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To Director – Mining Projects, Development Assessment and Approvals
NSW Department of Planning and Infrastructure

Submission Re Rocky Hill Coal Project, SSD 5156

I oppose this project for the reasons given below. I have been a member of the Gloucester Exploration Project CCC since it's inception. I am Deputy Chairperson of BGSPA and a retired medical practitioner (psychiatrist). I will confine my comments to health matters and related issues. I have read the complete EIS. I have not made any political donations in the past two years.

This proposed mine is small and very close to a large population base. There are massive quantities of coal elsewhere where the health and other environmental damage done per ton of coal produced would be far less. It is a project which will result in considerable totally unnecessary harm***.***
From a purely humanitarian point of view it should be rejected.

Director General's Requirements (and health)
There are five pages of standard requirements. Of note is the fact only one requirement phrase is underlined:- " a description of the existing environment, using sufficient baseline data;"

The environment is both the human and physical environment.
The medical profession believe that a Health Impact Assessment (HIA) is an essential part of obtaining baseline data of the human environment. Statements to this effect have been made by many public health groups including Doctors for the Environment of Australia and most recently:- Recommendation 8 of the Federal Senate Inquiry into impacts on health of air quality in Australia reads "The committee recommends that Health Impact Assessments be required as part of the assessment process for all new developments"..

In brief the reason for this is that all communities are not the same. Any mitigating measure must be designed according to the health profile of the population at risk and then adjusted according to the result of ongoing health monitoring. This will vary greatly from project to project.
Thus although a HIA is not 'specified in words' it is nevertheless essential baseline data to safeguard the health of the many people living close to this project. (Approximately 450 persons living within 3km, and 3500 persons living within 7km).
The social and economic assessment must necessarily include a costing of the health impacts since this will be a very significant impost on the state (and federal economies).

The absence of a baseline health assessment of the population at risk and the absence of a health costing I believe both constitute failure to comply with the DGR's and are therefore grounds for rejection of this proposal.

Additional Matters for Consideration in the EIS
The massive health impact of Noise is understated.
Noise and Blasting assessment is present in the EIS almost exclusively because of it's potential impact on human health. (Vibration has adverse effects on both buildings and humans.)

Noise pollution, according to the WHO, is the form of environmental pollution responsible for the greatest number of deaths world-wide, through stress effects on the cardiovascular system. It also has many other serious effects.
Noise(particularly low frequency noise) travels further than PM10 dust.
The adverse health impacts of noise have been far advanced since the implementation of the current Industrial Noise Policy (INP) and so whilst the INP acknowledges the adverse effect on sleep and a belittling ill defined 'annoyance' factor, it fails to include psychological effects such as communication and cognitive effects or the cardiovascular effects.

NSW Health in the Socio-Economic Section of Additional Considerations are quoted:- "It is the view of this office that occupation of residential dwellings is not appropriate in close proximity to mining operations.....due to potential health impacts and nuisance associated with issues such as particulate matter, noise and blasting. Occupation of residential dwelling in close proximity to mining operations can also lead to psychological distress for individuals."
Noise is a comparatively neglected area of potential health damage but a sufficient baseline assessment should at the very least determine where there are people who have already existing hearing damage and also obtain baseline data of sleep quality and daytime sleepiness so that these can form the basis of the extent required for mitigating measures and be monitored to map the effectiveness of such measures.

Air Quality has traditionally been studied in greater depth than noise. Legislation has lagged seriously behind advances in scientific knowledge. Thus in 1993 the Harvard Six Cities Study demonstrated the critical importance of fine PM2.5 sized particles, yet 20 years later Australia still have not legislated to make their measurement mandatory. This legislative neglect with its inevitable consequence of unnecessarily increased mortality and morbidity makes the necessity for baseline assessment and ongoing monitoring of relevant health parameters even more imperative.

Air pollution and particles have both recently been officially recognised by the WHO as a carcinogen though the effect of PM2.5 particles and toxic gases in increasing the rate of lung cancer has been known for a long time. Poor air quality predominantly has effects on the respiratory and cardiovascular systems. BGSPA called for baseline lung function testing (spirometry) as the simplest measure to assess the respiratory function of 'At Risk' individuals but this suggestion has the notation 'Not necessary' in the EIS with no explanation as to how that conclusion was reached. We contest this conclusion since no satisfactory alternative is advanced. (Later in this submission I provide evidence of the high rate of already lung impaired, 'High Risk' individuals in the potentially affected community).

The failure of this EIS to detail a health monitoring system smacks of gross inequity. All miners elect to enter a possibly polluted environment. They have a health assessment provided before employment and only the fit are employed. They are monitored regularly and if their health becomes adversely affected an assessment and compensation system is in place. Miners unless they live close-by are only in a polluted environment for a quarter of the 168 hours in a week.
Community members mostly are reluctant victims of mining applications having come here for the clean air, and may be at 'High Risk' already (elderly, health impaired or children), can be in a polluted environment 168 hours/week, do not get an initial health assessment nor monitoring, nor is there a proper assessment and compensation system. Surely this inequity needs addressing urgently and the start is a health audit and a monitoring system to cover both air pollution and noise for each new open cut coal mining project.
With the absence of any sign of an official community health assessment and monitoring system the community has commenced doing this themselves using volunteers to do spirometry (lung function

testing), blood pressure and sleep quality monitoring (details further on) but this should be a mainstream preventive health commitment presumably funded at arm's length by the miners.

Human Health Damage – Background research facts

"Coal Pollutants affect all major body organ systems and contribute to four of the five leading causes of death:- heart disease, cancer, stroke, and chronic lower respiratory disease". (This is the opening sentence of the executive summary of "Coal's Assault on Human Health" a Nov 2009 report of the US Physicians for Social Responsibility.

In October 2012 the University of Sydney report 'Health and Social harms of Coal Mining in Local Communities' by Ruth Colagiuri et al has its key finding:- " There are clear indications from the international health research literature that there are serious health and social harms associated with coal mining and coal-fired power stations for people living in surrounding communities."
This report had many additional findings but particularly pertinent to this project:-
Adults in coal mining communities have been found to have:-

- Higher rates of death from lung cancer, chronic heart, respiratory and kidney diseases
- Higher rates of cardiopulmonary disease, chronic obstructive pulmonary disease (COPD) and other lung diseases, hypertension, kidney disease, heart attack and stroke and asthma
- Poorer self rated health and reduced quality of life

Children and infants in coal mining communities have been found to have:-

- Increased respiratory symptoms including wheeze, cough, and absence from school
- High blood levels of heavy metals such as lead and cadmium
- Higher incidence of neural tube defects, a high prevalence of any birth defect and a greater chance of being of low birth weight

These are terrible states of affair to impose unnecessarily on a community.

Human Health Damage and the Rocky Hill Coal Project
The extent and severity of health damage from open cut mining is shown in the classical pyramid EIS illustration (Fig 3.1 of Health Risk Assessment). In greatly increasing frequency but reducing severity these are listed as premature mortality, hospitalisation, emergency department visits, GP visits, restricted activity at home/work/school, medication use, symptoms, impaired lung and other organ function and other subtle effects. By restricting itself to deaths and hospitalisations the EIS creates a deception that since these numbers are small the total health impact is small. The vast majority of the numbers of health damaged people and the costs lie with those 'just' made sick but not hospitalised in the short term.

Health Impacts start from the announcement of the Exploration license. In the first years the health impacts are predominantly psychological in origin due to stress. Additionally Rural communities can attract stressed individuals seeking 'quiet and asylum' so there may be more 'High Risk' people than expected. There have been many such cases of mental disturbance already seen in the project area and assessment of this community stress from mining exploration should occur. (I am a retired psychiatrist working from Gloucester Medical Centre prior to my retirement in 2007. I saw perhaps 20 cases where coal mining or exploration was a significant stressor and contributor to their mental disorder).
The psychosocial stressors do not disappear if a decision to mine is taken, as the authors of some sections speculate. They continue during mining which we see in our community at Stratford and again these should be monitored and compensation considered. Regrettably, traditionally these 'psychological casualties' are ignored entailing even greater consequent health costs.

Buffer Zone
Recently there has been acknowledgement that the threat to the community surrounding a mine is indeed unacceptable and a buffer zone should be mandatory. A 2km buffer zone has been proposed for wind farms and future coal seam gas projects to limit exposure to low frequency and other noise.

The Senate Air Quality Inquiry Recommendation 3 reads " the committee recommends that buffer zones be used to protect populated areas from large point-source emitters".

It is now well known there is no absolutely safe level of exposure to PM2.5 particles and a 10km buffer zone has been proposed by Beyond Zero Emissions for open cut coal mines until a lesser distance has been demonstrated to be safe. This limits mining to relatively unpopulated areas as the only appropriate sites and would prohibit the establishment of this proposed mine. I support this principle.

Population 'At Risk', Deceptive and limited monitoring and data

This mining proposal is notable in it's proximity to a substantial concentration of human habitation. (approx 450 persons within 3km, 3500 persons within 7km). It is also notable in that consistently about 85% of the larger affected population state they don't want this development. This has implications for increasing the psychological impacts of the project.
Data collection. Some data collected is deceptive.
Air quality for instance is averaged over traditional annual and 24 hour periods thus obscuring shorter lived but much greater 'health endangering' peak levels. Monitors are not placed in small population clusters. The EPA takes a large population approach.
There are only two TEOM monitors capable of measuring PM2.5 particles so far and neither of these have been placed in population concentrations.
Senate Inquiry Recommendation 4 reads "The committee recommends that pollution monitoring should accurately capture population exposure for communities and homes proximate to pollution point sources". It also recommends that the NEPM Review recommendations be adopted which includes removing population sized thresholds.

The EIS contains a 'Health Risk Assessment' but this is again deceptive because it is only an assessment of air quality. It is compiled by non doctors who may not understand equating 'Health' just with 'Air Quality' is an oversimplified approach to the complexity of medicine and the human body. It is reviewed ('Peer' assessed) by a Consultant who regularly works for mining companies and whose conflict of interest is inevitable. He acknowledges that as a respiratory physician he is only an expert in assessing air quality and it's impacts, which is a limited part of the integrated health picture. He has no expert knowledge in psychosocial impacts neither is he an acoustician nor a toxicologist. His overall conclusions which include these other areas therefore have substantial limitations.
Acceptable Risk The term 'acceptable risk' is used by the medical peer reviewer, though this concept has never been discussed at an Australian community level and has no social legitimacy. It begs the question "Acceptable to whom"? Certainly not those adversely affected and not compensated.
When a development is not essential e.g. Rocky Hill Coal Project, the level of 'Acceptability' is surely less than when a development is critical for a nation's survival, yet the acceptable risk concept fails to distinguish between these very different situations.
A community survey of Stratford residents by BGSPA (available on request) found about 50% believed their health had been adversely affected by mining. Thus mining induced health impairments from Rocky Hill are therefore likely to affect at least several hundred people, yet apparently count for nothing. They need to be estimated and costed.

Populations 'At Risk' – Numbers and Health Status

Geographically 'At Risk'

Throughout the EIS maps have been used which list the properties extending to about 3km from the mine though no justification has been made for this cut off. (The only exceptions being when forced to plot noise for the larger community which extends 7km to the furthest reaches of town and air quality at 'sensitive receptors'). This repeated limiting of 'receptor' maps to 3km creates a false impression that the residents of these approximately 170 properties (approx 450 people) are the only people who will be affected. This is not the case:-

E.g. The predicted annual TSP Concentration contours from the proposal (pages 2A- 100-103) all extend out of the map into Gloucester township. If maps were presented for the seasons when there are southerly winds and if maps of shorter lived peak levels were presented then the impacted area would be seen to extend further and it might be easier to assess the degree of risk to hospital and nursing home inpatients etc where only an hour or two's immersion in a raised PM 2.5 environment may trigger an acute asthma attack or cardiac arrhythmia, also the number of dwellings that will be intermittently affected could be estimated.

The section on "Sensitive Receptors" provides 24hour averages for the High School and Captain Cook Park when we all know that for such sites this is an illogical time period and shorter duration peak concentrations would be the pertinent data.

High Risk Groups Studies from the UK of children living near mines have shown the frequency of asthma starts to rise above the background community rate of 10% if they live closer than 5km to a mine. At 3km the rate has doubled and at 1.5km the rate has trebled. Therefore all maps concerning air quality should be examining residencies at least extending to 5km and the changes resulting from different wind conditions. Averages are only helpful for estimating the load in conditions that slowly build up over years.

Noise and its health impacts

The potential importance of noise as a health hazard is emphasised by the World Health Organisation who report that traffic noise is harming the health of every third person in Europe and costing 40billion euros per year. The health impacts and cost of traffic noise projected on Jacks Rd, Bucketts Way and Gloucester town will be chicken feed in comparison but needs estimating. Traditionally industrial noise impacts have related to the hearing loss caused by excessive middle frequency noise and then more lately the disturbance of sleep by traffic, aeroplanes etc was the domain of Industrial Noise Policies. It is now realised many other factors should be assessed.

In 1975 Prof Arline Bronzaft in New York studied the cognitive development of different classes in a school close to a railway line. The school had a noisy side by the rail line and a quiet side the other side of the building. By the end of primary schooling children in classrooms on the quiet side were nearly one year ahead of children of the same age who had consistently been in a noisy classroom and the noisy classroom children had more disruptive behaviours. These cognitive and behavioural consequences of lower intensity noise have been seen elsewhere many times and recently Patricia Tassi et al has shown long term exposure to nocturnal railway noise has produced chronic signs of cognitive deficits and diurnal sleepiness. (Stratford school is only 100metres from the rail line that Rocky Hill coal will use.)

Constant night-time noise can cause an increase in stress hormones with an increase in blood pressure and cardiac instability, whereas sudden increases of more than 15dB are very likely to wake you and if this happens five or more times per night you are likely to get sleep deprivation.

Older persons (e.g. many Forbesdale and other new housing development residents) find interpreting speech more difficult if there is background noise. This is more marked if they also have

a hearing deficit. Therefore to assess noise impact it is important to determine how many people have hearing deficits.
People vary in their noise sensitivity just as it is well known people vary in their susceptibility to motion sickness.
Some people with schizophrenia and many with autism find noise particularly stressful.
Those who have been in military conflicts e.g. Vietnam frequently have Post Traumatic Stress Disorder which is exacerbated by sudden loud noise.
Sleep quality is influenced by the total duration of sleep, by the time needed to fall asleep, by the number of times you are disturbed, by anxiety, by pain etc. Recently hair cells in the outer cochlear have been discovered which respond to infrasound of low intensity that you can't hear.

Low frequency noise is notorious for the distance it travels, particularly in quiet rural settings and at night when there are temperature inversions. The further you go from the mine the greater the percentage of the noise is low frequency noise. It has very different health impacts to middle and high frequency noise. It is very possible some people living 10km away may be impacted. (The EIS failed to distinguish between the different problems associated with the different noise frequencies and appears to have totally neglected to use C-weighted measurements which are necessary to properly capture low frequency noise.)
The number of residents who will hear mining noise in future, who currently can not hear it, was required by the EPA (but not numerically provided) and could well be 1000+ people. The new noise (Predicted 10% exceedance $L_{Aeq\ 15min}$ page 1-101) contour map extends far into Gloucester urban areas including the council chambers and post office. It also shows an area at the foot of the Bucketts which will be impacted because of sound bouncing off the mountain. This map makes a mockery of the 3km zone List of Land Ownership etc. Noise will entail substantial health costs and argues for forbidding any mining operations or rail wagon loading at night.

Mining owned residencies
Those residencies owned by the mining companies tended to be ignored in lists of impacted houses despite their often being the closest to the mine and likely to suffer the most severe impacts. Even though the high mining wages and cheap rentals are a partial compensation for the likely health damage, the residents need to be warned and the local medical centre prepared for treating this important group. They will be very susceptible to blast fume mishap effects for which local medical staff may require specific education/training.

The miners themselves are a further group who even if they commute from distant areas and are of good health when first employed will still be at risk of being impacted and some description of the severity and frequency of likely impacts and their projected use of local medical services should be included in an honest and open EIS.

Baseline health audit
There has been no attempt by the proponent to do a baseline community health audit to assess the health status of the geographically 'At Risk' community. The Gloucester Shire is known to have more elderly persons than the state average and also more low income persons who are both "High Risk" subgroups. The Forbesdale community which is the closest to the mine, I am told has an average age of 65 years i.e. greater even than the Gloucester average age.
It is common to hear that someone has come to the bush for the clean air because they have a chronic illness and so this further 'High Risk' group (the chronically ill) may well also be over-represented.
The last 'High Risk' group are the very young who may be numerically under represented but their incompletely developed lungs, their immature immune defence system, and high respiratory rates makes them particularly susceptible to air pollutants. Thus the presence of 3 schools within 5km of

the mine rings an alarm bell and suggests baseline examinations, monitoring and community education will be required at the schools. Precautions should exist particularly for pregnant women with the foetus very sensitive to environmental toxins and even noise has been demonstrated to cause low birth weight. Who is to advise residents living close to the mine at what point you should move and not take the risk? If this is the local GP then they will need information to guide them.

Lung Function Testing and Sleep Quality Testing

A community group (Health Under Gloucester Skies, HUGS) alarmed by the lack of a baseline health audit organised for the accredited training of volunteer nurses to do spirometry (lung function testing) on concerned residents. To date (Oct 2013) more than 200 persons have had their lung function measured.

Spirometry Of particular interest may be the 49 persons, so far baseline tested, living less than 3km from the proposed mine. 18 persons(37%) had impaired lung function, 16 persons had high blood pressure and 11 persons stated they had hearing problems. 28 persons in this group are over 60 years old. They are still too small a group to be sure they are a representative sample but the strong suggestion is they have a high number of 'High Risk' individuals due to existing chronic disability. Further testing will be ongoing. Results can be forwarded to their GP.

Sleep Disturbance More recently a group have been screened with the Pittsburgh Sleep Quality Index (PSQI) and the Epworth Sleepiness Scale(ESS). We were struck by the high levels of sleep disturbance generally but particularly of the very high degree of sleep disturbance in the only two people who live at Stratford that we have tested so far.

It reinforces the principle that we should be guided by the mistakes from neglect of health impact assessment at Stratford (where there has been mining for 18 years just 1.5km from the village with no health assessments) and not repeat the same tragedies.

To date 56 people have had baseline sleep screening and only half of those (28) have non sleep disturbed PSQI scores.

Multiple and Cumulative Damaging Factors

Each body system is likely to be impacted by several mining stressors concurrently.

E.g. Sleep is impaired by :-

- sudden noises from mining, coal loader, railway etc causing frequent wakening,
- continuous noise causing sleep quality to be affected by stress hormones
- dust induced nocturnal asthma attacks leading to awakening and sleep loss,
- anxiety and depression from life time plans having to be put on hold, inability to sell one's house, fears of being poisoned etc. This leads to impaired sleep quality and reduced sleep duration.

The net effect is a cumulative one and likely to impair cognitive (memory, learning, decision making etc) abilities, cause emotional and behavioural disruption and increase next day sleepiness.

- Poisoning of the brain from heavy metals in the water and toxic hydrocarbons from CSG and diesel emissions will further exacerbate the sleep quality, cognitive, emotional and behavioural impairment effects.
- PM 2.5 levels are likely to be simultaneously increased by diesel emissions from mining vehicles, diesel emissions from generators for CSG well pumps and the Central Processing Unit and by a local farmer 'burning off'.

Calculating each individually as 'Proposal Only' but not creating likely cumulative lists promotes a deceptive and false level of security.

The semi-enclosed nature of the Gloucester valley means the valley walls enhance noise effects and cause air currents to keep particles within the valley. Additionally the valley shape promotes more temperature inversions. These all serve to extend the area and severity affected by mining noise and

dust. Whilst theoretically these may be planned to be accounted for in the computer modelling this was missed with Duralie Mine, which is further south down the same valley, where noise bouncing off the walls of the valley is a problem.

Air Quality Assessment

Production Rate

All the data presented is based on an assumption of mining 2Mta yet the application is to seek a license for 2.5Mta. The proponent states they anticipate they will only occasionally mine at the higher rate. It is common knowledge that the value of coal is on a declining trend so that there is high motivation to mine at a maximum rate and it is naïve to think the company will not do this whenever possible.
The data should all be presented again in accordance with the 2.5 Mta if a license is sought for this.

Dust (PM 10 and TSP) Minimisation

Substantial quantities of dust (approximately 60% of the total) are emitted from the coal stockpile and haul roads. The coal stockpile and CHPP could and should all be covered as is mandatory in China eliminating dust from these sources. Gloucester Council received details of a company providing such reusable covers using a Bolt-sphere grid structure. (Potent Mechanical and Industrial Co Ltd)
Haul roads should be regularly sealed/veneered, substantially reducing emissions from hauling. The EPA in their 'Dust Reduction Program' estimate haul roads dust emissions can be reduced by 80% from the levels presented in this EIS. These stricter limits should be part of the initial consent conditions.

Coal wagons emit high levels of dust for a short period of time (about 4 minutes) when they pass. Gradually uncontaminated rail track gets a load of dust which is stirred up when any train passes. Perhaps surprisingly empty wagons emit more dust than full wagons raising the levels up to 13 fold in the recent CTAG study. These recent findings by the Newcastle CTAG group demonstrates the inadequacy of spraying with water or an adhesive film because this is just done to full wagons and water has a very temporary effect as was found in Queensland. Covered rail wagons from any commencement of operations would greatly assist the health and amenity of Forbesdale, Stratford, Craven and Wards River communities locally and all other communities on the rail corridor to Newcastle. It reinforces the Senate Inquiry Recommendation 6 which reads "The committee recommends that state and territories require industry to implement covers on all coal wagon fleets".

Houses close to the mine should be offered air purifiers and an assessment made of their efficacy

PM 2.5 and Ultrafine (PM 0.1) Particle Minimisation

The EIS is confused about these smallest particles. They tell us how important they are then say it is OK to ignore diesel emission products.
There is an acknowledgement that they are now believed to be the most important so far as adverse health consequences are concerned and also that there is no level that is absolutely safe so that even if the proponent kept at all times below the current advisory levels there would still be adverse health effects (which are controversially labelled 'acceptable'). This uncomfortable fact supports the 10km suggestion by Beyond Zero Emissions as being the appropriate buffer zone distance.

The EIS tells us PM 2.5 particles are the result of incendiary processes whilst the larger particles are from mechanical processes (overburden and coal). One suspects there may be some overlap but the truth is we don't know the chemical make- up of our PM 2.5 particles because we have never investigated PM 2.5 particles in this valley. The Upper Hunter has had a PM 2.5 particle characterisation study which was sited within the towns of Muswellbrook and Singleton and highlighted the contribution of wood smoke in the winter season but PM 2.5 exceedances occurred all year. They did not determine how far from the town this effect extended. Our situation is very different since we have a much smaller town, the affected population is predominantly rural and fortunately we lack coal fired power stations.
Agricultural 'Burning off' and wood smoke from domestic heaters may contribute some PM 2.5 load as may the activities of Stratford, Duralie and even Hunter Valley mines and power stations. Spontaneous combustion has been a problem at Stratford Mine and its current status is unstated.

Diesel Use Effects
Diesel combustion products are a Group 1 carcinogen. This carcinogenic effect may well be from the ultrafine particles which are so small they can get inside cells and cause genetic change. The Senate Inquiry recommends further data on ultrafines be collected. It would be very appropriate to do this in Gloucester Valley since it is a site with no power station and so would help determine the relative contributions of diesel emissions and power station emissions.
Diesel fuel will be used on site at the massive rate of 16+ million litres per year in full production. This will require 5 x 10,000litre tanker loads every day of the year. There is no legislation regulating the level of exhaust emissions from off road vehicles. These diesel combustion products must be a principal source of the PM2.5 'incendiary' particles produced by the project. The predicted PM 2.5 level exceeds the advisory level at 2 residences. Yet the Consultant in his peer review on page 2C-8 states "….It is argued that emissions from combustion engines including carbon monoxide, sulphur dioxide and diesel fumes would be relatively low given the number of mining machines and the large area of the site together with the fact these emissions disperse rapidly and widely. Therefore these emissions are not considered in this report." This is a totally unacceptable conclusion.

The EIS states vehicles will be fitted with standard exhaust systems.
There must be every effort possible in minimising the exhaust emissions with the highest possible systems mandated. Any old machinery should particularly require updating of the exhaust emission controls.
The Senate Inquiry Recommendation 10 and 11 state "The committee recommends that the Commonwealth develop a national standard for diesel engines' and "….a national emissions standard for small non-road engines equivalent to the US EPA standards."

The exposure of mine workers to diesel fumes is a big concern.
The Senate Inquiry also recommends "Safe Work Australia undertake research regarding the exposure of workers in the hospitality, transport and mining industry to diesel emissions".
This EIS needs to include some statements on this issue of mine worker health.

The appropriate PM 2.5 and other particle consent criterion levels?
Clean rural communities such as ours have lower background levels than urban areas.
Whilst the WHO decided on an annual PM 2.5 maximum advisory average of 8microgm/cubic metre, this didn't specify the particular environment. The introduction of an open cut mine will increase the level by 1 or at the most 2microgm immediately next to the mine and so for a clean environment they shouldn't be allowed to go up to the 8microgm advisory level because every increase of PM 2.5 particles will result in an additional health burden. The different level of danger associated with fine and ultrafine particles means no unnecessary leeway should be provided. The background level in

the project area is about 4microgm and so the annual average consent criterion level should be at the most 6microgm/cubic metre.

Whilst the health danger argument is less compelling for PM 10 particles the mine still should not be permitted an unnecessarily high addition to the clean rural background levels. On the windiest ?10 days in the year mining operations should not be permitted. Advantage should not be taken of the normal pristine surroundings. Therefore the annual PM10 level should be at the most 20 microgm/cubic metre. (An advisory level the WHO is actively considering at the moment). Currently the background level is between 8 and 10 microgm and the 10microgm maximum 24hr isopleth is at the mine site boundary.

24 hour and annual PM 2.5 , PM10 and TSP consent criterion levels etc should all be adjusted down accordingly appropriate to the current low background particle levels.

Methane and Associated hydrocarbon emissions

The project area has also been the focus of attention by AGL exploring for Coal Seam Gas. There has been fracking of at least 12 wells concentrating around their Tiedman Lane property which is very close to the mine site. Following this fracking farmers in McKinley's Lane noted bubbling from their water bores and bubbles coming into puddles present after rain. This is highly suggestive of an increased background air methane level and associated hydrocarbons which include the carcinogenic and neurotoxic BTEX hydrocarbons. The air methane level from mining at Stratford has never been measured. The Chief Scientist may be investigating the extent of CSG leaking from the fracked but capped wells and this will have a cumulative impact with the mining fugitive methane (90,000 t CO2-e per year in full production). Monitoring of fugitive methane levels and associated hydrocarbons needs to be initiated.

A project studying surface water methane levels above and below mining has recently been completed by a Macquarie University honours student. The results are expected this month and may give information about how much methane is being leaked from Stratford Mine.

Degassification prior to open cut mining may be indicated.

Blast Emissions

Of all air quality environmental issues the EIS rates the generation of blasting fumes as posing the highest level of risk (High). Even after proposed mitigation it still poses a medium risk in the eyes of the proponent. Why is this deemed to be 'acceptable'?

NSW EPA has not set any air quality goals for NO. It has adopted the NEPM standards which have one hour and annual average goals.

For anyone caught by a blast fume cloud an hour is a ridiculously long period of time. NO2 turns to nitric acid with the moisture within the lungs and is immensely damaging. This is a further example of a situation that a very damaging peak level lasting only a few minutes can be hidden in a 1 hour average reading. Blast fumes should be continuously monitored, ?optically, with absolute peaks having criterion levels as well as the traditional 1hour average.

Ground Vibration and airblast risks are similarly rated 'High' with no proposed effective mitigating measures.

Clearly a policy of excessive blast strengths exists and the maximum allowable blast needs to be substantially reduced.

Domestic Rainwater tank contamination

This very significant public health problem first arose and has been the subject of subsequent intensive interventions at Stratford School where lead contamination was detected ten years ago. A Stratford resident was alarmed and checked her own water at an accredited laboratory and found

600 times the maximum accepted level of lead. This in turn triggered the most extensive Australian study of domestic rainwater tank contamination by heavy metals which was done in the Gloucester Valley by Macquarie University Environmental Science department headed by Associated Professors Damian Gore and Mark Taylor. They are both pre-eminent Australian researchers into heavy metal contamination. The study was a group project study done by their students. It was of 101 domestic rainwater tanks within 10km of Stratford or Duralie Mines. About half of those rainwater tanks are within 10km of the projected Rocky Hill Mine site. They are virtually all south of the site because town water has been extended to the new housing developments at Forbesdale.
The results of this study were not written in a journal but the veracity of the results is reflected in that individual water results were given to each householder with appropriate advice. (These individual results are still available but are not given here for confidentiality reasons).
The pertinent results are that 97% of tanks had a pH of between 5.0- 6.0. 16% of tanks had elevated lead levels and a different but overlapping 16% had elevated copper levels to a health endangering degree. Coal particles were observed in many samples but they didn't have equipment to measure hydrocarbons. Anecdotally residents observe their filters block with coal dust after a month or so such that the expense has led some to abandon replacement of the filters.Some tanks have an oily film. All metal tanks and metal guttering and roofing rusts in about a year. The source of the lead and the copper is the house's roofing, old painting and plumbing. The source of the acidity releasing these heavy metals is hypothesised to be a combination of natural and mine dust contaminants.
No investigation of the hydrocarbons in the tank water has been done.

The location of tanks likely to be affected by dust from Rocky Hill Mine needs to be determined, baseline measurements taken and an ongoing monitoring program organised.

Both NSW Health and BGSPA signalled the importance of this research by Macquarie University.
The EIS ignores this evidence or actively avoided obtaining it and quotes a small study by Gloucester Council employees who corroborated the presence of lead (but strangely dismissed it because the houses were in poor repair) and quoted other studies in distant situations. MidCoast Water do not have funds to extend the town pipeline without imposing a special levy.
The best solution to this problem is to order an extension of the town water supply as far as Stratford Village and be paid for jointly by Rocky Hill and Stratford Mine. Isolated residencies should have bottled water supplied again at joint expense of the mining companies.
Regular mine funded cleaning of tanks such as now occurs at Camberwell is a second best solution.

Greenhouse Gas Emissions
Global warming and acidification of the oceans are the 'elephant in the room' problems with this project. Climate change was described in Lancet in 2009 as the greatest threat to global health this century and the situation has only got worse since then. Australia has signed up to keep global warming to no more than 2deg and that necessitates leaving 80% of known coal reserves in the ground. Australia is increasingly obtaining a poor reputation internationally for accelerating it's rate of fossil fuel extraction and accelerating global warming.
The health effects of global warming have already commenced with more heat related deaths and signs of more tropical diseases such as malaria and dengue fever. Recent unseasonably severe bush fire conditions including two fire-fighter deaths may well be a local effect of global warming. Overseas there is an increase in dysentery and dehydration deaths.
Australia has made a commitment to make a modest reduction in greenhouse gas emissions which it had hoped to achieve through solar power reducing electricity generation but although electricity generation is reducing, the reduction in greenhouse gas emissions is more than being negated by increases in fugitive emissions from coal mining.

The attitude taken is that the effect of this project is a very small part of the whole problem from which we are to believe it makes it OK. Rocky Hill Coal will cause global deaths. Obviously if everyone takes this stance of denial no reduction in anthropogenic warming will ever happen.
A start must be made at some stage by reducing the number of new coal mines and this unnecessary and potentially disastrous mine from health impacts would be an excellent example to demonstrate a willingness for New South Wales to start to play it's part.

Health Economic Costs of Air Quality Impacts
Over the life of the mine 5154 tons of PM10 dust will be emitted. Utilising the modelling of Dr Geoff Morgan "Health Costs of Air Pollution in the Greater Sydney Metropolitan Region" Michael Bowman in the GRIP submission to this EIS estimated the costs as $408million. Noise health costs would be in addition.

Summary of Air Quality and associated Health Conclusions and Proposals

Grounds for Refusal of this project application

- The combination of (1) A large number of people living in close proximity to mining with inevitable risk of health damage. (2) An Absence of health costing together with a likelihood of health costs exceeding financial gains to the State. (3) The non-essential nature of this small mining project with disproportionately large harm and no irreplaceable features all combine to argue for refusal of this application.

- The 'Acceptable Risk' concept in relation to health damage has been inappropriately applied when these risks can be avoided without significant penalty to the State.

Proposals should this project not be refused
The following recommendations of the Senate Inquiry into air quality in Australia be followed

- A comprehensive Health Impact Assessment be conducted (including community education about preventive strategies, a health audit of the current health status of those living within 5km of the proposal, ongoing monitoring of this group and a compensation assessment system for any with suspected mine related health damage.
- Buffer Zone of several km's (to be negotiated) with offer of purchasing of properties within the buffer zone
- Cover all the rail wagon fleet
- A diesel emission standard for non road vehicles and machines
- Monitoring of the diesel emissions exposure of miner site workers
- Research into ultrafine particles emitted

Maps indicating locality and numbers of those suffering all levels of potential health impacts i.e. not just deaths and hospitalisations.

More detail about mining residencies close to the mine and whether habitation should be permitted in each residence

Details of full health impacts on miners of this proposal

Estimation of the increase in medical services required from the proposal

Data should be represented on a production rate of 2.5 Mta

Coal stockpile, CHPP and conveyors must be fully covered

Haul roads to be veneered/sealed to obtain the 80% dust reduction as per EPA program

A characterisation of the PM2.5 particle in the Gloucester Valley

Particle criterion levels need adjusting downwards to reflect the current clean environment prior to mining

A methane and associated hydrocarbon reduction and monitoring strategy

Maximum allowable blast to be reduced to lower risk levels from fumes and ground vibration

Blast fumes to be continuously monitored

Location of domestic rainwater tanks and any domestic bore water to be determined. Hydrocarbons in domestic rainwater tanks to be investigated. Tank water quality to be monitored and filters supplied

Town water supply to be extended to Stratford

An assessment of air purifiers for 'At Risk' homes

Conclusion

The Rocky Hill Coal Project is an unnecessary mine that is far too close to population. Inevitably it would cause enormous health damage alone far exceeding any financial benefits. It should be rejected.