Submission to Senate Committee on ' The impacts on health of air quality in Australia'.

Introduction

Air Quality varies greatly from city to rural and to industrial environments. The Gloucester Valley, a mostly pristine rural area, is about to experience a large expansion of industrialisation including the expansion of two small existing open cut coal mines (Stratford and Duralie Mines), the establishment of Gloucester Gas project consisting of 330+ gas wells, a gas pipeline to Newcastle, a central processing unit and probably a small gas fired power station, and a new proposed open cut coal mine sited on the edge of Gloucester township

The author of this submission lives in Gloucester, NSW. I am a specialist medical practitioner (psychiatrist) who saw patients, including a number who described various impacts of coal mining on them, at Gloucester Medical Centre from 1998-2007 one to two days per week. I am still living in Gloucester Shire. I retired from medical practice five years ago. Both patients and friends have described to me the health impacts from this coal mining. In retirement I have further developed this interest in the health impacts from mining and whilst not holding formal public health qualifications I consider I have become an expert in the clinical impacts of mining (particularly in the psychological impacts of mining). I have been a member of the Community Consultative Committee since 2007 during the exploration phase of the proposed Rocky Hill Mine. The director of that proposed mine told our meeting he had been a miner for 35 years and coal dust had not done him any harm!

This submission will focus on issues which have presented in the Gloucester Valley where there has been open cut coal mining for 18 years at Stratford Mine and 10 years at Duralie. Stratford Village with 50 residencies and a primary school is only 1.5km from the mine. Currently about 500 people live within 5km of a mine but if the above projects are approved the number will rise to nearly 2,000 people. Additionally there has been Coal Seam Gas exploration in the same area since 2006. The issues discussed must be repeated in many other rural places

Origin and composition of Particulate Matter (PM) in Gloucester Valley

Despite there having been multiple Environmental Impact Statements written regarding applications to mine and extend existing mining, and each one having a section on air quality, there has never been an overall characterisation of the dust being sampled. The miners are quick to state agriculture produces dust and burning off and wood fires both cause wood-smoke with an implication these external factors are a major contributor to any dust being captured. Gloucester has virtually no broad-acre farming or aerial spraying which might create dust and wood fires do not have a noticeable impact. Burning off certainly occurs at the end of winter and may be the major origin of PM on some days. We need to

separate out these different contributors to poor air quality both to assist designing pollution reduction programmes and to clarify where the responsibility lies.

So far as coal mining is concerned there are several different types of dust with differing health impacts. Namely dust originating from mining overburden, coal dust emanating from stockpiles and transport of coal in uncovered rail wagons and particles originating from diesel vehicle emissions and blast fumes. Mining dust has 7 tons of overburden to every 1 ton of coal. Dust may be breathed in or may settle on roofs and get dissolved into domestic rain water tanks or settle on crops or pastures and enter foods. These tend to be all lumped together.

Stratford Mine reports to the NPI (National Pollution Index) but there is little following through of the more than 20 toxins reported. The heavy metals, PM's, VOC's, PAH's etc sound alarming to the community but there is no indication of what is a health damaging level and what might be relevant reduction strategies for each toxin.

<u>Outdated continued focus on coarse PM10 particles for monitoring.</u>

The following is an extract of my submission in respect of a recent proposal to extend Stratford Mine:-

Air pollution is a consequence of both the quantity and size of particles and the chemical/physical make-up of those particles. The modern gold standard of air quality particle size (PM 2.5) was set out with the publication in 1993 by Dockery et al of the Harvard six cities study. It is only these fine particles which can enter lung tissue. It became the mandatory size for monitoring in the US in 1997. Health savings followed the adoption of this new standard. The old standard PM 10 coarse particle size is not satisfactory because it results from different processes (mechanical) than PM 2.5 (incendiary) and the relationship between the two particle sizes is not consistent. In 2008 the American Heart Association found (JAMA May 14 2008) "…. whereas there was a strong correlation between increased PM2.5 levels and admissions for cardiovascular and respiratory disease, there was no correlation with increased PM 10 levels".

The American Heart Association in 'Circulation' produced an update of it's scientific statement in 2010 on 'particulate matter, air pollution and cardiovascular disease' and included in this review is the statement " …myocardial infarction can occur within hours of increased PM 2.5 exposure" and also that the chemical make-up of the particle was an important variable. Amazingly 20 years after the discovery of the critical importance of fine particles Australia still has not adopted PM 2.5 as the mandatory size for monitoring.

In 2000 a major report from the Clean Air Task force of US "Death, Disease and Dirty Power" pointed out that " …**deaths occur below the PM2.5 standard and there is no threshold below which particles of this size are safe".** In the same year Kunzli et al writing in the Lancet "Public health impact of outdoor and traffic related pollution" showed "life

expectancy is reduced by about six months for every 10micrograms increment in PM10 levels". (We now know this is primarily due to the PM2.5 component of PM 10). More recently in 2012 Kloog et al from Harvard Public Health showed chronic exposure to PM 2.5 particles is associated with 4.2% more hospital admissions for respiratory diseases for every 10micrograms increase and 0.7% increase for acute exposure.

Thus by continuing to mine coal close to a population base we are unnecessarily killing people prematurely and chronically disabling others. All of this is being done without any warning to this effect being given in this EIS. In fact with the expansion of the Roseville West mine to within 1km of the village boundary and the movement of mining 3km southwards to a new area with Stratford East Mine this will escalate the unnecessary premature death and disability numbers.

The high sulphur content particularly in some of the thinner seams, has led to spontaneous ignition in the walls of the mine. This is a slow incomplete burn which results in carcinogenic compounds and has a nasty odour.

Alarmingly, because PM 2.5 monitoring is not mandatory, no measurement has ever been made of PM 2.5 levels in Stratford! The valley is partially enclosed and expert meteorologist Martin Babakhan says the up to 560 meter high walls of the valley (Gloucester Buketts) will circulate PM 2.5 particles back into the valley which is 11km wide at Stratford. The EIS has modelled the PM 2.5 levels for this project using just 450meters valley height which is the maximum height on the lower side of the valley and this resulted in a PM2.5 level for this project of 4micrograms in Stratford Village but air quality modelling of PM 2.5 levels in the Upper Hunter has been notoriously inaccurate. To what extent would the PM 2.5 contours change if the higher side of the valley is included? We are not given cumulative impact data of PM 2.5 particles from other sources (which of course would have a different chemical composition profile.)

In response to the lack of a health audit of possible damage caused over the past 18 years local volunteers have just commenced measuring lung function, oxygen saturation and blood pressure in the Stratford environs community and comparing it with a Gloucester community 10km distant from mining. To date 9 of 43 persons (21%) tested at Stratford had impaired lung function. If this is reflective of the whole community it is clearly irresponsible to increase air pollution as planned.

The history of air monitoring of this mine shows it has been largely complying with PM 10 consent conditions whilst the community has been experiencing lung cancers, strokes, asthma etc in anecdotally higher rates than non mining rural communities. PM 10 Dust levels are only a guide and a poor one at that.

There is no social license for premature killing and causing disability in a community.

Air Quality Recommendations

1) **After 17 years exposure we need to be auditing the health status of the affected community before any expansion is contemplated.**
2) **Any future consent conditions should have mandatory PM2.5 monitoring with an annual average maximum of 5micrograms.**
3) **24hour continuous air monitoring with real time hourly results on the web to enable high risk individuals to be able to move to an air filtered room before risking acute heart or asthma attack. (Gloucester valley is not included in the Upper Hunter Air Quality Monitoring Network).**
4) **PM 2.5 mapping of the Gloucester valley with air monitors at critical community sites (Gloucester Hospital or Gloucester High School and Wards River) as well as sites important to miners.**
5) **PM 2.5 chemical particle characterisation for the Gloucester valley**
6) **Blast fume monitoring**
7) **Methane levels in Stratford Village and close to fracked gas wells to be monitored**
8) **Pollution Reduction Program to add a focus on reducing PM 2.5 levels via stringent emission control on vehicles**
9) **Vehicle running sheets to be checked by Community Consultative Committee to ensure night-time water spraying is occurring etc**
10) **Covering of coal rail wagons and ?veneering at stockpiles.**
11) **Listing in the EIS of toxic substances reported to National Pollution Inventory with discussion of dangers and a program for their reduction**
12) **Compensation fund for the rusting of roofs, gutters, tanks and water filters and extension of Dust Diseases Tribunal responsibility to community members**
13) **Recommendation to MidCoast Water to extend mains water to Stratford Village**
14) **Recommendations regarding health dangers to pets, stock and native animals and safety of pastures and milk.**
15) **A locally stationed enforcement officer**
16) **A Complaints system that avoids resident contact with the Mine.**
17) **A costing of health damage should be presented**

Greenhouse Gases, Global Warming and Health Impacts

The burning of coal and the release of fugitive methane are a significant contributor to global warming. To date there has been 1degreeC rise in global temperature and heat records have been broken world-wide. Locally the record 45.8degC (114degF) in Sydney was a wake-up call that Australia as a premier culprit needs to take a lead and start reducing it's coal production. This unhealthy unpopular mine would be a good place to start.

The increased temperatures has already world-wide caused increases in malaria, dengue fever, Japanese encephalitis, infant diarrhoea, heat stress with dehydration in the elderly and infants. It is estimated there are now 300,000 deaths per annum worldwide from global warming. Locally Ambulance and mortuary services are stressed on very hot days. Food supplies for the world will be adversely affected leading to malnutrition and starvation.

Dust contaminating domestic rainwater tanks

The government granted a license to mine 18 years ago at a site that was only 1.5km from the village of Stratford with 50 residencies and a primary school. The village relies on tank water for it's domestic water supply. The initial license was for 8 years and there would have been some consideration of the inevitable acute and chronic health damage that would be expected to eventuate over that time with a mine so close to a population base. Evidently it was judged to be a risk worth taking and the license was granted. To my knowledge no warning was given to the community, particularly to 'at risk' groups (the very young, the elderly and the chronically ill) of the health dangers or of measures they might take to reduce the impact of the mine on their health.

In 2001 a warning occurred that should have resulted in greater action. The Education Dept arranged for the water of the Stratford Primary School to be tested and it showed amongst several abnormalities there was a raised lead level. Advice was sought from health authorities and the water was monitored, the problem persisted, bottled water was supplied briefly and eventually the tank was cleaned out and a series of filters and a calcium carbonate float was added. The most likely explanation was that the natural rainwater plus the acidity of blast gases and diesel vehicle emissions had caused an acid pH causing heavy metals (lead and copper) to leach from the roofing, plumbing and paint. The school was instructed to run the water for 3 minutes before any pupil drank the water each morning to flush the system to eliminate water standing overnight in the pipes. To my knowledge no blood tests were done for lead levels in the children, no cognitive or behavioural screening tests were done and no warning was given to the rest of the community of this danger. No hydrocarbon testing (BTEX etc) was done. Yearly water testing has been done since the filters were added in 2004. I don't know whether the float has been replaced.

More recently a resident took a sample of water from her gutter which supplied water to her drinking tank and it was several hundred times the maximum recommended concentration for lead and 25 times the maximum for cadmium.

A survey of 101 domestic rainwater tanks in the valley by Prof Damian Gore of Macquarie University showed 16% of tanks had lead levels above the maximum health recommended level and a further 16% had the same for copper.

This is just one example of the many health dangers associated with that original risky decision to grant a license to mine so close to people. In all probability wide-ranging health damage has been accumulating in the approximately 500 people living within 5km of the mine but the most severely affected will be long term residents of Stratford Village.

Education, Screening, Monitoring, Health damage assessment and Compensation

It is notable that mining employees request to be employed, are medically examined before employment with baseline health data recorded, only the fit are employed, they are educated about minimising risks, they are mostly only working 40 hours/week in the 'at risk' environment and are typically in air conditioned vehicles and wear ear muffs. They are remunerated with high wages in part as recognition of the health risks, they undergo regular health monitoring and they have a system of compensation should they suffer health impairment.

In contrast the community of Stratford Village and surrounds did not ask for a mine, were not medically screened initially and so do not have baseline health data, they received no health education, are not supplied with air filters or sound muffling except in exceptional circumstances, they may be in the risk zone for up to 168 hrs/week. There is no health damage compensation system. It has increasingly become a village of underprivileged people and so there is expected to be an above average number of people with compromised health.

No health audit takes place as part of every extension of mining application despite there being widespread knowledge that mining is likely to cause health damage.

Methane, Coal Seam Gas Mining and Air Quality Impairment

The dangers of CSG Mining have been known from reports from the US and were highlighted in the 'Gasland' film. The health impact possibilities have been neglected in the Gloucester valley.

In our valley they had been drilling through aquifers, fracking 20+ wells, and flaring exploration wells continuously for nine months. Fugitive gas was seen escaping through old bores and puddles in the vicinity of the fracking when it rained. The gas processing unit, a further source of nasty poisons and noise, has not yet been built at Gloucester but is planned to be sited only 2km from Stratford school.

Reports from Tara, Qld alerted us to the reality of the suspected health dangers here in Australia from CSG mining. This suspicion has been strengthened by researchers from Southern Cross University who found a threefold increase in air methane levels around Tara.

Methane doesn't support respiration and so in high concentrations would lead to collapse from anoxia. It is slightly toxic in solution but poorly soluble in water. It's biggest problems are that it becomes explosive when mixed with air in confined spaces and also it is a powerful greenhouse gas. More important from a health viewpoint is the fact methane from coal seams is frequently accompanied by other far more toxic emissions, such as the BTEX chemicals originating in the coal seams. Additionally the chemicals used in drilling fluids and fracking may also be present. These can be present in both the air and dissolved into water that has become mobilised by fracking and depressurisation.

NSW Health Dept have stated these above possible health impacts argue for an investigation to clarify the extent and circumstances of the health risks with this mining but the NSW State Government appear to have turned a deaf ear to such recommendations after putting the Camden Gas Project on hold. No air or water methane levels have been done in the Gloucester Gas Project despite 40+ wells having been drilled and the majority of those have been fracked.

Dust Monitors and Community Feed-back

Currently no PM 2.5 monitoring has been done in Gloucester town (or around Stratford Mine) because the miners are reluctant to do anything more than what they are compelled to do. There are more than 1,000 additional residents who will live within 5km of the proposed mine and although most of those will be in the 3.5km -5km zone it includes two schools, the hospital and nursing homes, all 'high risk' groups. We do not know for certain they are not being affected by fine and ultrafine particles carried down the valley from Stratford Mine about 12km away. They deserve the reassurance of knowing with certainty the level of air contamination measured in their community at any time so that those at risk of acute illness (asthma attacks, cardiac arrhythmias) can take protective measures such as staying in an air filtered room. (24 hour averaged levels are no good for providing this protection, we need hourly readings real time).

We have investigated doing such monitoring ourselves but the cost is prohibitive.

The coal terminal action group in Newcastle and the ARTC study have shown the coal dust and train exhaust emissions emitted near the rail corridor which argues for communities close to rail lines, such as Wards River in our Valley should be part of this network.

Cumulative Impacts

This enquiry inevitably has to have boundaries but there are dangers that as a consequence air quality is given extra attention when in the case of mining even more attention may

need to be given to noise and psychological factors. I say this because the NSW Health Dept have an expert committee advising about air quality but are doing nothing about these other causes which are interconnected.

Increasingly coal and CSG are being mined close to each other like they are in the Gloucester Valley, often there are several coal mines. Individual mining projects are apt to measure their impacts as if they occur in isolation. Whilst the chemicals and particles may be somewhat different with coal and CSG mining they can have a cumulative damaging impact on the brain etc. PAH and VOC will be emitted from pumps, and vehicles of both industries and the CSG processing unit also emits toxic hydrocarbons. We need a system of cumulative ongoing monitoring.

Less obvious is that noise and also psychological stress can have a cumulatively damaging effect with organs damaged from impaired air quality. E.g. long term nocturnal railway noise, also can impact on brain functioning causing cognitive damage (impaired concentration, learning, information processing and memory) and daytime sleepiness, potentially having an adverse cumulative impact with cognitive damage from diesel emissions or sleepiness from nocturnal asthma attacks induced by fine dust particles. This health damage may be overlooked by being labelled an educational impact

Stress from a variety of psychodynamic, social, economic and cultural causes will have hormonal effects further impairing both the cardiovascular system and brain functioning already impaired by toxins in the air.

Dr Steve Robinson, (Deputy Chairperson, Barrington Gloucester Stroud Preservation Alliance)

4 March 2013