

From: GIBBS Teale [Teale.Gibbs@ehp.qld.gov.au]

Sent: Friday, 12 June 2015 11:57 AM

To: Compliance Support

CC: DAVIS Geraldine

Subject: RE: EPO - use to authorise an activity

Attachments: Permit - Baal Gammon Copper EPML00792513.pdf; BG Pit Treat and Discharge Sched R02.pdf

Hi Rebecca

That's great, thank you.

In this case the pit has filled due to normal weather conditions, therefore I don't believe it would fit the applicable event definition for a TEL.

I've attached the EA for reference. The history is:

- They can treat the water to a certain quality, but have not been able to meet discharge limits for fluoride or aluminium. (As required under Conditions F1-2 and Tables F3 and F4)
- The discharge location may or may not be the point authorised in the EA under Table F1 – this would be something likely to be specified in any stat tool used.
- Previously the department approved a TEP for a treat and release program. I've attached a document that provides some additional background if required, but you probably don't need that level of detail. We are considering whether a TEP could be used again, but it is an ongoing non-compliance issue therefore it may not be appropriate to use a TEP again for the same issue.
- Our concern is that the pit is so full of water and the wet season is coming up and they will be in a position where they can't meet Design Storage Allowance on 1 November and we need to take action to force them to reduce pit water levels.
- The client has indicated the possibility of amending the EA – however this would likely be a major amendment and take some time to process. It is up to them to initiate also.

Please let me know if you require anything further or have any questions.

Thanks

Teale

Teale Gibbs

Team Leader (Compliance), North Queensland Compliance | Cairns

Environmental Services & Regulation

Department of Environment and Heritage Protection

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From: BARBIERATO Rebecca **On Behalf Of** Compliance Support

Sent: Friday, 12 June 2015 10:59 AM

To: GIBBS Teale

Subject: RE: EPO - use to authorise an activity

Hi Teale,

We're working on the response to your question now, and we are wondering if a Temporary Emissions Licence has been considered in addressing the problem? At a glance, it seems like this could be an appropriate response to the situation you described. Can you also please provide some more information on the EA condition that you are seeking advice on, and some additional information on why the water needs to be released?

Thanks,

Rebecca Barbierato

Environmental Officer, Compliance Support Team
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From: GIBBS Teale
Sent: Friday, 12 June 2015 10:06 AM
To: Compliance Support
Subject: RE: EPO - use to authorise an activity

Hi Rebecca

Thanks for your response. The matter has some urgency, so if we could have advice back by Monday that would be appreciated, if it is possible.

Thanks
Teale

Teale Gibbs
A/Compliance Delivery Manager, North Queensland Compliance | Cairns
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From: BARBIERATO Rebecca **On Behalf Of** Compliance Support

Sent: Friday, 12 June 2015 10:04 AM
To: GIBBS Teale
Cc: Compliance Support
Subject: RE: EPO - use to authorise an activity

Hi Teale,

Thank you for contacting us and seeking our advice. Compliance support is considering your request and is in the process of formulating a response. Do you have a specific time frame by which you need the advice?

Thanks,

Rebecca Barbierato

Environmental Officer, Compliance Support Team
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From: GIBBS Teale
Sent: Thursday, 11 June 2015 4:47 PM
To: Compliance Support
Cc: LITTLE Rob; DAVIS Geraldine
Subject: EPO - use to authorise an activity

Hi Compliance Support

Could you please provide advice as to whether an EPO can be used to require an activity to be undertaken that would not otherwise be lawful.

For example, reducing mine pit water levels through a treat and release program that would involve release of mine waters that are not in compliance with EA limits and from a point that is potentially not specified in the EA.

Thanks
Teale

Teale Gibbs

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From: BRADSHAW Tony [Tony.Bradshaw@ehp.qld.gov.au]
Sent: Wednesday, 22 July 2015 4:08 PM
To: DAVIS Geraldine
CC: GIBBS Teale; CAVICCHIOLO Mark
Subject: RE: Advice on water treatment options for the Baal Gammon Mine

Hi Geraldine and Mark,

Water quality issues are:

Low pH – requires pH correction – As a general rule, this would be expected to precipitate out dissolved metal contaminants to varying degrees based upon solubilities at various pH values e.g. Al, Cu, Cd, Co, Fe, Mn, Ni, Zn.

Dissolved metals (cations) - following pH correction and precipitation as above, treatment by reverse osmosis would be expected to further reduce metal concentrations.

Anions e.g. sulfate fluoride. Hydrotalcite is reported as a useful agent for anion exchange. This would be expected to reduce anion concentrations

http://www.zrchem.com/Data/Application_Downloads/HTCDOC1.pdf
<http://pubs.acs.org/doi/abs/10.1021/ie00043a023>

Salinity as measured by electrical conductivity. Dosing may increase salinity initially. Reverse osmosis would be expected to further salinity.

The degree of removal for various contaminants should be estimated from trials, which should aim to optimise removal efficiencies. This should be provided.

Note that the trigger levels for cadmium, chromium (III), copper, lead, nickel and zinc should be adjusted for hardness as recommended in the ANZECC water quality guidelines. Dissolved aluminium sometimes is elevated if the water contains colloidal clays. Filtering through a finer filter than 45 microns can provide a better estimate of risk to aquatic ecosystems if this is the case.

This may well raise the values, as the trigger levels in the table are based on soft water (30 mg/L hardness). I will call tomorrow to further discuss.

Cheers Tony

Tony Bradshaw
Senior Principal Environmental Officer
Technical Support
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From: DAVIS Geraldine
Sent: Monday, 20 July 2015 11:25 AM
To: BRADSHAW Tony
Cc: GIBBS Teale
Subject: Advice on water treatment options for the Baal Gammon Mine

Hi Tony,

I tried to ring you this morning but your number was not working. Would it be possible for you to provide advice on whether there are technologies available that would enable the pit water (water quality results shown in column 6) to be treated (and released to the receiving environment) in accordance with the contaminant trigger levels and limits provided in columns 3 and 4?

The Baal Gammon pit is currently full with water which is potentially causing the release of contaminated seepage to the adjacent Jamie Creek. I am just trying to determine whether it would be technically feasible for the EA holder to treat to the EA contaminant trigger levels and limits as this will determine the type of enforcement tool to be used to require them to reduce the levels in the pit.

In 2013/2014, the EA holder treated and released pit water under a TEP by dosing the pit water with hydrotalcite and then treating through a RO plant. Prior to undertaking the program, they indicated that they would be able to meet the EA trigger levels and limits for most parameters other than aluminium and copper. As a result, EHP authorised a release limit of 650µg/L for aluminium and 3 µg/L for copper. During the course of the TEP, the EA holder advised that they had exceeded the fluoride limit.

Any advice you can provide would be appreciated.

1	2	3	4	5	6	7
Parameter	Unit	EA Trigger level ¹	EA contaminant limit ²	BG02	Pit water	SW0.1
pH	pH unit	6 - 7.5	5 - 9	3.10	3.12	6.84
EC	µS/cm	250	5970	2535	2628	41
Turbidity	NTU	15		-		-
Sulfate	µg/L	-	1,000,000	1,300,000	1,300,000	840
Fluoride (total)	µg/L		2000	40,000	45,000	180
Aluminium (dissolved)	µg/L	55		82,000	78,000	840
Aluminium	µg/L		5000	83,000	80,000	3700

(total)						
Arsenic (dissolved)	µg/L	13		36	26	4
Arsenic (total)	µg/L		500	36	26	7
Bismuth (dissolved)	µg/L	0.7		<0.5	<0.5	<0.5
Cadmium (dissolved)	µg/L	0.2		230	200	<0.1
Cadmium (total)	µg/L		2	230	200	<0.1
Cobalt (dissolved)	µg/L	2.8		440	430	<1
Cobalt (total)	µg/L		1000	430	420	<1
Copper (dissolved)	µg/L	1.4		37,000	38,000	4
Copper (total)	µg/L		1000	37,000	38,000	8
Indium (dissolved)	µg/L	-		540	540	<5
Iron (dissolved)	µg/L	300		8,800	21,000	330
Lead (dissolved)	µg/L	3.4		33	58	<1
Lead (total)	µg/L		10	32	57	3
Manganese (dissolved)	µg/L	1900		14,000	14,000	<5
Nickel (dissolved)	µg/L	11		320	300	<1
Nickel (total)	µg/L		20	310	290	<1
Silver (dissolved)	µg/L	0.05		0.90	0.08	<0.05
Silver (total)	µg/L		100	0.80	0.08	<0.05
Tin (dissolved)	µg/L	3		<2	<2	<2
Zinc (dissolved)	µg/L	8.0		23,000	23,000	6
Zinc (total)	µg/L		3000	23,000	23,000	15

Cheers,

Geraldine Davis

Senior Environmental Officer

North Queensland Compliance | Environmental Services and Regulation

Department of Environment and Heritage Protection

P 07 4222 5384

From: Rebecca McIntyre [Rebecca.McIntyre@csdtin.com.au]
Sent: Wednesday, 23 December 2015 2:33 PM
To: BASKARAN Arun
CC: EHP-Northern_Cairns_Pollution_Alerts
Subject: Baal Gammon treat & release program

Hi Arun,

As discussed on the phone today, the most recent preliminary lab results for the Baal Gammon treat and release program has shown an exceedance for fluoride – result of 2.2mg/L. I have asked SGS to check the preliminary result, and the test has returned the same.

The crew on-site continue to conduct in-situ readings for fluoride using a calibrated meter, and current results are well below 1mg/L. The meter is being re-calibrated by CSD today.

Another treat and release program water sample is being collected today by CSD, and will be submitted to SGS Cairns for analysis.

Kind regards

Bec McIntyre
Manager - Environment

Consolidated Tin Mines Limited
395 Lake St, Cairns North, QLD 4870
PO Box 4, Mt Garnet, QLD 4872

sc14p4 (6) Personal information

Email: Rebecca.McIntyre@csdtin.com.au

cid:image002.jpg@01D0E4AF.A2C4F190



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From: DABINETT Karen [Karen.Dabinett@ehp.qld.gov.au]

Sent: Friday, 12 June 2015 4:09 PM

To: John Banning (John.Banning@csdtin.com.au); Rebecca McIntyre (Rebecca.McIntyre@csdtin.com.au); jallchurch@montominerals.com

CC: FOMIATTI MINNESMA Ingrid; SHARPE Dean; TRENERRY Michael; GRANT Millie; DAVIS Geraldine

Subject: Baal Gammon Post Mine Land Use Plan and EA amendment info for water treat and release program

Attachments: Letter 20150612 Baal Gammon PMLUP review.pdf; gl-bi-wastewater-to-waters-em112.pdf; gl-bi-activities-impacts-water-em963.pdf

Dear John and Rebecca,

Following our teleconference this afternoon, please find attached a letter detailing EHP's concerns and comments on the Baal Gammon Post Mine Land Use Management Plan (PMLUP).

In relation to our discussion regarding a water treatment and release program via an EA amendment, please find following the information required to support the proposed application. The following guidelines will need to be considered to describe/justify any proposed releases to the receiving environment

- [Wastewater release to Queensland water technical guideline \(EM112\)](#) (the wastewater guideline)
- [Application requirements for activities with impacts to water Guideline \(EM963\)](#)

CSD would need to work through the process outlined in the wastewater guideline to determine whether it is possible to get to a stage where a release to the receiving environment is acceptable, and no future releases are required. Table 1 of the Wastewater guideline details the information requirements by EHP for assessing waste water releases.

Other useful links are:

- [Water quality guidelines](#)
- [Deriving local water quality guidelines fact sheet](#)
- [QLD Environmental Protection Policy \(Water\) 2009](#)
- [Qld Water Quality Guidelines](#)
- [ANZECC guidelines](#)

Please don't hesitate to contact myself to arrange a meeting to discuss the comments regarding the PMLUP in the letter further.

Cheers

Karen Dabinett

A/ Senior Environmental Officer (Assessment) | Minerals
Environmental Services and Regulation | Northern Region
Department of Environment and Heritage Protection

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Department of
**Environment and
Heritage Protection**

Ref 101/0008744, EPML00792513

12 June 2015

John Banning
Consolidated Tin Mines Limited
395 Lake Street
CAIRNS NORTH QLD 4870

Cc: James Allchurch
Baal Gammon Copper Pty Ltd
Level 1, 33 Ord Street
WEST PERTH, WA 6005

Dear Mr Banning,

Baal Gammon Post Mine Land Use Plan 2015

I refer to the Post Mine Land Use Plan (PMLUP) submitted by Consolidated Tin Mines Ltd (CSD) on behalf of Baal Gammon Copper Pty Ltd (BGC) on 6 May 2015 and discussed in the meeting between the Department of Environment and Heritage Protection (EHP), BGC representative James Allchurch and CSD representatives John Banning and Rebecca McIntyre on 7 May 2015.

EHP has reviewed the PMLUP and has made a determination that the proposed rehabilitation strategy does not meet the requirements of Environmental Authority EPML00792513 (the EA). Firstly, the rehabilitation methodology for the waste rock dump and open pit void outlined in the PMLUP does not comply with that provided in the Environmental Management Plan (EMPlan) for the project, which formed the basis for approval, and was conditioned in the EA. Secondly, the PMLUP does not adequately address the requirements of Condition C2-1 of the EA.

The EMPlan (North Queensland Metals Ltd, 2008) specified that potentially acid forming (PAF) waste generated from mining activities had the potential to adversely impact groundwater and Jamie Creek. To manage this risk, it was proposed that PAF cells would be established within non-acid forming (NAF) waste in the temporary waste rock dump until the end of mine life at which stage all PAF waste would be returned to the bottom of the pit and covered with compacted non-acid forming (NAF) waste. As a result of this commitment, condition D7-3 was applied on the EA.

During the meeting on 7 May 2015, CSD representatives discussed that the majority of waste in the waste rock dump (WRD) which had previously been classified as NAF, had recently been reassessed to be mostly PAF. As a result, CSD has proposed to close and cap the WRD *in situ* due to the calculated volume of PAF waste being greater than the volume available in the pit void.

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EHP does not support the proposal for *in situ* rehabilitation of the WRD as contemplated by CSD as EHP considers that the nature of the PAF waste contained within the dump would pose a substantial environmental risk regardless of what capping and cover design is proposed to be put in place given the location of the WRD.

In regard to the requirements for the PMLUP not being met (as per Condition C2-1 of the EA), further detail of these issues are provided in Attachment 1.

EHP understands that CSD and BGC are currently undertaking work on a post-rehabilitation site water balance and other issues relating to the requirements of the PMLUP. EHP encourages CSD/BGC to work with and liaise with us on these matters.

As confirmed during today's teleconference, site accountability will remain the responsibility of CSD and BGC until such time as a surrender application has been accepted by EHP.

EHP would like to take this opportunity to invite you to schedule a meeting to discuss these matters or any other issues relating to rehabilitation planning. Should you have any other enquires regarding this matter, please contact Karen Dabinett of EHP on telephone (07) 4222 5324.

Yours sincerely,

sch4p4(6) Personal Information

Ingrid Fomiatti Minnesma
Director Minerals
Delegate of the Chief Executive

Attachment 1: Comments on Rehabilitation Plan

Attachment 1: Comments on Post Mine Land Use Plan 2015

In reviewing the plan for Baal Gammon Copper, EHP has considered whether the plan outlines the development of rehabilitation goals, objectives, indicators and completion criteria as specified in the EHP guideline 'Rehabilitation requirements for mining resource activities (EM1122)'. The following comments are made in relation to the submitted Rehabilitation Plan.

Determining objectives and indicators for rehabilitation

- Information regarding the environmental values and land uses of the surrounding environment must be included to provide background information and justification of the rehabilitation goals and objectives.
- Demonstrate how existing surrounding land uses and environmental values of the receiving environment will be preserved or improved.
- Provide a description of areas on the mining lease that will remain undisturbed at the end of mining.
- Demonstrate how the anticipated final landforms compare to the existing undisturbed environment.
- The plan does not detail if any reference sites have been established for the purposes of rehabilitation trials, and the results of these trials.
- As per Table C1 of the EA, it is noted that the post mine land use capability is listed as "no more than 10% of all disturbed lands is class VIII", for the following areas:
 - Stage 2 Pit area
 - Hardstand
 - Mine water dam (MWD)

And "no more than 30% of all disturbed lands is class VIII" for the following areas:

- Workshop, administration, go lone and car park
- Mine magazine area
- Waste Rock dump (WRD)
- Topsoil/NAF stockpiles

The plan does not describe what land use class the remaining land (90% and 70% respectively) for each domain will achieve.

Surface and ground water monitoring

- The surface and ground water contaminant limits proposed by CSD/BGC are based on historical data collected prior to mining activities being conducted under the existing EA. The PMLUP does not include a description of the statistical treatment of the data used to derive these values. Tabled data provided by CSD separate to the PMLUP submission appears to show that these limits have been derived from the maximum contaminant levels in pooled data from 2008-2011 from a number of sampling bores (for derivation of the groundwater contaminant limits) and surface water monitoring sites (for derivation of the surface water contaminant limits). The determination of suitable contaminant limits should be based on the methodology provided by ANZECC/ARMCANZ (2000) or by similar established guidelines.

- Surface water monitoring is not proposed to be undertaken at any sites on the Walsh River and therefore impacts to environmental values further downstream from monitoring location 'SW6' in Jamie Creek cannot be determined.
- Describe the reliability of the historical sampling data and how quality assurance and quality control (QA/QC) has been ensured.
- Given the site has a history of offsite release events, EHP does not believe the proposed quarterly monitoring frequency is sufficient to monitor for potential release events. As such, EHP believes that the current monthly routine monitoring frequency should be maintained until such time that it can be demonstrated that the potential for release events is minimal.

Management of PAF waste

- As discussed above, the proposal by CSD to rehabilitate the current in-valley PAF-dominated WRD is considered to constitute an unacceptable risk to the environment and therefore, this methodology is not supported by EHP. CSD/BGC will therefore need to determine an alternative solution for encapsulating and managing PAF waste post closure, demonstrating how any future proposal is to be undertaken in accordance with a best practice approach, such as that outlined in the Global Acid Rock Drainage (GARD) guide or any similar established guidelines relating to the prevention and mitigation of acid rock drainage.

Open pit

- As discussed above, the proposal to keep the open pit as a storage for contaminated water and not to backfill with PAF waste is not in line with the rehabilitation methodology proposed in the EMPlan and does not comply with condition D7-3 of the EA. Any proposal for the pit void to remain open as a water storage post closure will need to be supported by site water balance modelling and ongoing verification of modelling accuracy based on actual conditions being experienced at the site over time.
- The hydraulic conductivity between the pit and Jamie Creek was identified in the response from Kagara Ltd to the Notice to conduct or commission an Environmental Evaluation (STAT686) issued by the department on 18 April 2012 following the release of contaminated seepage to Jamie Creek at the base of the pit wall on 7 March 2012. On 17 March 2015, a release of contaminated seepage from the outer wall of the pit was notified to EHP by CSD. The proposal for the pit to remain as a water storage post closure does not address the propensity for the release of contaminated waters to Jamie Creek brought about by peaks in pit water levels.
- The plan notes that the drainage design and erosion controls for the pit will use existing water diversion structures, and the pit will be a catchment for gravity-fed discharges from the waste rock dump (WRD) and Stage 2 pit area. EHP expects that the pit has a limited holding capacity for collection of seepage (in addition to other water inflows such as rain, the addition of contemporary PAF material from the stage 2 pit area, and seepage from Stage 2 pit area) before the pit overtops with subsequent offsite migration of contaminated water. The plan lacks detail on how the

pit will be managed once pit capacity is reached, and how WRD (and MWD) seepage will be managed from that point onwards.

- The plan does not provide water modelling

Haul roads

- The plan does not provide written confirmation from the landholder about retaining haul roads for site access.

Stage 2 Pit area

- To what depth does the PAF material occur, and will any potentially generated material still be present in the soil once the 'contemporary PAF' has been removed.
- In the absence of any rehabilitation trials, the plan does not provide information on the nominated coverage depths for the of 0.1m NAF cover and 200mm topsoil, and how these depths will provide a sufficiently stable cover that will not erode and will support any vegetation. EHP expects that some erosion will occur until vegetation on top of the cover has matured. The plan does not detail how this erosion will be managed.
- The 'erosion and sediment control plan - Baal Gammon Project (NRA 2011b)' cited in the plan only applies to the initial construction phase of the project

Hardstand

- To what depth does the PAF material occur, and will any potentially generated material still be present in the soil once the 'contemporary PAF' has been removed? How will the presence/absence of any residual PAF material be confirmed? If there is any residual potential PAF generating material remaining, how will this be managed?
- It is noted that no clay capping/capillary break is proposed for the hardstand area. CSD must demonstrate that the absence of a cap/capillary break will not result in the release of contaminants to the environment, from any remaining potentially generated material.
- In the absence of any rehabilitation trials, the plan does not provide information on the nominated topsoil coverage depths and how these depths will provide a sufficiently stable cover that will not erode and will support any vegetation. EHP expects that some erosion will occur until vegetation on top of the cover has matured. The plan does not detail how this erosion will be managed.

Land contamination clearance

- Section 5.2 notes that rehabilitation works may only commence once the area to be rehabilitated has been verified as being at or below acceptable contamination levels. The plan does not outline how each site will be rehabilitated should contamination assessments determine areas are still contaminated (haul roads, Stage 2 pit area, hardstand areas, workshop, administration, go line and car park).

Erosion management

- How will erosion prone areas (such as 0.1m covers) be managed to avoid erosion?
- How often will erosion monitoring be undertaken?

- What is the purpose of the one-off land capability soil sample monitoring, if land capability has already been established?

Seepage monitoring

- Section 8.3 notes that rates of seepage from the WRD will be monitored and reported in the annual Post-closure monitoring report. However, the plan does not address how seepage from other areas will be monitored, including seepage from the base of the pit into Jamie Creek, through adits (including the UNA adit) and seepage from the MWD.

Rehabilitation/Vegetation

- The rehabilitation treatment designates monitoring without any scope for a response to monitoring should 'issues' be detected. No planting of trees is advocated only seed spreading.
- There is no iterative process, or fixing problems detected in monitoring rehabilitation.
- The completion criteria should include tree size, sustainability and diversity measures
- Subjective measures with analogue sites can be unclear. An explanation on species richness should include a spatial component.
- Tree Density should relate to canopy species. Diversity is different from species richness as a measure.