

Date: 7 September, 2006

To: Ms Rachel Callinan
General Purpose Standing Committee No 3
NSW Legislative Council
Macquarie Street
Sydney NSW 2001

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SCHOOL OF
SAFETY SCIENCE

Regarding: Inquiry into health impacts of air pollution in the Sydney basin

Dear Ms Callinan

Thank you for forwarding the transcript of my evidence after appearing before General Purposes Standing Committee No 3 on 16 Wednesday 2006.

My suggested comments on my draft transcript are attached.

With regard to the questions on notice:

1 What kinds of pollutants do such sources emit, and which of these are the most significant?

The important environmental atmospheric pollutants are gases and vapours on one hand, and the particulates on the other.

The main gases such as carbon monoxide, oxides of nitrogen, oxides of sulphur, ozone where pollution is present, N-nitroso compounds, volatile organic compounds (such as benzene, n-hexane or other solvents), polyaromatic hydrocarbons and chlorinated hydrocarbons (such as trichloroethylene, vinyl chloride or dioxins). The most common sources of environmental pollutants of this type are industrial production facilities, motor vehicles and domestic heating.

The main particulates are the heavy metals (such as lead, mercury, cadmium), inorganic particulates such as asbestos and silica and organic particulates such as pesticide drift or moulds. Dust particle sizes of certain sizes (below PM_{10} and definitively below $PM_{2.5}$) are toxic because of their size, rather than chemical properties. The most common sources of environmental pollutants of this type are mining organisations, industrial production facilities, power stations, motor vehicles and agriculture.

One pollutant to keep a watching brief on is manganese, as it may be being used as a replacement for lead in petrol. I consider that in the long term, manganese would be worse than lead as an environmental pollutant.

Environmental pollutants can cause immediate (acute) or long-term damage (for example, through carcinogenic, mutagenic or embryotoxic substances). They can cause damage on their own, or in combination with other substances (the

combination effect): non-toxic substances can combine to form poisons (for example, the N-nitroso compounds). The transformation from non-toxic to toxic substances (and contrariwise) can take place both in the environment (water, soil, air) and in the bodies of living organisms. Particularly dangerous environmental pollutants are characterised by a good rate of absorption into the human body, long biological half-lives and high stability (persistence).

2 Based on your experience and expertise, how has the air quality situation in the Sydney Basin changed in the last thirty years? Are we seeing any new threats to air quality emerging?

My evidence is personal. I arrived in Australia in 1983. I remember seeing the Sydney skyline clearly from south of Sydney on trips back from the south, and the Blue Mountains from travelling on the Western Highway. The clear views I recall from two decades ago have gone. They are now hazy and indistinct. Within the past 5-10 years, the trip from Canberra along the Hume Highway is associated with stinging eyes as I drive off the Southern Highlands, probably from entering Sydney's smog. These are all changes caused by generic environmental pollution, and all changes for the worst.

Other evidence is more descriptive. The NPI report for 2004-05 lists a number of companies and organisations that have admitted releases of high or medium amounts of chemicals in the Sydney region. These include:

Company	Place	High	Medium
Amcors Packaging	Enfield		Ethyl acetate
Amcors Packaging	Regents Park	Ethyl acetate	Ethanol
Ameron Coatings	Seven Hills	Dibutyl phthalate	
Appin Power Station	Appin	Formaldehyde	Acetaldehyde
Ashton Coal	Singleton		PM ₁₀
Austral Brick	Horsely Park		Flouride compounds
Blue Scope Steel	Port Kembla	Acrylonitrile Carbon monoxide 1,1,2,2-Tetrachloroethane Polyaromatic hydrocarbons 2-Ethoxyethanol acetate	Acetonitrile 2-Ethoxyethanol
Caltex	Kurnell	Biphenyl	
Cargill Foods	Springdale	Ammonia	
Coal and Allied	Singleton		PM ₁₀
Continental carbon	Kurnell		Polyaromatic compounds
CSR Bradford Insulation	Ingleburn		Phenol
CSR Building Products	Cecil Park		Ethyl chloride
CSR Building Products	Schofields		Ethyl chloride
Delta Electricity	Vales Point		Sulphuric acid Oxides of nitrogen
EDL Coal Seam Power	Duglas Park		Formaldehyde
Edmonds	Dee Why		Trichloroethylene
Foamco	Minto		Dichloromethane
Huntsman Corp	Matrville	Ethylene oxide	

Company	Place	High	Medium
Joyce Corp	Moorbank	Dichloromethane	
Macquarie generation	Mussellbrook	Sulphuric acid Selenium Oxides of nitrogen	Sulphur dioxide Fluoride compounds
Mount Thornleigh/ Warkworth Mining	Singleton		PM ₁₀
Mt Arthur Coal	Muswellbrook		PM ₁₀
Nalco	Banksmeadow		Acrylic acid
Nuplex Industries	Botany	Methyl methacrylate	
Orica	Kooragang Island	Nitric acid	
Orica	Matraville	1,2-Dichloroethane	
Pacific Brands	Wetherill Park		Dichloromethane Toluene-2,4- diisocyanate
Pilkington Glass	Alexandria	Antimony and compounds	
Rockdale Beef	Yanco	Ammonia	
Sydney Water	Malabar	Total Nitrogen Total Phosphorus Ammonia	Acetaldehyde Hydrogen sulphide
Sydney Water	Manly	Total Nitrogen Total Phosphorus	Ammonia Acetaldehyde
Tomago aluminium	Tomago		Fluoride compounds
Visy Board	Hoxton Park		Tetrachloroethylene
Wattyl Australia	Blacktown		Toluene-2,4- diisocyanate

This is not a short list. I do not believe it to be complete. Further, sources of environmental pollution from traffic and agriculture are not recorded.

New threats to air pollution are less about new sources of pollution and more about increases in existing sources – more cars, more industry, more pollution.

3 Based on your experience, which poses the greater danger to human health; air pollution caused by road use, or air pollution caused by road use, or air pollution from industrial sources?

This is a simplistic question that cannot be answered with any certainty. In the list extracted from the NPI above, there are conventional sources of pollution (such as dusts from mines or emissions from power generation and industry) which are known to affect the health of humans.

To answer the question realistically, the greater risk is from proximity to sources of pollution. People who live near industry that pollutes or road tunnels are more at risk than people living further away. Such effects tend to be local, it would be difficult, except in broad terms, to note that air quality in general in the Sydney basin has a greater risk on a regional basis.

Further, while it may be outside the terms of reference of the Inquiry, these pollutants also affect the environment, and a reasonably large number have environmental effects associated with them, including global effects such as

greenhouse warming. These effects should not be discarded in the committee's deliberations.

4 The terms of reference require the Committee to inquire into the health impacts of air pollution on any 'at risk' groups. Are you able to identify any groups particularly at risk of adverse health impacts from air pollution in the Sydney Basin? If so, what are the likely health impacts?

People at risk include:

- Residents close to sources of pollution. Effects include sensory irritation and respiratory effects based on exposure to pollution, and toxic effects (either short or long term) dependent the individual or interactive effects of exposure to specific pollutants.
- Children. There are higher rates of leukaemia in children living near busy roads.
- Asthmatics. People with respiratory sensitisation and allergy are more prone to respond to environmental pollution. They are also likely to respond to lower levels of exposure. Effects would be increasing incidence of asthma, and increasing severity of asthma when it arises.
- People with respiratory diseases, especially bronchitis and emphysema. Effects would be increasing incidence of respiratory problems, and increasing severity of respiratory problems when it arises, perhaps leading to death.
- The immunologically compromised. Such people lack basic defence systems to deal with chemical exposures.
- The elderly. The ability of people to biologically respond to chemical exposures both decrease with age and decrease with increasing body burden of chemicals bioaccumulated in life.

5 Based on your experience and expertise, what more could be done to improve air quality in Sydney?

Firstly, amend all environmental pollution and control legislation to establish that organisations have the specific obligation of a duty of care to ensure that their activities does not affect the community or the environment.

Secondly, the duty of care must be met by the development of due diligence systems that releases outside the organisation (whether to air or any other environmental compartment) should be identified, assessed and controlled to the lowest practicable level using the hierarchy of waste management: i) waste elimination; ii) waste prevention; iii) waste reduction; iv) re-use; v) materials recycling; vi) on site treatment; vii) off site treatment; viii) discharge to air by incineration with energy recovery; ix) discharge to air by incineration without energy recovery; x) discharge to air by landfill with energy recovery, xi) discharge to air by landfill without energy recovery; xii) discharge to water.

At the moment, the Protection of the Environment Operations Act allows load based licensing (a measure a long way down the hierarchy of waste minimisation) which sends a message to polluters that it is acceptable to pollute as long as you pay for it. This message is misleading, and should be replaced with one that says any pollution is unacceptable.

These two provisions will then drive organisations that pollute to better address the pollution they cause, including applying the hierarchy of waste minimisation to reduce emissions. Initiatives such as life cycle systems or cleaner production will help with this process.

I hope this assists.

A handwritten signature in black ink that reads "Chris Winder". The signature is written in a cursive, flowing style with a horizontal line underneath the name.

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ASSOCIATE PROFESSOR IN APPLIED TOXICOLOGY

7 September, 2006