural Resources, Mines and Energy and Minister for Trade concerning mine overflows and the north west 2009 floods. I have been requested to reply to you on the Premier's behalf.

The contents of your letter have been noted.

Please be assured that Minister Robertson will give your concerns his full consideration.

Again, thank you for bringing this matter to the Premier's attention.

Yours sincerely

Nick Williams
Senior Policy Advisor

B/C The Honourable the Minister for Natural Resources, Mines and Energy and Minister for Trade

By direction. For your information and direct reply, please. Copy of inwards correspondence is attached.

s.49 - Signature

Nick Williams
Senior Policy Advisor

Queensland Government

BETTY KIERNAN MP
Working for the Outback

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Tuesday, 26 May 2009

Tomorrow's Queensland

Hon Stephen Robertson MP
Minister for Natural Resources, Mines & Energy and
Minister for Trade
PO Box 15216
CITY EAST QLD 4002

Regarding Mine Overflows - North West 2009 Floods

Dear Minister

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I look forward to working with you into the future.

Kind regards

s.49 - Signature

BETTY KIERNAN MP
Member for Mount Isa

cc Premier of Queensland

563/4

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NCSI Certified Quality System ISO 9001

3225 8484

Our reference: 2136669C-LTR008Amj
EPA Reference: ISA658

1 May 2009

Mr Rob Lawrence
Director
Department of Environment and Resource Management
C:\ Mount Isa House
Corner Camooweal and Mary Street
MOUNT ISA QLD 4825

Dear Rob,

Environmental Protection Order – Lady Annie Mine

Parsons Brinckerhoff (PB) on behalf of Deloitte Touche Tohmatsu, Receivers and Managers for the companies associated with the Lady Annie Mine, provide this report outlining the methodology regarding the remediation of downstream impacts in order to comply with the requirements of Item 2 of the Environmental Protection Order (EPO) issued on Monday 30th March 2009.

1. Introduction

PB was engaged by Freehills, on behalf of Deloitte Touche Tohmatsu, Receivers and Managers for CopperCo Limited (Lady Annie Operations) on Friday 27 February 2009. PB's role is to manage the sites compliance with the EPO and verify works undertaken on-site.

On 9th April 2009, PB issued a report to the then Environmental Protection Agency (reference 2136669C-Ltr003Amj) outlining the measures proposed to be taken in order to achieve compliance with the EPO issued on 30th March 2009. Subsequent to this report, a response was issued on 17th April by the then Environmental Protection Agency (EPA). This response outlined reservations regarding PB's proposed approach (principally in-situ treatment utilising Bauxsol) to remediation of the Creeks.

On 24th April 2009 a meeting was held at PB's Brisbane offices attended by representatives of Deloitte Touche Tomatsu, PB, the Department of Environment and Resource Management (DERM), the Department of Employment Economic Development and Innovation (DEEDI) and Lady Annie Operations with the aim of expediting an agreed remediation strategy.

Outcome

Further to the former EPA's response to the proposed remedial treatment option, the DERM reinforced the requirement to prevent or minimise in-stream treatments in favour of ex-situ treatments that may have a lesser long-term potential impact on the receiving environment.

It was agreed by all parties that ex-situ treatment along the entire course of the Saga Creek Tributary, Saga Creek and Inca Creek would be impractical due to access and potential Cultural Heritage issues.

It was further agreed that a suitable remedial option may involve 'flushing' the creeks with freshwater (i.e. not contaminated). Treatment was proposed to be achieved by capturing the 'flush' waters in a series of existing (i.e. current farm dams) or purpose built dams, and subsequent treating with a suitable chemical in a batch style process.

It should be noted that the following outlines the remediation measures proposed to date, which may be subject to change following further review, design and feasibility of options. PB would be pleased to discuss the approach and any questions the DERM may have as per the details listed in this report.

2. Item 2 Requirements

Subject to obtaining approval for access from affected landowners, as soon as possible, and by no later than 5.00 pm (AEST) on Friday 1 May 2009, treat all on-stream farm dams and sections of Saga and Inca Creeks, which have been affected by the discharge of contaminated waters from the mine site in January and February 2009, to achieve as a minimum for metals and pH, either:

- ANZECC 2000 trigger levels for the protection of freshwater aquatic ecosystems (at the 95% level); or
- reference values.

2.1 Proposed strategy

Overview

It is intended to rehabilitate the contaminated creek by releasing a series of "slugs" of clean water from the mine site via the licensed discharge spillways, down the creek(s) and diverting them into a series of capture dams for treatment. Each "slug" must achieve a minimum velocity before entry to the dams so that the pollutants in the creek can be re-suspended. Although the pollutants were deposited during a flood event, it is not intended to replicate a flood event.

It is intended to repeat the release of the "slugs" and batch-style treatment of the dams until the concentration of pollutants in the creek is reduced to concentrations below the applicable criteria adopted. The number of slugs released, however, may be constrained by the volume of clean water that is available in storage at the site.

Further to the above, it was agreed that the following basic strategy be further researched with regard to feasibility:

1. Review areas for flows below the stream bed, assess quality and if necessary pump and monitor these flows.
2. Utilisation of clean water sourced from the Lady Annie Operations site at Mount Clarke to flush the impacted sections of the Saga Creek Tributary, Saga Creek and Inca Creek.
3. Capture of the flush water in a series of dams spaced along the course of the Creeks (approximately 4-6 dams in total).
4. Treatment of the captured water in-situ in each dam.
5. Release of the treated water back into the Creek system to further mobilise contaminants in downstream sections, to be captured in downstream dams.
6. Final flush of water to be captured prior to the confluence of the Inca Creek/Buckley River by a terminal dam.

Underground stream flows

A review of selected areas will be undertaken to determine the presence and extent of water flows beneath the stream bed within the sediments. The review will comprise the following steps:

1. Excavation of a series of small trenches to identify if water flows exist within the sediments beneath the stream bed.
2. Where present, a 150mm diameter piece of slotted pipe will be installed, such that these flows can be collected and pumped into the stream periodically before and after the treatment of the stream. Initially up to 50 slotted pipes will be installed at a rate of approximately 1 per kilometre.
3. During initial pumping pH and EC reading will be monitored to determine the level of contamination. Based on these levels, a program of pumping works will be established to coincide with the initial flushing of water downstream.
4. Monitoring of these locations will be included as part of the long term monitoring plan for the project.

Flush requirements and modelling

Available survey data and resources

Electronic survey data currently available includes 1 metre contours for a length of approximately 1.8 km along Saga Creek downstream of the stormwater ponds at the western side of the site. Beyond the 1 m contours, 5 metre contours have been traced from the 1:100 000 topographical map.

Radar reflection survey taken by the Space Shuttle is also available, however only in 90 m wide grids and hence is not accurate enough to provide a profile shape of a creek that is narrower than the grid. The radar survey is only accurate to +/- 5 metres in elevation, which is also not specific enough to determine a creek profile for the purposes of this analysis.

Operators of Lady Annie Mine processing site have a site surveyor who may be available to undertake manual ground surveys at particular locations on the creek that are within an accessible area and distance from the site, where requested.

Preliminary Hydraulic Analysis

A preliminary hydraulic analysis was undertaken with the available data to assess the attenuation of a proposed "slug" down the creek. This analysis did not include surveyed sections of the creek channel, which are expected to be completed within the next two weeks pending the availability of survey equipment and personnel.

The analysis comprised the release of the "slug" of water at the upstream end of the creek, which was then routed down the creek and monitored at various locations. The preliminary analysis assumes no losses into the creek bed, which may be significant, and a refinement of the analysis is required to ensure that the "slugs" are sufficiently large enough to overcome these losses. However, specific physical and geological information required for this assessment is not currently available.

The software used to undertake the preliminary attenuation calculations was XP-SWMM. The results are summarised in Table 1 below. The results report hat the bigger the slug, the further it carries downstream with an appreciable velocity.

Table 1 – Results of Preliminary Hydraulic Analysis

Storm Ref	Inflow (m3/s)	Inflow Duration (hrs)	Volume (ML)	Velocity (m/s) at Chainage						Time to Peak (Days)	Time to End (Days)
				0km L01	1.2km L04	6.4km L05	11.6km L06	27.3km L09	53.4km L13		
01-020	1	5.55	20	0.21	0.18	0.12	0.10	0.08	0.07	7.5	20
01-040	1	11.11	40	0.21	0.19	0.14	0.12	0.10	0.08	6.5	18
01-060	1	16.67	60	0.22	0.19	0.15	0.14	0.12	0.09	6.0	18
01-080	1	22.22	80	0.22	0.19	0.16	0.15	0.13	0.10	5.8	18
01-100	1	27.78	100	0.22	0.19	0.16	0.15	0.14	0.11	5.6	18
03-020	3	1.85	20	0.30	0.27	0.12	0.10	0.08	0.07	7.9	19
03-030	3	2.78	30	0.30	0.27	0.14	0.11	0.10	0.07	6.3	19
03-040	3	3.70	40	0.30	0.27	0.15	0.12	0.11	0.08	5.9	19
03-060	3	5.55	60	0.30	0.27	0.17	0.14	0.12	0.09	5.6	19
03-120	3	11.11	120	0.30	0.27	0.20	0.17	0.15	0.12	4.8	18
03-180	3	16.67	180	0.30	0.27	0.21	0.20	0.17	0.14	4.5	18
03-240	3	22.22	240	0.30	0.27	0.21	0.21	0.19	0.16	4.5	17
03-300	3	27.78	300	0.30	0.27	0.21	0.21	0.20	0.17	4.3	17

Note that Chainage 0km is located at Lady Annie Mine and Chainage 53.4 is located at Buckley River. The "time to peak" and "time to end" refer to the fully attenuated hydrograph at Buckley River with no capture dams, and they give an indication of how long it takes to collect the "slug" at the downstream end of the creek.

Table 1 demonstrates that the maximum velocities are low, and they diminish as the flood wave passes down the channel. Though a velocity of about 0.3 m/s can be achieved at Lady Annie Mine by the release of the "slug", this is reduced to 0.07-0.17 m/s at Buckley River.

Required Velocities

Published data focus on erosion velocities, and most empirical and theoretically derived data refer to granular soils and particle size. The velocities in Table 1 are safely below the ranges of velocities presented in most published information, which reduces the source information available. Ven Te Chow provides a velocity-particle size table in Fig 7-3, based on US and USSR data. This plot indicates that the velocities required to move particles of 0.01mm, 0.1mm and 1.0mm are 0.17m/s, 0.24m/s and 0.54 m/s respectively.

Proposed Setup

Based on the above information, it is likely that the desired layout would include releases of water at rate of 3m/s with a volume of 60ML. This would require the construction of 8 dams every 6.5km. Unfortunately the level of disturbance and limited access makes this unrealistic, and as such the following layout is proposed:

- installation of a 30ML dam on-site
- installation of a 20ML dam every 10-15km
- release of clean/treated water slugs up to 3kL/s
- maintenance and monitoring (including sampling and excavation) of dam sediments throughout the 2009/2010 wet season.

Whilst this arrangement will not scour soil particle larger than 0.01mm, it will achieve velocities around 0.11m/s and displace ponded contaminated water within the stream.

Clean water sources

Currently, clean water sources at the Lady Annie Mount Clarke site comprise the following:

- approximately 118ML within the Raw Water ponds
- approximately 20-40ML of stormwater runoff captured behind the Heap Leach Pads
- piped water from the Johnston Creek Borefield.

Additional water sources that may be utilised pending treatment include:

- water captured in the Mount Clarke East and West Pits and Flying Horse Pit – Approximately 376ML. Currently impacted with heavy metals
- water within Stormwater Ponds 1 and 2 – Approximately 576ML. Currently low pH and impacted with heavy metals and sulphates.

It is proposed that to achieve the velocities required in Table 2 above, an on-site dam with a 20ML capacity be created adjacent to the current Raw Water Pond, complete with active flood gate to allow rapid discharges.

Current dam infrastructure

It is understood that most of the dams located on downstream properties are in need of repairs following the flooding of these areas. Consequently it is anticipated that the dams will be of minimal use for the proposed remediation, without significant works to increase integrity, size and water release mechanisms.

Based on available information, six-seven dams will be constructed in the stream, at locations to be determined in consultation with stakeholders.

To satisfy the requirements of the remediation strategy, the dams are required to be:

- in-line with the creek
- involve the construction of an earth wall across the stream with an area (sump) excavated immediately in front of the wall for accumulation of sediments
- include the placement of a permanent drainage structure (ie Floodgate) with invert level situated higher then sediment capture areas. This does not include the dam situated at the confluence of the Buckley River and Inca Creek, which will be removed immediately following the validation of all treatment works.
- accessible by road or track
- capable of accepting a minimum of 20ML water.

Following treatment, each dam will be released downstream to flush the next section of stream.

Treatment options

Currently, it is proposed that Bauxsol or 'red mud' is used to chelate and precipitate metals and adjust pH. The treatment of the water within the dams is likely to involve the mixing of a powder based Bauxsol compound plus additional reagents into a wet slurry before being sprayed across the surface of the dams at a rate of approximately 1-3g/L. Once in the ponds, the compound increases the pH of the water and permanently bind heavy metals in the process.

Over a period of 2-3hours, the Bauxsol will settle out of the solution, forming a thin (1-3mm), non-toxic, stable sediment. Following release of the treated water back into the creek, the sediment will be removed via an excavator or equivalent. Excavated material will be transported back to the mine site by truck and use for revegetation purposes.

It is noted however that treatment via the use of other chemicals/compounds (such as Limestone or Hydrated Lime) has not been fully explored with regard to the proposed methodology. It is further understood that these treatment options will need to be comprehensively considered prior to the most appropriate treatment being adopted.

During the treatment process, the water will be monitored using field pH meters to ensure that the pH corrections are achieved and samples collected 24hrs post treatment to confirm the metals content has reduced to acceptable levels. Analysis of samples will be undertaken on-site to provide an indicative analysis of concentrations prior to the collection of validation samples for analysis at a NATA accredited laboratory.

3. Further work

It is proposed that further research be conducted regarding the feasibility of the proposed remediation methodology prior to finalisation of the method and the commencement of field works. To facilitate this research it is proposed that specific data regarding the physical and geological nature of the creek along its course be sought to further the required modelling of the system.

Data must include:

- survey data of representative sections of the creek beds to ascertain gradient
- local surface and sub-surface geology
- permeability of creek bed soils/sediments.

4. Schedule

With respect to the preliminary work undertaken in this report, the following indicative timeline is provided as a conservative estimate. Actual timelines are likely to be compressed through treatment of multiple locations simultaneously:

Action	Schedule	Week Ending
Completion of supporting research to justify methodology. Design of dams and outlet structures	2 weeks	15th May
Engagement of contractors to undertake civil works (dams), installation of slotted screen pumping locations. Mobilisation of treatment equipment.	4 weeks	12th June
Flushing of water, treatment and verification sampling	4 - 8 weeks	10th July – 7th August
Removal of impacted sediments and re-instatement of farm dams	2 weeks	21st August

5. Closure

We trust that this report provides appropriate information to satisfy the EPA's requirements.

If you have any questions regarding the works and results documented above, please contact either Matt Jeffs (07) 3854 6302 or Brian Fainton on (07) 3854 6616.

Yours Sincerely

s.49 - Signature

Matthew Jeffs
Senior Environmental Engineer
Parsons Brinckerhoff Australia Pty Limited

s.49 - Signature

Brian Fainton
Senior Environmental Scientist
Parsons Brinckerhoff Australia Pty Limited

QUEENSLAND MINES AND ENERGY
FILING COVER SHEET

563 MILU:	Lady Annie and Mine Flooding 2009			
NO	DATE	TO	FROM	CONTENTS
1	9/4/2009	Rob Lawrence	Matthew Jeffs	Environmental Protection Order - Lady Annie Mine
2	26/5/2009	Minister Stephen Robertson	Betty Kiernan	Regarding Mine Overflows - North West Floods 2009
3	29/6/2009	Anglea Schulz		Doctrak response document MC4032
4	1/5/2009	Rob Lawrence	PB	Letter and Report - Environmental protection order - Lady Annie Mine - Report number 711
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Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

Mt Isa Office, Mt Isa House
Cnr Camooweal & Mary St., Mt Isa Q 4825
Ph: (07) 47447888 FAX: (07) 47447800
www.env.qld.gov.au ABN: 87221158786

Environmental Protection Order

Section 360 *Environmental Protection Act 1994*

This Environmental Protection Order is issued in accordance with section 360 of the Environmental Protection Act 1994.

Under the provisions of the *Environmental Protection Act 1994* an Environmental Protection Order is issued:

To: Lady Annie Operations Pty Ltd (ACN 076289097)
Attention Messrs Gary Peter Doran and David John Frank Lombe
Receiver Managers for Lady Annie Operations Pty Ltd
Deloitte Touche Tohmatsu

of: Woodside Plaza Level 14
240 St Georges Terrace
PERTH WA 6000

TAKE NOTICE that under the provisions of the ***Environmental Protection Act 1994***, an Environmental Protection Order is issued to you by the administering authority. The administering authority is the Chief Executive of the Environmental Protection Agency (referred to below as the EPA).

The Environmental Protection Order (STAT 448) is issued in respect of the activities of Lady Annie Operations Pty Ltd and related entities conducted under Environmental Authority MIN100401006 (the EA) at premises/place on land described as ML5426, ML5435, ML5446, ML5447, ML5448, ML5474, ML5476, ML5478, ML90168, ML90169, ML90170, ML90178, ML901079, ML90184 (the mine), which is located approximately 100 kilometres north of Mount Isa to secure compliance by the person with the general environmental duty under section 319 of the *Environmental Protection Act 1994.*

A. Grounds

The Environmental Protection Order is issued on the following grounds:-

1. To secure compliance with the general environmental duty, which pursuant to section 319 of the *Environmental Protection Act 1994* ('the Act'), requires that a person must not carry out any activity that causes, or is likely to cause, environmental harm unless the person takes all reasonable and practicable measures to prevent or minimise the harm.

The facts and circumstances forming the grounds are:

1. CopperCo carries out mining activities on the mine.

2. During normal operating conditions, the mining activities cause, or are likely to cause, environmental harm. The EA authorises the mining activity and limits the actual and potential environmental harm that can lawfully be caused.

3. Rainfall records indicate that between 1 January 2009 and 17 February 2009, approximately 1000 mm of rain fell on, or in the vicinity of, the mine.

4. On 30 January 2009 and 7 February 2009 the EPA was advised by Jason Alexander of Copperco that discharges had occurred from the mine into Saga Creek Saga Creek which flows into Inca Creek, and then the Buckley River.

5. The EPA took water samples from Inca Creek, downstream of the mine, on 23 February 2009. *In situ* analysis of the water samples indicate that the water had low pH levels when compared with reference sites.

6. On 30 January 2009, CopperCo provided the EPA with data relating to discharge water over the pond spillways. That data indicated that:

    a. water in Stormwater Pond 2 contained 0.04 g/l copper and had a pH of 4.26;

    b. water in the Stormwater Pond 2 spillway contained 0.22 g/l copper and had a pH of 2.51.

    c. the depth of the water over the spillways was approximately 200mm and flow was approximately 12. cubic metres per second.

    d. the water at monitoring point MKDSO4 had a pH of 3.45 and Electrical Conductivity of 862 µS/cm.

7. On 21 February 2009, an owner of land located 20 kilometres downstream from the mine advised the EPA of poor water quality in Inca Creek.

8. EPA staff, who are also Authorised Persons took water samples from Saga and Inca Creeks at locations downstream of the mine, and carried out *in situ* water quality monitoring.

9. The *in situ* water quality monitoring indicated that the water was acidic with pH ranging from 3.3 to 4.7.

10. EPA Officers also made observations that the water in Saga and Inca Creek was clear, with an obvious green discolouration, and had a strong and unusual odour. The water in Saga and Inca Creeks is usually turbid.

11. EPA Officers observed dead fish (species included spangled perch and catfish) and a dead crab. They collected six (6) dead fish for investigation and post mortem.

12. On 25 February 2009, EPA officers took water samples from Saga and Inca Creeks and carried out *in situ* water quality monitoring in the waters from the mine and downstream for a distance of approximately 30 kilometres.

13. *In situ* testing indicated that the water in Inca Creek at the point closest to the mine was acidic with a pH of 2.2.

14. *In situ* testing conducted at the sites downstream of the mine discharge indicated that the pH in the water gradually increased as distance from the mine increased. *In situ* testing at the monitoring point 30 kilometres from the mine indicated pH at 5.7.

15. Compared to the ANZECC 2000 guidelines for livestock drinking water (table 4.3.2) the water quality results showed:

    e. Copper exceeding guidelines at all sites within Saga and Inca Creeks;and
    f. Aluminium and Cobalt exceeded the guideline at various sites in Saga Creek and Inca Creek; and
    g. Nickel exceeded the guideline in Saga Creek

16. Compared to the ANZECC 2000 water quality guidelines for the protection of ecosystems (95%) the guidelines were exceeded for various water quality parameters within Saga and Inca creek including Aluminium, Chromium, Beryllium (LR), Cobalt (LR), Copper, Iron (LR), Lead, Manganese, Nickel, Vanadium (LR), Uranium (LR), Zinc, pH

17. On 5 January 2009, CopperCo Ltd advised the EPA of subsidence in the wall of Stormwater Pond 2 on the mine.

18. On 17 February 2009, EPA Officers attended the mine and inspected the wall of Stormwater Pond 2. They observed subsidence of the pond wall and waters discharging from the pond to Inca Creek. The subsidence was observed to be significant, and to have greatly reduced the capacity of the pond to contain hazardous material, as intended.

19. The information provided to the EPA and investigations undertaken by the EPA indicate that:

    h. A large volume of water with a low pH has been released from Stormwater Pond 2 on the mine to Inca Creek;

    i. Environmental harm has been caused.

20. Works are required to be carried out within the receiving environment to mitigate the impacts caused by the releases.

B. Requirements

Pursuant to this Environmental Protection Order you are required to:

1. As soon as possible, and by no later than 5.00 pm (AEST) on Friday 22 April 2009, for those sections of Inca Creek and Saga Creek which exceed the ANZECC 2000 water quality guidelines for livestock drinking water quality, in consultation with the landowner, implement measures to prevent access by all livestock and minimise access by fauna.

2. Subject to obtaining approval for access from affected landowners, as soon as possible, and by no later than 5.00 pm (AEST) on Friday 1 May 2009, treat all on-stream farm dams and sections of Saga and Inca Creeks, which have been affected by the discharge of contaminated waters from the mine site in January and February 2009, to achieve as a minimum for metals and pH, either:
    a. ANZECC 2000 trigger levels for the protection of freshwater aquatic ecosystems (at the 95% level); or
    b. reference values.

3. As soon as possible, and by no later than 5.00 pm (AEST) on Thursday 9 April 2009 identify practical options for treatment of all on-stream farm dams and sections of Saga and Inca Creeks, which have been affected by the discharge of contaminated waters from the mine site in January and February 2009, to achieve as a minimum for sulphate either ANZECC 2000 trigger levels for the protection of freshwater aquatic ecosystems (at the 95% level) or reference values. These options must:

    a. Be provided to the administering authority and a preferred remediation option nominated for each area identified including the remediation standard.

    b. Provide a map of the areas assessed and showing any contamination identified.

    c. Where an area has been impacted and no remediation is proposed provide justification for that proposal and identify the effect this will have on the impacted environmental values.

    d. Include a proposed schedule of remediation works.

4. Treatment undertaken in Requirements 1-3 must not result in contamination or environmental harm to the receiving environment.

5. Treatment undertaken in Requirements 1-3 must ensure that water quality in the Buckley River directly downstream of the confluence with Inca Creek meets as a minimum, either
    a. ANZECC 2000 trigger levels for the protection of freshwater aquatic ecosystems (at the 95% level); or
    b. reference values.

6. As soon as possible, and by no later than 5.00 pm (AEST) on Friday 8 May 2009, assess the impact of the discharges of contaminated waters from the mine site in January and February 2009 on the environmental values of the receiving environment. The investigation must:

a. Define the geographic extent of impacts
b. Include identification of the environmental values
c. Be in accordance with the ANZECC 2000 methodology and AUSRIVAS methodology.
d. Include assessments on the impacts on:
    i. Water quality for surface and groundwaters;
    ii. Sediment quality;
    iii. Soils; and
    iv. Flora and fauna.
e. Include a comparison and review of previous relevant studies undertaken.
f. Include relevant reference sites.

7. As soon as possible, and by no later than 5.00 pm (AEST) on Friday 15 May 2009 identify practical options for remediation of any areas of contamination of ground water and land (including sediments) resulting from the January and February 2009 releases of contaminants from the mine site. These options must:
    e. Be provided to the administering authority and a preferred remediation option nominated for each area identified including the remediation standard.
    f. Provide a map of the areas assessed and showing any contamination identified.
    g. Where an area has been impacted and no remediation is proposed provide justification for that proposal and identify the effect this will have on the impacted environmental values.
    h. Include a proposed schedule of remediation works.
8. Develop a long term monitoring program by no later than 5.00 pm (AEST) on Friday 21 May 2009, to assess the recovery of the impacted environment identified under item 6. The program must include:
    a. sufficient spatial and temporal replication (including controls) to enable statistically valid conclusions to be made concerning any impacts of the release on receiving environment; and
    b. physical, chemical and biological assessment of sediment, water and habitat quality; and
    c. properly defined and accessible sampling locations which have regard to water use by downstream land owners; and
    d. consistent sample procedure and analysis; and
    e. a consistent range of analytes including dissolved and total metals at each location; and
    f. proper quality assurance procedures; and
    g. a timeframe for provision of reports regarding the recovery of the impacted environment to the Environmental Protection Agency; and
    h. Identification responsibilities and timeframes for each action
9. By no later than 5.00 pm (AEST) on Tuesday 9 April 2009, provide a report to the administering authority outlining the measures taken and/ or proposed to be taken in order to comply with the requirements of this Notice.
10. By no later than 5.00 pm (AEST) on Tuesday 30 June 2009, provide a report to the administering authority, from suitably qualified person certifying that Saga and Inca creeks have been decontaminated and rehabilitated.
11. For the receiving environment that has been affected by the discharge of contaminated waters from the mine site in January and February 2009, obtain prior permission from the respective landholders of those places, for entry to those places for the purpose of:
    - Inspecting, examining, measuring, testing photographing or filming

- Taking samples
- Recording, measuring testing or analysing things
- Remediation works

Definitions:

ANZECC 2000 - Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000)

ANZECC water quality guidelines 2000 livestock drinking water quality:

- For metals and metalloids – refer to ANZECC 2000 - table 4.3.2
- For pH - 6-8
- For major Ions and dissolved salts – limits outlined in sections 4.3.3

ANZECC trigger levels for protection of freshwater aquatic ecosystems (at the 95% level) – ANZECC (2000) default trigger levels for aquatic ecosystems of slightly disturbed tropical Australian upland rivers as defined in table 3.3.4, 3.3.5 and 3.4.1.

Reference values –local trigger limit based on a minimum samples size of 8 consecutive reference site samples.
Reference site must:

(a) be from the same biogeographic and climatic region; and
(b) have similar geology, soil types and topography; and
(c) contain a range of habitats similar to those at the test sites; and
(d) a similar flow regime; and
(e) not be so close to the test sites that any disturbance at the test site also results in a change at the reference site.

Environmental values as defined in section s7 of the Environmental Protection Policy (Water)

Long term monitoring program is monitoring program which is carried out over a number of years to assess the recovery of the impacted environment. The program will need to continue until such time that it can be demonstrated that the receiving environment has recovered to a status equivalent to prior to the contamination event in January and February 2009.

Receiving environment includes but not necessarily limited to groundwater, surface water, flora and fauna, land, air and sediments within mining leases (MLs) ML5426, ML5435, ML5446, ML5447, ML5448, ML5474, ML5476, ML5478, ML90168, ML90169, ML90170, ML90178, ML901079, ML90184 and areas off lease including Saga, Inca creeks and Buckley River.

And also **TAKE NOTICE** that:

1. The requirements of this Order take effect immediately upon service of the Order.

2. Failure to comply with this Environmental Protection Order is an offence under the *Environmental Protection Act 1994 (Qld)*.

3. This Order remains in force until further notice from the administering authority.

4. You may apply for a review of or appeal against the decision to issue the Environmental Protection Order within ten business days of the service of the order. Information regarding the reviews and appeals are attached to this order.

Obligations

Should you propose to dispose of the place or business to which this Environmental Protection Order relates, you must advise the buyer of the existence of this Environmental Protection Order (Section 362).

s.49 - Signature

.... 20 March 2009

(Signed) (Date)

Ingrid Fomiatti Minnesma
Delegate of Administering Authority
(Environmental Protection Act 1994)

EXTRACTS FROM THE ACT REGARDING REVIEWS AND APPEALS

Procedure for review

521.(1) A dissatisfied person may apply for a review of an original decision.

(2) The application must-

(a) be made in the approved form to the administering authority within-

(i) 10 business days after the day on which the person receives notice of the original decision or the administering authority is taken to have made the decision (the **"review date"**); or

(ii) the longer period the authority in special circumstances allows; and

(b) be supported by enough information to enable the authority to decide the application.

(3) On or before making the application, the applicant must send the following documents to the other persons who were given notice of the original decision-

(a) notice of the application (the **"review notice"**); and

(b) a copy of the application and supporting documents.

(4) The review notice must inform the recipient that submission on the application may be made to the administering authority within 5 business days after the application is made to the authority.

(5) If the administering authority is satisfied the applicant has complied with subsection (2) and (3), the authority must within 10 business days after receiving the application -

(a) review the original decision; and

(b) consider any submissions properly made by a recipient of the review notice; and

(c) make a decision (the **"review decision"**) to-

(i) confirm or revoke the original decision; or

(ii) vary the original decision in a way the administering authority considers appropriate.

(6) The application does not stay the original decision.

(7) The application must not be dealt with by-

(a) the person who made the original decision; or

(b) a person in a less senior office than the person who made the original decision.

(8) Within 10 business days after making the review decision, the administering authority must give written notice of the decision to the applicant and persons who were given notice of the original decision.

(9) The notice must-

(a) include the reasons for the review decision; and

(b) inform the person of their right of appeal against the decision.

(10) If the administering authority does not comply with subsection (5) or (8) the authority is taken to have made a decision confirming the original decision.

(11) Subsection (7) applies despite the *Acts Interpretation Act 1954, section 27A.*[112]

(12) This section does not apply to an original decision made by-

(a) for a matter, the administration and enforcement of which has been devolved to a local government - the local government itself or the chief executive officer of the local government personally; or

(b) for another matter-the chief executive personally.

Stay of operation of original decisions

522

(1) If an application is made for review of an original decision, the applicant may immediately apply for a stay of the decision to-

(a) for an original decision mentioned in schedule 1, part 1 – the tribunal; or

(b) for an original decision mentioned in schedule 1, part 2 – the Court.

(2) The tribunal or the Court may stay the decision to secure the effectiveness of the review and any later appeal to the tribunal or the Court.

(3) A stay may be given on conditions the tribunal or the Court considers appropriate and has effect for the period stated by the tribunal or the Court.

(4) The period of a stay must not extend past the time when the administering authority reviews the decision and any later period the tribunal or the Court allows the applicant to enable the applicant to appeal against the review decision.

Who may appeal

531 (1) A dissatisfied person who is dissatisfied with a review decision, other than a review decision to which subdivision 1 applies, may appeal against the decision to the Court.

(2) The chief executive may appeal against another administering authority 's decision (whether an original or review decision) to the Court.

(3) A dissatisfied person who is dissatisfied with an original decision to which section 521 does not apply may appeal against the decision to the Court.