NSW GOVERNMENT Health
Population Health
Nepean Blue Mountains Local Health District
Western Sydney Local Health District

12 September 2012

Our Ref: Trim 12/14389
Your ref: Project Application no: 10_0178

Mining and Industry Projects,
NSW Department of Planning and Infrastructure
GPO Box 39,
Sydney, NSW, 2001.

Dear Sir/Madam,

Coalpac Consolidation Project (Project Application no: 10_0178)
Response to Submissions Report

I am writing to provide further information about potential health impacts of this proposal on the health of residents of Cullen Bullen. In particular I would like to provide more detail about the effects of coarse particles on health as I am advised that the response by the proponent did not adequately address the public health concerns. I understand that officers from the Nepean Blue Mountains Public Health Unit have also subsequently met with the proponents and had the opportunity to explain some of these matters directly.

Health Impacts of Coarse Particulate Matter
Firstly, the proponent's response did not review the references provided that describe the health problems related to coarse particulate matter (or $PM_{2.5-10}$) so I will take this opportunity to expand on the evidence NSW Health uses to estimate the potential health impacts of coarse particulate emissions.

In 2005 Brunekreef and Forsberg, undertook a systematic review of ecological studies looking at health effects of coarse particulate air pollution. In studies of chronic obstructive pulmonary disease, asthma and respiratory admissions, coarse $PM_{2.5-10}$ has a stronger or as strong short-term effect as fine PM, suggesting that coarse $PM_{2.5-10}$ may lead to adverse responses in the lungs triggering processes leading to hospital admissions. Brunekreef and Forsberg also noted that there is also support for an association between coarse $PM_{2.5-10}$ and cardiovascular admissions.

A number of toxicological studies have provided evidence of biologically plausible pathways of how PM_{10} and fine particulate matter ($PM_{2.5}$) may lead to adverse health outcomes (Becker 2004 & 2005, Hetland 2005, Pozzi 2003). Notwithstanding, epidemiological evidence is convincing that adverse health outcomes are significantly associated with both PM_{10} and $PM_{2.5}$ exposures. This evidence includes ecological studies from Toronto, which found a significant association between coarse particles and hospitalisation for asthma and respiratory infections,

Centre for Population Health
Parramatta office.
Gungurra (Building 68) Cumberland Campus
Locked Bag 7118
Parramatta BC, NSW, 2124
Phone: (02) 98403603
Fax: (02) 98403608

respectively, among children younger than 15 years (Lin 2002 & 2005). Gordian assessed the effects of exposure to PM_{10} from road sanding and re-entrained volcanic ash on asthma medication in schoolchildren. There was an observed increase in asthma medication administered to schoolchildren with increased exposure to PM_{10} (Gordian 2003).

Several studies have been conducted to look at the question of how exposure to mining dust may impact on local communities: Brabin et al. in a cross sectional study in Merseyside, UK found respiratory symptoms were more common in coal mining dust exposed areas, including wheeze, excess cough in primary school children and school absences for respiratory symptoms (Brabin 1994). Pless-Mulloli recruited 4860 children aged 1-11 from 5 socioeconomically matched pairs of communities close to active opencast coal mining sites and control sites away from them in rural England (Pless-Mulloli 2000 & 2001). The studies concluded that children in opencast communities were exposed to a small but significant amount of additional PM_{10} to which the opencast sites were a measurable contributor. Past and present respiratory health of children was similar, but General Practitioner consultations for respiratory conditions were higher in opencast communities. However we note that there was little difference in PM_{10} levels between opencast and control communities in this study (17.0 versus 14.9 $\mu g/m^3$). By contrast, this proposal is predicted to increase the exposure of the Cullen Bullen community to PM_{10} from current levels of around $13\mu g/m^3$ annual average to between 17 and 26 $\mu g/m^3$. Howel studied a sub-group of children from the communities in the Pless-Mulloli research (Howel 2001). The associations found between daily increases in PM_{10} levels and respiratory symptoms were positive but varied between communities.

A study conducted in Brisbane by Rutherford examined the particulate characteristics of 11 dust events in Brisbane and associations with daily diary records of people with asthma, and hospital emergency attendances for asthma during 1992-94 (Rutherford 1999). The results indicate that a number of dust events were significantly associated with changes in asthma severity, but general relationships could not be determined.

The findings of the above studies confirm that there are health effects of the coarse fraction $PM_{2.5-10}$, and that coarse PM_{10} from mining activities could be associated with adverse health effects, predominantly respiratory conditions. This view has been reiterated in the most recent World Health Organization Update of Air Quality Guidelines (2005): "WHO recommends AQGs and interim targets for PM_{10}. This is because coarse PM (the fraction between 10 and 2.5 μm) cannot be considered harmless, and having a $PM_{2.5}$ guideline alone would provide no protection against harmful effects of coarse PM." **The annual guideline for PM_{10} recommended by the WHO of 20 $\mu g/m^3$ is predicted to be exceeded in parts of the Cullen Bullen township at each of the modelled time points in the Environmental Assessment.**

Environmental Assessment versus Health Criteria

I understand that officers from the public health unit have explained to the proponent that health concerns raised in regard to increased population exposure to particulate matter are separate to compliance with EPA air quality criteria (section 4.2.23) as EPA criteria are not set on the basis of health protection and compliance with EPA criteria does not imply that no health effects are expected from a development. There is currently no evidence of a threshold level of particle pollution below which health effects do not occur. Because of this, NSW Health assesses the potential for health impacts from a new emissions source in relation to the absolute exposure concentration compared to health guideline values (such as those issued by the World Health Organization) and also by the incremental increase above existing exposure levels to provide an estimate of the expected increased health effects. In general we anticipate a linear relationship between particulate matter exposure and health effects. As previously stated, the 30 – 100% increase in exposure to particulate matter predicted for residents of

Cullen Bullen may result in a range of respiratory health impacts such as exacerbations of chronic obstructive pulmonary disease and asthma, and mortality.

Given the health evidence around likely impacts arising from the predicted exposures, NSW Health recommends that should the project be approved all feasible measures are adopted to minimise the impact of particulate matter impacts on the village of Cullen Bullen. The proposed continuous particulate matter monitoring at Cullen Bullen Primary School is welcome and we recommend that the monitoring is regularly reported in a way that is accessible to the community and NSW Health, such as via community liaison meetings and the internet.

High Level Particulate Matter Impacts (section 4.2.22)
I understand that the proponent has provided assurances to the public health unit that all properties under Coalpac control subject to severe particulate matter impacts will not be occupied during the project. Coalpac have also provided assurances that the owners of lots 198 & 199 have been informed about potential health risks but are unwilling to leave their homes. Coalpac has undertaken to adjust operations to prevent pollution impacts and to provide mitigation measures for these homes however from a health perspective there is no evidence that measures such as air conditioning, air filters and insulation can reduce the risk of health effects in these circumstances.

With regard to the other matters raised in our original submission the undertakings made by the proponents can satisfy health concerns if adopted, namely commitments to:

- Use only quiet plant and equipment
- Modify operations to minimise noise impacts on Cullen Bullen PS
- Employ best practice in blasting operations, utilising meteorological forecasts to prevent plume impacts on the village

It will be critical that operational management plans reflect these undertakings, and that appropriate monitoring and response protocols are in place. Should you seek any further clarification please contact Dr Shopna Bag, Registrar, or Helen Ptolemy, Environmental Health Officer on (02) 9840 3603.

Yours sincerely,

Kay Hyman
Chief Executive
Nepean-Blue Mountains Local Health District

References:

Becker S, Soukup JM, Sioutas C, Cassee FR. Response of human alveolar macrophages to ultrafine, fine, and coarse urban air pollution particles. *Experimental Lung Research*.**29**(1):29-44, 2003:-Feb.

Becker S, Dailey LA, Soukup JM, Grambow SC, Devlin RB, Huang YC. Seasonal variations in air pollution particle induced inflammatory mediator release and oxidative stress. *Environmental Health Perspectives*.**113**(8):1032-8, 2005.

Brabin B, Smith M, Milligan P, Benjamin C, Dunne E, Pearson M. Respiratory morbidity in Merseyside schoolchildren exposed to coal dust and air pollution. *Archives of Disease in Childhood*.**70**(4):305-12, 1994.

Brunekreef B, Forsberg B. Epidemiological evidence of effects of coarse airborne particles on health. *European Respiratory Journal*.**26**(2):309-18, 2005.

Gordian ME CA. PM10 and asthma medication in schoolchildren. *Archives of Environmental Health* 2003;58(1):42-7.

Hetland RB, Cassee FR, Lag M, Refsnes M, Dybing E, Schwarze PE. Cytokine release from alveolar macrophages exposed to ambient particulate matter: Heterogeneity in relation to size, city and season. *Particle & Fibre Toxicology* **2**:4, 2005.

Howel D, Darnell R, Pless-Muloli T. Children's Respiratory Health and Daily Particulate Levels in 10 Nonurban Communities. *Environmental Research Section A* **2001**;87:1-9.

Lin M, Chen Y, Burnett RT, Villeneuve PJ, Krewski D. The influence of ambient coarse particulate matter on asthma hospitalization in children: case-crossover and time-series analyses. *Environmental Health Perspectives*.**110**(6):575- 81, 2002.

Lin M, Stieb DM, Chen Y. Coarse particulate matter and hospitalization for respiratory infections in children younger than 15 years in Toronto: a case-crossover analysis. *Pediatrics*.**116**(2):e235-40, 2005.

Pless-Mulloli T, Howel D, King A, Stone I, Merefield J, Bessell J et al. Living near opencast coal mining sites and children's respiratory health. *Occupational & Environmental Medicine*.57(3):145-51, 2000.

Pless-Mulloli T, Howel D, Prince H. Prevalence of asthma and other respiratory symptoms in children living near and away from opencast coal mining sites. *International Journal of Epidemiology*.**30**(3):556-63, 2001.

Pozzi R, De Berardis B, Paoletti L, Guastadisegni C. Inflammatory mediators induced by coarse (PM2.5-10) and fine (PM2.5) urban air particles in RAW 264.7 cells. *Toxicology*.**183**(1-3):243-54, 2003.

Rutherford S, Clark E, McTainsh G, Simpson R, Mitchell C. Characteristics of rural dust events shown to impact on asthma severity in Brisbane, Australia. *International Journal of Biometeorology*.**42**(4):217-25, 1999.