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Subject: Berrima Colliery Closure Working Group (Meeting 17)
Location: Berrima Cement Plant Engineering plus Microsoft Teams
Date & Time: 26th May 2023, 10.30am

Independent Chair: Alan Lindsay (stand in)

Attendees:

Peter McMillan – Environmental Inspector, NSW Resources Regulator
Greg Kininmonth – Manager Environmental Operations Southern, NSW Resources Regulator
Greg Noonan – NSW Environmental Protection Authority
Barry Arthur – Manager Environment and Sustainability, Wingecarribee Shire Council
Ray Nolan – Local Resident
Alan Lindsay – Local Resident

Boral Personnel:

David Spears – Project Manager, Boral Cement
Greg Johnson – Environmental Sustainability Manager, Boral Cement
Sharon Makin - Environment Business Partner NSW/ACT
Minutes: - Robert Byrnes*

Apologies:

Brad Mullard – Chairperson (meeting replacement Alan Lindsay)
Girja Sharma – Assessment Officer Water NSW Catchment
Lance Ward – Medway Resident
Andrew Couldridge – NSW Environment Protection Authority
Dr Ian Wright – University of Western Sydney
Julian Brophy – Local Resident
Clive West – Local Resident
Ravi Sundaram – Mining Catchment Specialist, WaterNSW
Daryl Gilchrist – Manager Catchment Protection – Water NSW
Tony McCormick – Local Resident representing Mandemar Lane
Graham Kelly – Local Resident
Kate Woodbridge – Stakeholder Relations Manager, Boral Land & Property)
Karly Roder – Environment Protection Authority

These minutes reflect the presentation and consequent conversations conducted as part of this meeting. The content, while an accurate summation of proceedings, should not be taken to represent exact dialogue unless specifically minuted as such. Text in italics have been added by the minute taker for clarification or to reference items being spoken about such as the presentation slides, graphs or other meeting materials. For the full presentation, visit www.boral.com.au/medway. Minutes do not become 'official' unless endorsed at the following meeting by the appropriate representatives.

** Boral Cement uses the services of International Environmental Consultants (IEC) to undertake environmental monitoring and technical report preparations for the Berrima Colliery. Rob Byrnes, owner and Director of IEC, acts as the nominated minute taker for the Closure Working Group (CWG) via the appointment of Boral Cement.*

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Meeting opened – 10.30am

1/2 Welcome and apologies/Terms of Reference

Alan Lindsay to chair the meeting in the absence of Brad Mullard. We have Peter McMillan, Greg Kininmonth, Greg Noonan, Barry Arthur online we also have Sharon Makin from Boral who is one of our Environment Business Partners. On site we have David Spears, Alan Lindsay, Ray Nolan and Robert Byrnes. We have received apologies from Brad Mullard, Dr Ian Wright, Julian Brophy, Andrew Couldridge, Lance Ward, Clive West, Graham Kelly, Tony McCormick, Ravi Sundaram, Kate Woodbridge and Greg Newman. Girish has now retired.

AL: I think that covers everyone. I refer you all to the terms of reference which we have all been through before. We can now move onto the review of the minutes from the December 2022 meeting. Are there any comments or proposed changes to the minutes if not can I have someone to move their acceptance.

(no comments or objections)

RN: move to accept minutes.

AL: as there are no objections the minutes are accepted.

3. Actions from Previous Meeting

AL: actions that came from that meeting?

GJ: there were two actions from that meeting, the first was for Boral to take additional water samples from behind all the bulkheads and report results at the next meeting and the second was to communicate this with the group should any material matters arise before the next meeting.

RB: The additional water samples were from behind all the bulkheads rather than just the one bulkhead previously.

GJ: we will talk about the water quality results in the presentation.

GJ: there was also no additional information to report prior to this meeting.

AL: we can move onto the water quality update.

4. Water Quality Results Update

GJ: *(referring to presentation slides 9 to 11)* Its been six months since our last update, we are still discharging 1.9ML/day. The pH is being managed well and Electrical Conductivity is staying around the 1,000 $\mu\text{S}/\text{cm}$ level. We have got Iron back under control while Manganese has reduced. This is a result of the lime dosing system that we have in place now which assists with raising pH.

AL: what was the reason for the higher readings on the graph?

GJ: We did have a period of higher Iron and Manganese prior to our last meeting. Our underground limestone treatment beds needed to be supplemented by additional lime which is mixed at the surface and pumped underground.

DS: the mixed lime is sent underground to mix with the discharge water entering the underground roadway which leads to the licence discharge point.

GJ: the Nickel and Zinc levels have also fallen to previous levels. This is mostly due to raising the pH towards 8.

GJ: With the river results (referring to slides 12 to 16), the discharge has a slight influence on receiving water pH but not conductivity. The discharge is not having an influence on river concentration of Iron. We did find higher readings of Manganese further downstream which is likely the result of higher stream flow.

AL: there are some readings above the green line (reference standard used)

GJ: the increase occurred further downstream rather than the first site downstream of the mine discharge. *(The green line is a reference standard for Drinking Water at 0.1 mg/L for Manganese. The 95% ANZECC default*

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ecosystem protection goal is 1.9 mg/L for Manganese. The levels downstream are actually very low for natural streams).

GJ: the results for Nickel and Zinc showed the river levels at below the 95% protection level downstream.

AL: is there anything else that needs to be done for Manganese?

RB: Manganese is a mineral that is more difficult to remove. The colliery has always had a discharge of elevated Manganese, close to the 95% default criteria. The concentration in the discharge at present is slightly better than the historic average.

AL: so looking at the graph, was the last reading taken on the 1st March 2023?

(the last ambient sample on the graphs was taken on 20th March 2023, another sample was taken on 25th May 2023, ambient samples are taken every two months)

GJ: the graphs show the discharge point as an arrow, the next downstream site is Biloela and then the Downstream site. The graphs show that the level was lower at Biloela and then it went up at the next site downstream. This means that there are other influences further downstream. The other results from previous months also show that the level increases further downstream.

AL: how far downstream is that?

GJ: about 6 km.

GN: the graph doesn't show the discharge from the colliery?

GJ: it shows an arrow but the level is higher than the scale of the graph. If we reduced the scale of the graph it would not show the variation in the upstream and downstream concentrations. We show the drinking water guidelines just for comparison, it is not a standard for the discharge.

GJ: Copper levels are very low but our sulphate levels are having an influence on receiving waters. It is below our trigger levels but there is an effect on background levels.

RB: We have been looking at why the Sulphate levels have increased. Our treatment system underground occurs in the coal seam, there is a coal floor and coal ribs. The Wongawilli Seam is not a high Sulphur seam but it does have some Sulphur. We believe that the underground treatment system itself may be causing the rise in Sulphate due to continual exposure of the coal seam to oxygenated water. In theory our treatment system should remove sulphate from the system because we are adding Calcium (*limestone is Calcium Carbonate*) which should form Gypsum (Calcium Sulphate) which is insoluble and should drop out of solution. When we convert to a passive treatment system on the surface, we should be able to remove the Sulphate as a precipitate more effectively. We are hoping this would also reduce the Electrical Conductivity as well since Sulphate is the only salt that has increased since the Electrical Conductivity started to rise.

GJ: (*referring to slide 17*) these are the earlier results from behind the bulkheads, we will get the updated information to you.

PM: yes we are interested to see if there are any differences between the bulkhead levels.

GJ: we can send you the data separately.

5. Water treatment Update

DS: We continue to maintain the underground treatment system with the limestone bed and aeration system but with the addition of the lime dosing system to assist in raising the pH. We don't see a lot of change in discharge quality as we are able to increase or decrease the dosing rate quickly if there are any changes. The discharge rate has been very consistent.

GJ: We pump from the behind the bulkheads to maintain the levels.

DS: There is a slight reduction of about 10 mm per week in the water level at present, but we try to just maintain the level to be able to measure seepage coming through the strata which was part of the original trial design.

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GJ: The 1.9 ML/day is reflective of our pump out rate and seepage which combined is our recharge rate. There is some change if a pump goes down which is why we need a bit of head room behind the highest bulkhead.

DS: This year we had a power outage for a day and a pump failure but was replaced quickly. A 24 hour outage doesn't have a significant effect on the water level behind the bulkheads. We have also made sure that we have sufficient spare parts and replacement pumps on site so if there is a failure we can do a change out very quickly.

AL: as far as the water table is concerned, back further in the mine, I would imagine that after the higher rainfall over recent years that the increased amount of water absorbed into the mine that would now be coming out.

DS: It could be assumed that more water should be coming into the mine, but it does not appear that it is coming down to the bulkheads. I suspect that as the water table is higher now that the water entering the mine would be going somewhere else. Despite all the rain we have had, the recharge underground, at least as measured at the bulkheads, appears consistent at 1.9 ML/day.

GJ: or perhaps it hasn't reached the bulkheads yet?

RB: we have previously age dated the water entering the mine at 30 years old.

DS: you can see in the graph that in the first 12 months after installing the bulkheads that the water built up quickly and then the graph levels off which corresponds to the period of pumping.

RL: what period does that graph cover? (*referring to Bulkhead water level graph on page 21 of presentation*)

DS: the graph covers all the data since the bulkheads were installed, over a 4 year period.

AL: any other questions? We can move onto the proposed water treatment project.

6. Pit Top Water Treatment and Pipeline EPL Update

GJ: We had a variation to our EPA licence about 18 months ago in response to an application lodged with the Resources Regulator to construct the pit top treatment system. The licence variation required an environmental assessment be undertaken, which was done. We received comments back from the EPA in relation to the point of discharge of treated water back into the river and we decided to relocate the treated water back into the underground workings. The Resources Regulator got back to us with a request to provide more information basically to determine if what we are proposing is the best option. This was presented as a Section 240 Notice requesting an update to the groundwater model and the hydrogeological study. Now that we have completed the directions, we will revisit the REF with the additional information. The updated studies have now been lodged and once the Resources Regulator gets back to us we will proceed with the REF. One of the comments provided by the EPA was that we do a noise assessment for the construction phase which we have yet to complete.

GK: have you done any further drone monitoring of the river?

GJ: no we haven't done any more since the end of the performance monitoring PRP. This was a two year period of more intense monitoring of the river. On completion of this we did a Scientific Study which included aquatic ecology and ecotoxicology studies. We kept an additional upstream sampling site near the drift for a while longer but the drone sampling is no longer required.

DS: we kept the performance monitoring program sites going for another six months, so overall the additional sampling was done over a two and half year period. As the results were very similar we eventually reverted back to the original sample sites. The Scientific Report confirmed that the additional monitoring sites were no longer required.

RB: we currently monitor the original ambient sites being the Berrima Bridge and MacArthur's Crossing as the two upstream sites and Biloela and Black Bobs Creek confluence as the two downstream sites. The performance monitoring program required additional samples taken from within the Wingecarribee Gorge. The sampling regime was similar to what was done in 2012, when the mine was operating and since the results were essentially

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the same, the final report recommended going back to the original upstream and downstream sampling sites. These sites give us enough information to determine what the implications of the water discharge from the mine is having on the river and the mixing zone.

AL: lets move onto the project outline.

GJ: (*referring to presentation slide 23*) In summary we will be constructing a purpose built passive treatment system at the pit top. We will pump water from the mine through the treatment system and then back into the mine. The treatment system will involve aeration, pH correction and settlement by the multi-celled ponds. Originally the treated water would have been pumped back to the Wingecarribee River via a new licensed discharge point near the mine drift bridge. When the EPA reviewed the draft REF, the EPA raised concerns in relation to the discharge of treated water at the drift bridge. This location is about 700 m upstream of the mine adit discharge point and so would potential impact a new stretch of the river and create a new mixing zone that has never been impacted by the mine before. We decided that to avoid this, we could pipe the water back into the mine and discharge into the drain adit roadway, in front of the bulkheads. This water would then discharge at the drain adit location as it currently does. So there will be no change to our licensed discharge point.

AL: so you will be pumping from the mine, through the treatment system and then back into the mine. Will be it a pipeline or just a flow through the mine?

GJ: it will be a pipeline into the workings to a point where it discharges into the drain adit roadway. This is where all the water from the mine currently drains to before being discharged into the river via the drain adit discharge point.

DS: there will be no change needed to our current discharge license point from the mine. We will be able to monitor the water from the surface.

GN: so there wont be a pipe line all the way to the drain adit, you will drop the water back into the drain adit roadway?

DS: the pipeline will enter the workings but not go all the way to the licensed discharge point. It will discharge water in the drain adit roadway and flow out of the mine at drain adit discharge point.

(the route of the pipeline into the mine workings and discharge point from the pipe within the workings has yet to be confirmed and will subject to detailed design. A suggested possible route for the treated water would be to run the pipeline down the ventilation entry and discharge near the existing V Notch Weir site. The water would then flow down the drain adit roadway for a distance of approximately 500 m to the existing licensed discharge point into the river).

GJ: a portion of the treated water will be sent to the cement works. The overland pipeline will be located in the old railway easement between the pit top and the cement works. This easement is covered by the mining lease as well as on land owned by Boral. Its also covered by our Environment Protection Licence. The cement works uses about 600,000 litres of water per day when operating, which is about 46 weeks of the year. The water is used for cooling and dust suppression. Water not needed by the cement works will be returned to the river via the current discharge point.

AL: update on the draft Review of Environmental Factors?

GJ: the REF has not progressed any further as are waiting the feedback from the Resources Regulator on the updated groundwater and hydrogeological assessments. The Resources Regulator was going to have a meeting with the EPA in relation to the project.

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GN: yes we met with the EPA in late November 2022. The EPA wrote to Boral in relation to the proposed and potentially changed discharge point as well as the noise impacts but we also need to touch base with the Resources Regulator on those issues as well.

GJ: the reason why the REF has been held up is because of the directive issued by the Resources Regulator so there wasn't much the EPA could do until that was resolved.

7. Resources Regulator Activity Update

GJ: The directive was issued by the Resources Regulator to clarify whether or not our proposal was the best option. It required us to update the groundwater modelling, and to include an assessment what would be the effect of installing additional bulkheads, this was referred to as the Shunt 8 Seal and see if that made any difference to the volume of water discharged. *(the Shunt 8 Seal is located in an area of old workings that Boral considers to be unsafe to attempt to access. It is located at a higher elevation than the pit bottom seals and the previous modelling found that its installation would make little difference to the volume of water being discharged).*

GJ: They also wanted to know more about the quality of water being discharged over a long period of time. We have completed those directives, Katarina has updated the groundwater model, it assessed Shunt 8 as well as other variables such as different permeabilities. That updated report confirmed the previous model results and was submitted to the Resources Regulator in April. We have also had an updated report from Mark Stuckey from Environmental Earth Sciences. Mark is the geochemical expert who previously did work on the closure project. He has completed his updated geochemical modelling. His draft report has been lodged with the Resources Regulator. That report has also been used to form our final closure option which was included in the final directive report which was lodged yesterday. We had a meeting with the Resources Regulator last week and took on board their comments in the final report submitted yesterday. This report looks at the feasibility of installing the pit top treatment system as part of a longer term strategy for mine closure. We are now looking at a 5 stage process but I think it would be appropriate for the Resources Regulator to review the proposed staging first before we provide details in this forum.

AL: would it be possible to see those reports?

GJ: The plan is that once the Resources Regulator is happy with them and there are no other comments or information to provide, we will share them with other stakeholders including this group.

PM: That sounds like a fair approach. We will need time to digest the reports lodged.

GJ: it has been a long journey and we hope that what we have put forward will be accepted so we can start moving forward again. It does mean that we will be retaining the EPL and mining lease for some time to come. This is appropriate given the view of Mark Stuckey that this water will not be suitable for discharge without treatment for a very long period of time. Given the nature of the sandstone strata overlying the workings, no one can say how long elevated minerals will occur in the water. What we have put forward is a 25 year staged approach to manage this water. By managing the water outside the mine provides a sustainable solution. It could be that water quality naturally improves over this time period and if it does that may well change the need for ongoing treatment, but the evidence to date is that poor water quality will be generated by the mine for hundreds of years.

8. Medway Community and Communications Update

AL: any updates on the Medway Community?

GJ: we haven't had anyone come forward from the Medway Community or no other issues have been raised in the last six months. We completed the weed spraying around the pit top and private land holdings.



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AL: any communications update?

GJ: Kate was an apology for today but I understand that there are no issues that need to be addressed

AL: any general business to put forward? If not then our next item is to set the next meeting. Boral have put forward 27th October.

GJ: that date should allow us hopefully to get to the final position on the pit top treatment facility.

AL: I would hope that we could see the reports that you provided to the Resources Regulator in the interim.

RN: One last question, when you say you are treated the water, what standard are you treating it to? Will you be treating it to the quality of the river?

GJ: that will be a discussion with the EPA but we aim to treat to a similar standard as the mine has historically discharged.

Meeting Closed 11.15am

Summary of Meeting Actions:

1. Boral to send bulkhead water quality data to Resources Regulator and report at next meeting.
2. As soon as the Resources Regulator is happy with the reports as provided, they will be released to the CWG.