

Hazelwood submission doc. Dr Joanna McCubbin.

I am a paediatrician based in Sale. I teach Environmental Medicine to Monash Medical students, in the Gippsland Clinical School. I was asked to teach this course because I had been active in the community group concerned about plans to build a Hazardous and Radioactive Waste Facility at Dutson Downs near Sale. I am a council member of the national Rural Health Alliance and was previously a member of the National immunisation Committee.

My interest in air quality was kicked along by living across the road from a peat fire in the summer of 2010-2011. The smell is very similar to the smell reaching Sale from Morwell this summer.



Dec 2010 air quality from peat fire across the road.

During that summer, having read of a similar event in Western Australia where evacuation had been considered, I requested air quality monitoring by EPA but was informed after about 6 weeks, that this would not be possible "as they only had one mobile monitoring station" which was being used at a construction site in the western suburbs. I was aware that 2 mobile monitoring stations were utilised during the 2006 -2007 campaign bushfires which burnt on both sides of The Great Divide with monitoring undertaken in Bairnsdale and also north of the Divide and published on the EPA website. This indicated that the technology was available to provide that information to the public..

Over the next 18 months this fire was not put out by flooding rains during winter. The following year, a million dollar roadside clearance was undertaken at tax payer expense, to protect The Esso BHP Longford Gasplant from the potential of fire to spread from the peat fire flaring up, on a north wind day.

It seems completely wrong that the tax payer funds protection for major international companies, who surely should contribute to defending themselves.



Peat fire site, Dutson Rd, Longford, Dec 2010

As a paediatrician I was especially interested in the potential effects of air pollutants on the foetus and the very young. Rapidly developing brains in small bodies would seem to be particularly vulnerable to inhaled pollutants because respiratory rates are much higher in the very small. If you are small you also receive a relatively higher dose on a per kilogram basis.

I made submission to the Senate Inquiry into air quality in 2013.

In February 2013, I also attended a roundtable on Health Implications of Energy Policy. A speaker at that event mentioned that public pressure in NSW had resulted in their EPA putting in 17 monitoring stations, the length of the Hunter Valley. If you registered interest, you could even receive text messages if Air Quality reached unsafe levels in your area. If this is possible in NSW I see no reason why the citizens of Gippsland deserve so much less.

The Office of Environment and Heritage (OEH) operates a comprehensive [air quality monitoring network](#) to provide the community with accurate and up-to-date information about air quality. Data from the monitoring network is presented online as ambient concentrations and air quality index (AQI) values which are updated hourly and stored in a database.

During 2010, OEH, in partnership with the Upper Hunter coal and power industries, established the [Upper Hunter Air Quality Monitoring Network \(UHAQMN\)](#).

From NSW EPA - <http://www.environment.nsw.gov.au/AQMS/hourlydata.htm>

This monitoring collects PM 2.5 levels for both the Hunter and Illawarra areas. I have, since, publically called for similar monitoring in Gippsland, when ever I have had the chance.

I attended an EPA Roadshow meeting, in Traralgon, on February the 18th (pre arranged in December 2013) as an invited Gippslander. The EPA staff indicated that they had had no plan for coping with an incident like this, as it was unprecedented. The initial actions taken, between Health, EPA and Fire Agencies, was to follow the Fire Emergency Response, as it was the only one they had, but essentially the strategy was being cobbled together as events unfolded. EPA staff were monitoring the air quality and alarmed at the information being provided to the Health. Department .They wished they had more monitoring equipment and that the air quality data could be put up on the website more quickly.

Over time there was more monitoring and more data put up on the website.

This did not occur until after Carbon Monoxide scares. The Morwell East (previously used monitoring station which used to have data directly on the website), was up and running again with data entered on the website, from February 13th. The new Morwell South station did not go "live" to the website until 19 / 2 / 2014. Other monitoring is still not available to the public, although there have been public statements that much more data is being collected.

There may be some silo effect with EPA staff and Health, operating independently of each other, and demarcation lines about who is allowed to make public statements. **Regardless it needs streamlining for the public to have confidence in the system.**

Key Issues I wish to discuss

1. **Regulation, Planning and Legacy issue**
2. **Health**
3. **Communicating difficult information to the public**
4. **Support for the health and mental health of residents and senior bureaucrats dealing with unprecedented events**

Regulation and Planning.

Much has been said, through the media, by local people, on the poor quality of rehabilitation of disused parts of the mine. I hope your inquiry will flesh out the realities from the rumour and innuendo, but there is a certain consistency to the statements made by many ex-employees, who may have worked there through the privatisation times and later.

In general, I do not believe that we have thought through the abandonment of mining, nearly cleverly enough. It is now obvious that subsidence, flooding,

fugitive emissions etc, are likely from all types of mining to a greater or lesser extent. **The fire risk from open cut mines or abandoned gas wells will become an increasing burden, unless we have very tight regulations mandating thorough rehabilitation of the mining site so that legacy issues will not haunt future generations.**

It seems ludicrous that houses and a freeway and even a school have been built as close to the mine as they are. This should never be allowed to happen again. If we cant have wind turbines which have not been proven harmful to human or animal health, within 2 Km of a house, it should not be possible to be that close to a mining activity!

There needs to be consistency and transparency in how disused mining sites are treated. The ordinary citizens need the security of knowing at a glance who is responsible for future contingencies, especially if companies merge or go bankrupt leaving mining disasters behind. The State Govt and the local community, need to be able to stipulate exactly how the site needs to be left when its usefulness is over. It is unlikely that any open cut mine will return to agricultural use, to any great extent. The community needs to be able to balance the future food productive value, against the short term value of the mining resource which prevents future agricultural endeavour.

A weighting that factors in whether an activity is renewable, should be factored into the relative value s of conflicting land uses.

The current Government is keen to open up more open cut mining and also unconventional gas mining. These industries need to come under the same constraints that should arise from this Inquiry. The Government should not allow new mining allocations to go to tender before the Inquiry recommendations have been made public and been widely discussed. **The thought of more open cut brown coal mines, which have proven to be highly flammable, in a landscape that will become more fire prone, beggars belief.**

It seems that fire protection will be an on going issue especially in light of climate change. We already have large areas of mine wall that need to be remediated in the existing mines. **I would love to see the Hazelwood mine area, adjoining Morwell, turned into a terraced, rainforest garden. "The Hanging Gardens of Hazelwood" could even become a tourist attraction.**

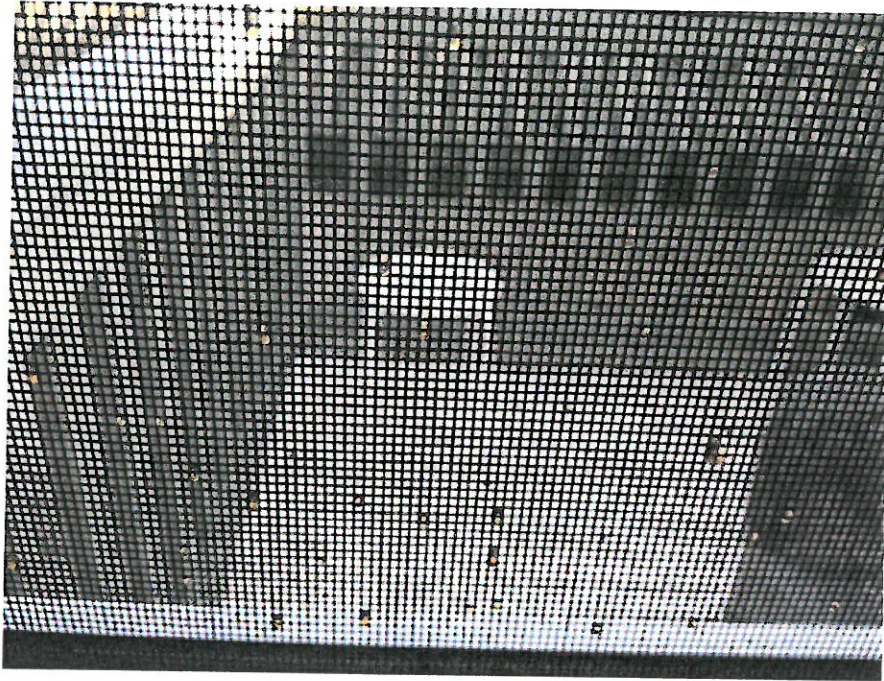
Funding and access issues would arise but should not be beyond human ingenuity to overcome. There would be valuable community building and job creation arising. Involving local people in the solutions would be a useful means of restoring trust and mental health for citizens.

1. Health Aspects

The smell from the Hazelwood fire could, in the wrong wind conditions, be smelt as far away as Bairnsdale in the East and Leongatha to the South. Places like Sale and Mirboo North regularly got to enjoy the stench. It should not be forgotten that a large swathe of Gippsland from just east of Stratford to Orbost in the east, burned around the same time. The air quality was extremely poor there as well, but not monitored. Obviously the less densely settled areas were not such a high priority, but they suffered too. Houses and livelihoods were lost and the people fighting the fires were subjected to weeks of extremely poor air quality too. Recommendations from this inquiry will inevitably be taken seriously elsewhere. It may be important that there is a separate inquiry for East Gippsland but also some air quality and health monitoring of that population. However I would add that a similar situation (Peat fire) in North Carolina, was cleverly studied using satellite technology and particularly detailed health data collection in that state, to study the effects of the fire on the health of dispersed populations. **They noted significant effects on a larger community 200 km from the fire, when the winds blew in that direction for 3 days.**

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3230437/> - !po=92.1053

This may be a useful method for studying the health effects on dispersed populations which might not otherwise reach statistical significance. However in very remote areas with limited access to medicare / GP services, it may be very hard to track the outcomes.



Brown fog droplets on screen in Sale approx 75km from Morwell 18/2/14

The two key health concerns for local people were Carbon Monoxide (CO) in the short term and Fine Particles (PM₁₀ and PM_{2.5}) and volatile organic compounds, in the longer term. Particularly for the fire fighters and anyone down in the mine (including visiting politicians, health workers and GDF Suez staff) Carbon Monoxide was causing illness, and appears to have been dealt with appropriately once the scale of the problem was recognised. CO may be acutely poisonous and rapidly lethal if the affected individual is not removed to clean air and/or treated with oxygen.. Clouded consciousness and poor decision making may be symptomatic of the early stages of CO toxicity.

For fire fighters, especially those volunteers who sign up to protect their own rural communities, air quality issues are a growing concern. Some cancers are known to be associated with fire fighting. It strikes me as patently unfair that MFB officers will be given some guarantees if they succumb to cancer but not the volunteers. **In recent weeks I have spoken to several who say they will no longer be active in their local CFA because of health concerns.**

CO was also an issue for local people on the Saturday afternoon when text messages were sent telling residents to go inside and seal up their houses. This was the day after CO monitoring went live on the EPA website. The public do not know what happened before then, but since fire intensity was very great in the early part of the fire and there was more of a focus on protecting the power station, there is room for concern, although it seems likely that people were not significantly harmed.

Can I say we are not critical of the fire services or the fire service commissioner; we believe they're doing everything in their power. **This is just a fire like they have not seen before.** The complexity of the fire and the material that actually is burning, the protracted nature of it, it is an extremely hostile environment.
Peter Marshall UFU Vic from The World Today 17/2/14

Fine Particles

It is well known that smoke can cause exacerbation of lung and heart conditions, but less well known that very fine particles (PM_{2.5}) may get into the blood stream from the alveoli, and then can travel anywhere in the body, to have more distant effects.

WHO update March 2014, reports that there is an increase in morbidity and mortality immediately after exposure, and following longterm exposure.

There is some analysis of the short term and longer term exposures to ultrafine particles acknowledging that repeated exposure on subsequent days may be worse than a single day of high level pollution.

As well as heart and lung inflammation, there is an increased risk of lung and bladder cancers, from long term exposure.

The report notes that : Small particulate pollution have health impacts even at very low concentrations – **indeed no threshold has been identified below which no damage to health is observed.** Therefore, the WHO 2005 guideline limits aimed to achieve the lowest concentrations of PM possible.

Guideline values

PM_{2.5} □ 10 µg/m³ annual mean □ 25 µg/m³ 24-hour mean

PM₁₀ □ 20 µg/m³ annual mean □ 50 µg/m³ 24-hour mean

<http://www.who.int/mediacentre/factsheets/fs313/en/>

Also from WHO and the European Commission, a review project
<http://www.euro.who.int/en/health-topics/environment-and-health/air-quality/publications/2013/review-of-evidence-on-health-aspects-of-air-pollution-revihaap-project-final-technical-report>

AKA REVIHAAP project

There is increasing, though as yet limited, epidemiological evidence on the association between short-term exposures to ultrafine (<0.1 μm) particles and cardiorespiratory health as well as the central nervous system. Clinical and toxicological studies have shown that ultrafine particles in part act through mechanisms not shared with larger particles that dominate mass-based metrics

There is also some emerging evidence that there may be neurological effects in later life such as Parkinsons and Alzheimers. With increasing understanding of the reactions within and between brain cells, and the underlying genetic and biochemical mechanisms occurring, we are only just beginning to fathom, what really happens, to cause the outcomes observed. It seems likely to be a mix of multiple factors but clearly inflammation caused by inhaled pollutants may begin causing damage at a young age although effects may take decades to become measurable.

<http://www.jneuroinflammation.com/content/8/1/105>

A key concept is that some reactions may trigger cell death, which if it occurs with advancing age, leads to the slow onset of observable damage. However in the developing foetus, the rapid multiplication of cells and the growth of nerve pathways, happens so quickly, that even a few days exposure to the wrong environment, may lead to relatively massive loss of brain tissue.

Children and Pregnant Women

There is evidence that environmental exposures may contribute to prematurity and low birth weight. This article (see below) contains **good diagrams showing the time frame during pregnancy when different organ systems may be susceptible.**

The fetus undergoes rapid growth and organ development and the maternal environment helps direct these processes, for better or for worse (Figure 1). . These babies are far more likely to die in infancy, and those who survive have high risks of brain, respiratory, and digestive problems in early life. The impact of environmental exposures on fetal development may be far-reaching, as data suggest growth and developmental delays *in utero* influence the risk for heart disease and diabetes in adulthood.

<http://www.environment.ucla.edu/reportcard/article1700.html>

“Cleaning up the air we breathe prevents noncommunicable diseases as well as reduces disease risks among women and vulnerable groups, including children and the elderly,” says Dr Flavia Bustreo, WHO Assistant

Director-General Family, Women and Children's Health.

<http://www.who.int/mediacentre/news/releases/2014/air-pollution/en/>

Increasingly there is evidence, much of it from China, linking PAH's and heavy metals in coal fired power station smoke, with neuro developmental problems in the children resulting from the affected pregnancies

<http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0091966>

Molecular and Neurodevelopmental Benefits to Children of Closure of a Coal Burning Power Plant in China

Deliang Tang et Al

In a similar vein, this study from Poland sets out some potentially useful information on study design. New York City, Krakow and the present Tongliang cohort have shown that the developing fetus is more susceptible than the adult to PAH.

Int J Occup Med Environ Health. 2003;16(1):21-9.

Effect of prenatal PAH exposure on birth outcomes and neurocognitive development in a cohort of newborns in Poland.

Study design and preliminary ambient data.

WIESŁAW JEŃDRYCHOWSKI et Al

<http://www.ncbi.nlm.nih.gov/pubmed/12705714>

I believe that cognitive and behavioural follow up of children born to exposed mothers, should be long term. Experience with very low birthweight (VLBW) premature infants, show that 2 yo performance often looks bad but things seem to improve, so that preschoolers appear to perform within the normal range. However, subtle learning difficulties begin to emerge in the primary school years. Useful data sets which may be accessed include AEDI data looking at vulnerabilities noted by pre school teachers and potentially NAPLAN

It is instructive that genetics has taken over most fields of medicine in the last decade. With the revolution in science in this field we have seen unfolding understanding of the detailed mechanisms by which different chemicals, inflammatory substances etc., have their effects on biological systems.

It is likely that there will be an explosion of information during the life of the 10 year Health Study, and this needs to be borne in mind in costing and scoping the study.

Communicating with the community.

It seems that this was the worst aspect of the whole event. Most of the concerns arose from what was **not** said and who did **not say** it.

Craig Lapsley was the standout performer. He seemed to say it like it was and each day gave out thoughtful information, that the community needed. He did not seem afraid of answering questions from the media or the community, with apparent genuineness.

The politicians were most notable for their absence. The State Politicians were apparently sneaking in and out, but not speaking to the media. The Local Councillors eventually began to fill the leadership gap. It came across as the Politicians being too scared to speak to the public, who as a result became more and more angry.

I was stunned to hear that the Health Minister was handing out largesse in Bairnsdale, and must have travelled past Morwell to get there, yet he appeared to scurry back to Melbourne, and somehow expect Gippslanders to be impressed. I got the very strong impression that all the Coalition politicians had been banned from speaking, leaving it to the bureaucrats to cop the flack. What I don't understand, is what they were so scared of? The likes of Bill Shorten, did well by being associated with the Beaconsfield Mine disaster in Tasmania.

Ministers could have done their images a lot of good, by doing "a Lapsley" And telling it like it was.

If they were terrified of saying the wrong thing and laying the Government open to litigation, it would seem that their behaviour probably rendered that inevitable. It is a core rule of Medical Defence Insurers, that you must show, compassion and express regret, early and often. Being available to take questions is the key to not looking mean, sneaky and guilty as Hell!,

I am aware that politicians from both sides of the house, visited the mine and the incident control room, and no doubt acted as a regular annoyance which slowed the work of the team trying to control the fire. Sadly they were seldom out talking to the locals.

The community REALLY needs answers as to why they were so very missing in action!

The other key aspect which was not told to the public, was the process by which health wisdom was sourced. Having at one stage been the Rural Doctors Association representative on the National Immunisation Committee.

I was a regular participant on roundtable teleconferences, during the roll out of the Pandemic Flu vaccine. Rosemary Lester was also on the calls at this time. The hook ups were convened by the Commonwealth's Chief Medical Officer. It was an important way of sharing doubts, questions, suggestions etc.

I only know through my membership of the National Rural Health Alliance that Senator Richard Di Natale, asked the current CMO, questions in senate

estimates. The CMO stated that there had been such teleconferences convened to help Rosemary Lester . Most tellingly he struggled to answer questions about political interference with this process.

I believe it would have been sensible to make public statements about this kind of conference to seek advice. It would have been an opportunity to make the point that this was so unprecedented that it was hard for health professionals to know what to advise.

Instead there was little actual information provided except for constant reiterations that the EPA was sending air monitoring data and Health were dealing with it.

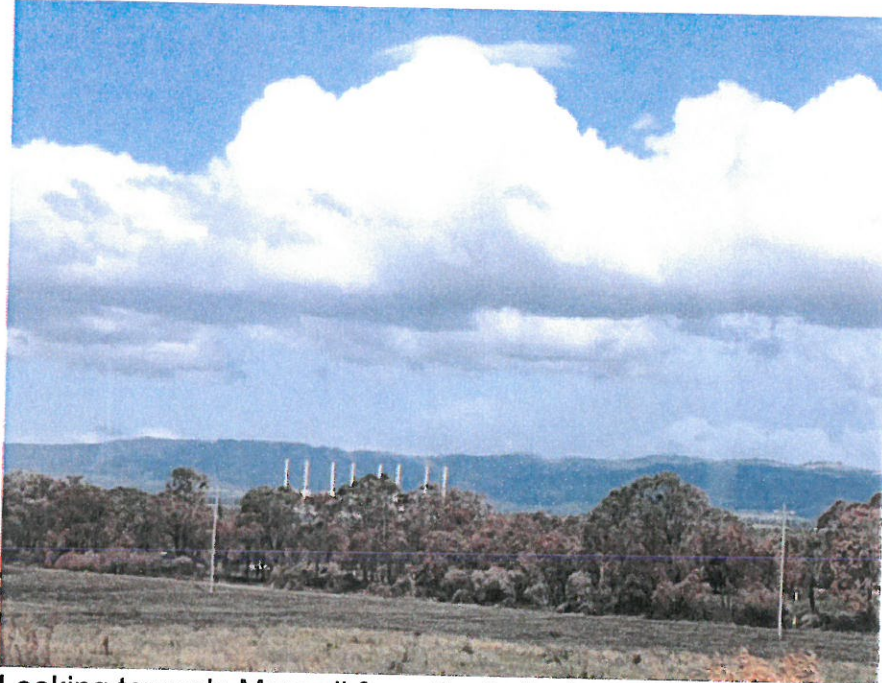
The health messages evolved over time and it would be useful for the committee to have a Time Line of who said or did, what and when that occurred

I know that a low level smoke alert was issued for Gippsland on February the 12th. The warning suggested that people with pre existing health complaints should stay in doors. This seemed inadequate and I e mailed Rosemary accordingly (See Appendix below).



This is what it looked like around Nowa Nowa, with air which stung the eyes and airways. It would clearly be harmful; to anyone to exert themselves in such conditions. **However, that is what fire fighters do!** This is smoke from the bushfires near Bruthen and Goongerah but also contributing to poor air quality in Gippsland more generally. This was also the day that carbon monoxide toxicity became an issue in the Morwell mine.

The quality of health alerts improved with time, but there were more questions than answers. Eventually the decision was taken to close schools and childcare centres and pregnant women were included in the health warnings. Still there was no recommendation for evacuation although recommendations to spend time away from Morwell were provided.



Looking towards Morwell from the train, burnt trees in the middle ground. March 2014

The community considers that evacuation should have been seriously discussed, and at a much earlier point.

The longterm health impact study is a good step. It is also an acknowledgement that people's health may have been put at risk. A focus on mental health is also very important. The well being of the bureuacrats who have been in the firing line, also needs to be considered.

In Summary:

I hope the inquiry will help to lay out a document that guides others in dealing with this kind of disaster. It is increasingly likely that similar events will happen, world wide as we dig up more and more of the earth's surface, to get at increasingly scarce resources, in a warming climate.

Recommendations to Government that prevent bad planning and mining

regulations, would also be welcome.

A well designed health study will be an important part of the mending process for the community around Morwell.



Cold war Gas mask available through Army Disposal Stores

APPENDIX

