30 October 2014

NSW Government
Department of Planning & Environment

Dear Sir/Madam,

**Submission to Airly Mine Extension Project**

I am an independent environmental scientist working as an Environmental Lecturer at University of Western Sydney. One of my research interests is freshwater pollution ecology and a second is the regulation of water pollution. This current proposal is of practical interest to me on both fronts and I will be watching this case with great interest.

Please find my attached submission to the proposed Airly mine extension.

Yours sincerely

Dr Ian A Wright
Lecturer (Environmental Science)
University of Western Sydney

**Personal submission on the proposed Airly Mine Extension Project**

**Dr Ian A Wright (Environmental Science Lecturer, University of Western Sydney)**

**30 October 2014**

I am an environmental scientist, educator and researcher and have worked as an environmental scientist with industry for more than 25 years. My qualifications include a Master of Science and a PhD degree. I am an advocate for sustainable water and catchment management and I strongly support multi-disciplinary projects. I seek to manage industry problems with evidence-based science. My scientific expertise covers many fields: freshwater ecology, water chemistry, pollution ecology of waters, freshwater macroinvertebrates as pollution indicators, impact of urban development, sewage effluent, agricultural, and mine waste impacts on streams and rivers. The greater majority of my research has been conducted on waterways, or topics, in the Hawkesbury-Nepean catchment and Sydney basin. I have expertise in the sampling design of environmental science studies and statistical analysis of environmental data. I have published (as senior or junior co-author) 39 peer-reviewed scientific publications. My research and industry experience has led to requests for my participation in voluntary reviews of research manuscripts for academic journals. I have also provided independent expert testimonies for environmental science matters for the NSW Land & Environment Court.

**Summary**

The surface water assessment documents provided for the Airly Mine Extension Project clearly highlight the importance of water pollution as a major environmental issue associated with the current mining activities and the proposed mine extension. The current coal mining operation is generating waste water that is highly saline and is also enriched with ecologically hazardous concentrations of metals and nutrients. The EIS documentation indicates that larger volumes of waste water are likely to be discharged to local waterways from three discharge points as part of the extended mine operation. The waterway currently receiving mine waste water (Airly Creek) from the current mine operation is a highly polluted waterway with degraded ecosystem health. The cause of this pollution is unclear, but is at least partly due to the current and previous mining activities. The EIS documents propose the use of '*site specific trigger values*' that in my opinion are inappropriate and seek to legitimise ongoing water pollution from the current mining operation to the expanded mine operation. The existing EPA licence held by the mine for discharge of contaminated mine water currently applies no effective limits for pollutants identified in the surface water assessment. Although the EIS documentation identifies the presence of many water quality pollutants at ecologically hazardous (and probably toxic)

concentrations in the current and expanded mine waste water, there are no discharge limits on these pollutants (e.g. salinity, nitrogen, phosphorous, ammonia, turbidity, zinc, nickel) in the EPA waste discharge licence (EPL #12374). In my opinion, the expanded mine operation appears likely to continue to generate environmentally damaging waste water that will be unregulated with an ineffective EPA environmental protection licence. Inadequate information is also presented on the likely adverse impacts on such water pollution to downstream waterways in the Hawkesbury-Nepean catchment and local and regional water users (agriculture, human recreation, conservation and biodiversity). Potential adverse impacts on Greater Blue Mountains World Heritage area streams and rivers from the current, or future extended, mine operation is a serious omission from this EIS documentation.

**Site Specific Trigger Values**

A major shortcoming of the '*Airly Mine Surface Water Impact Assessment*' (July 2014 documents) are the 'Site Specific Trigger Vales' that have been calculated and are presented in Table 1-8. The ANZECC (2000) water quality guidelines is quoted as the source of the methodology used to derive these trigger values. I am very familiar with the ANZECC (2000) methodology recommended for calculation of local water quality guidelines. I have used this methodology, with research colleagues, to derive local guidelines (or trigger values) for the Georges River catchment waterways (Tippler et al., 2012). The ANZECC (2000) methodology for calculating local trigger values (see Chapter 3 of the ANZECC guidelines – section 3.1.4 'Defining a reference condition') relies on the use on non-impacted local waterways. I strongly disagree that the approach used in this documentation is consistent with ANZECC (2000) methodology.

I do not believe that water quality results from Airly Creek can be reasonably used to represent 'reference condition' as this is defined in ANZECC (2000), section 3.1.4. It is my professional experience that Airly Creek ranks as one of the most polluted waterways that I am aware of (from my 25 years of experience as a water scientist in the Hawkesbury-Nepean catchment). It is consistent with a waterway that is highly degraded from coalmine wastes (e.g. Banks et al., 1997; Younger, 2003; Johnson, 2003). The July 2014 Surface Water Impact Assessment used only data from Airly Creek as the source of water quality data on 'reference condition'. In my opinion this is unacceptable and generates misleading information that will downplay the environmental hazards posed by coal mine wastewater to the local and regional environment.

The Surface Water Assessment provided limited and inadequate water quality data on a wider range of regional waterways. However, the Aquatic Ecology and Stygofauna Assessment (Cardno) provided more detailed information on regional water quality and confirmed that Airly Creek had the most degraded water quality and aquatic ecosystem in their survey of local waterways. This report also supports my belief that mining activities are as least partly

responsible for the water pollution in Airly Creek. See the following text extract from the Aquatic Ecology report (Cardno):

*'Initial sampling of the aquatic ecosystem indicated that the highest level of biological impairment generally occurred at sites on Airly Creek followed by Torbane Creek. Biological impairment at these sites is likely to be a result of extensive deforestation and use of land in the catchment for agriculture and mining activities.'* *(extract of text from section 4.8.3 of the Aquatic Ecology Assessment).*

In my professional experience the water quality data summarised from Airly Creek in Table 1-8 of the Surface Water Assessment represents highly contaminated water. The table below (Table 1) illustrates some examples of water quality variables and also includes 'site specific trigger values' as presented in the EIS documents (Surface Water Assessment). Calculation of 'site specific trigger values' should be based on water quality at 'reference' creeks in the local waterways, away from any coal mining operation. I expect the water quality in Airly Creek is strongly reflective of the current coal mining activities in the area, and thus it appears illogical to me to use highly contaminated water quality to be used as a basis of comparison, to protect local water quality from coal mine water pollution. My concerns are supported by reviewing the ANZECC (2000) text on calculation of site specific trigger values.

**Table 1 Comparison of Site Specific Trigger Values nominated in the Airly Mine Surface Water Assessment to the Environmental Protection Licence (EPL 12374) currently used by EPA to regulate water pollution from the discharge of Airly mine wastewater.**

| | SSTV nominated in Surface Water Impact assessment (Table 4-5) | EPL Licenced Discharge Limits (LDP001; LDP002; LDP003) |
|---|---|---|
| pH (pH units) | 6.5 – 9.0 | 6.5 – 9.0 |
| Electrical conductivity (µS/cm) | 2998 | - |
| Total Suspended Solids (mg/L) | 68 | 50 |
| Oil & Grease (mg/L) | - | 10 |
| Turbidity (NTU) | 83 | - |
| Ammonia (mg/L) | 0.9 | - |
| Total Nitrogen (mg/L) | 1.88 | - |
| Total Phosphorus (mg/L) | 0.24 | - |
| Nickel (mg/L) | 0.099 | - |
| Zinc (mg/L) | 0.072 | - |
| Copper (mg/L) | 0.013 | - |
| Arsenic (mg/L) | 0.024 | - |

**Environment Protection Licence 12374**

A second linked concern is that the proposed expanded mine operation seeks to continue use of the current NSW EPA 'Environment Protection Licence' (EPL) #12374 (see section 4.8.2 of the Surface Water Assessment).

The current Airly mine operation holds an EPA Environment Protection Licence (EPL #12374). The only pollutants that are permitted to be discharged from the Airly Mine (according to EPL 12374) are:

- Oil and Grease (10 milligrams per litre)
- pH (6.5-9 pH)
- Total Suspended Solids (50 milligrams per litre)

See Table 1 which shows a range of water quality attributes (as per the SSTV nominated values) that represent a range of the most serious and environmentally hazardous pollutants in Airly Creek, and in the current and expected mine waste water. These pollutants (salinity and metals in particular) have been linked to coal mine waste water pollution in the Sydney and Blue Mountains area (Belmer et al. 2014; Wright and Graham, 2012; Wright and Burgin, 2009) and internationally (e.g. Banks et al. 1997; Johnson, 2003; Younger, 2004). This table also lists the current EPL 12374 discharge conditions. The disconnection between the pollutants and the EPA licence is obvious and of great concern. This is a major issue that needs to be addressed as part of this proposed development.

I regard the three pollutant discharge limits, currently in EPL 12374, as being inappropriate and ineffective if the true purpose of the EPL is actually to protect the water quality of Airly Creek, and other waterways downstream of the waste discharge as is clearly defined in the guiding legislation: *Protection of the Environment Operations* Act (1997). Section 45 of this legislation covers matters that the EPA needs to consider when issuing an EPL and in my opinion the current EPL #12374 does not reflect S.45 part (c) of POEO Act:

'*the pollution caused or likely to be caused by the carrying out of the activity or work concerned and the likely impact of that pollution on the environment'.*

Having environmentally appropriate discharge conditions for a mine's EPA Environmental Protection Licence is the most important means for regulating the water pollution impacts from this mine and its extended operation. They will 'drive' industry to treat waste water to the level required to discharge to local waterways. Contaminated water is routinely treated by industry to meet stringent EPL conditions.

In my opinion EPL 12374 needs to specify pollutants in contaminated waste water from the coal mine, with discharge limits that conform to the ANZECC (2000) water quality guidelines and protection of downstream water uses and ecosystems. Given the high conservation value of waterways in the downstream Greater Blue Mountains World Heritage Area this should be based on protection of 99% of species (as per Table 3.4.1 of Chapter 3 'Aquatic Ecosystem' in ANZECC, 2000).

The inappropriate use of Environmental Protection Licences (EPL) is a highly controversial issue and is generating increasing community concern (Graham and Wright, 2012). For example, recently the NSW EPA has progressively modified the EPL held by Endeavour Coal (West Cliff Colliery at Appin) from a licence that was very similar to the one currently held for Airly mine (EPL 12373)(Wright, 2011). The West Cliff EPL (EPL 2504) has been modified to include the actual pollutants in the mine waste water that are likely to contribute the environmental damage caused by the mine discharge. This current development assessment is an ideal opportunity for the Minister of Planning to address such an important issue that will have such long-term benefit for the sustainable management of water pollution from this proposed mine expansion. Addressing this issue as part of the current development assessment process is of obvious importance.

A very important statement appears on page 6 of Appendix C 'Airly Mine Surface Water Impact Assessment. This statement explains the potential expected water quality expected to be discharge to waterways of the Airly Creek catchment. The production bore was reported in the Appendix C to have highly elevated salinity (median of 4735 µS/cm); and ecologically hazardous levels of two metals (results for other metals was not available) Nickel (median of 0.29 mg/L) and Zinc (median of 0.251).

*'Sites LDP001, production bore and 35 ML Discharge Dam represent the quality of current and future discharges to the Airly Creek catchment.' (page 6 of Appendix C)*

This information highlights how the expanded mine operation is likely to generate larger volumes of highly polluted waste water that is likely to worsen the already degraded water quality and ecological health of Airly Creek, and extend the negative impact further downstream.

In my professional opinion, the EPL 12374 for this current mine operation needs to be modified to include at least six additional pollutants (salinity, nitrogen, phosphorus, turbidity, ammonia, zinc and nickel) and impose meaningful limits that actually protect downstream waterways from pollution. The SSTV nominated in the Surface Water are inappropriate for the reasons explained previously.

The current water quality and stream ecology information provide inadequate information to make a detailed and informed assessment about the downstream implications of water pollution

likely to be generated from the extension of the Airly mine operation. The waterways further downstream (in the Colo River catchment) are of extreme environmental significance, and as such the Colo River is listed as a 'Wild River' in NSW and a large part of the area is protected as part of the Greater Blue Mountains World Heritage Area (UNESCO, 2009). Recent research has shown that another mine (Clarence Colliery) is generating damaging water pollution that extends at least 20 km downstream of that mine's discharge into the Greater Blue Mountains World Heritage Area (Belmer *et al.*, 2014). Previous research has shown that mine pollution in the Blue Mountains area can persist for extended periods of time following a mine closure (Wright and Burgin, 2009). I am concerned that this mine may also be causing adverse impacts into conservation areas, including the World heritage Area further downstream. Inadequate data is presented in the EIS to make an informed assessment on this matter.

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