

Toxic cocktail in fumes and dust

By MATTHEW KELLY Environment Reporter
April 12, 2013, 10:30 p.m.



CLOUD: Dust fills the air after blasting at a Hunter Valley mine. Picture: Brian Purdue

HEALTH professionals have demanded greater protection for Upper Hunter residents from a potentially deadly air-borne cocktail of mining dust and blast plumes.

It follows Department of Health advice to residents to head indoors to avoid potential contamination from toxic fumes.

Doctors have raised specific concerns about the long-term health effects on children who have been exposed to blast toxins and particulate matter.

“The long-term impacts can vary depending on the level of exposure but we do know that those tiny particles can get into people’s blood streams through their lungs,” Doctors for the Environment spokeswoman Dr Linda Selvey said.

Residents will present evidence of how their lives have been affected by poor air quality when a Senate inquiry visits Newcastle next week.

The concerns coincide with the release of the Environment Protection Authority’s Upper Hunter Air Particles Action Plan, which aims to improve the region’s air quality.

Jerrys Plains mother-of-five Di Gee is typical of parents who are concerned about the impact of air quality on their children's health.

Three of her five children suffer from asthma and 16-year-old Courtney is worst affected. Courtney, who was diagnosed with asthma when she was just four months old, has missed a significant amount of school this year because of her condition.

"I can't prove it but I think her condition is connected to the fact that she was born at the start of the mining boom," her mother said.

The family's home had been airconditioned in an attempt to assist the children's breathing.

"The reality is you can't live in a bubble," Mrs Gee said. "When the air changes and the dust increases, so does the asthma."

Courtney's doctor, Singleton GP Tuan Au, said the children were usually the first casualties of poor air quality.

"Young kids are very sensitive to dust because their airways are small," he said.

"If their airways are regularly inflamed, they are more likely to get a scar on their lungs, which means they are less likely to get rid of asthma when they get older."

National Asthma Council of Australia chairwoman Dr Noela Whitby said a significant body of research had highlighted the links between air-borne pollutants and asthma.

"In some ways adult lungs have been desensitised whereas children haven't had that advantage," she said. "From that perspective, the children are more vulnerable because they have new lungs."

An Environment Protection Authority spokeswoman said the authority was committed to ensuring the impacts from mining activities, such as blasting, remained within appropriate environmental and health standards.

"As a condition of operation, mines have set limits for ground vibration and overpressure [blast waves] as part of their environment protection licences.

"When conducting blasting, mines are required to take wind speed and other environmental factors into account to minimise dust emissions and blast plume drift."

Late last year, the EPA developed new blasting guidelines in consultation with the mining industry and is looking to adopt those guidelines in its current licensing conditions.

NSW Minerals Council chief executive Stephen Galilee said the industry had invested significant time and money into reducing the impacts of its operations.

“Air quality is a very important issue and we do take it seriously,” Mr Galilee said.

“That’s why the Hunter mining industry funds the Upper Hunter Air Quality Monitoring Network.

“That’s why we recently welcomed the release of the mine Pollution Reduction Programs by Environment Minister Robyn Parker.

“The industry has also been working closely with the Environmental Protection Authority on the issue as well.”

Residents inundated with black mine mess

WHEN Judy and Dexter Hadley moved to Jerrys Plains in 1981, they were surrounded by prime dairy country and rolling hills.

Three decades on and their neighbours are open-cut mines that ring the village.

Mrs Hadley wants to know at what point mining activities that produce dust and toxic fumes became more important than residents’ rights.

She cited the latest Department of Health advice to stay inside to avoid blast plumes.

“If you don’t go outside what happens to your livelihood? Should you still send your children to school,” she said.

And then there is the dust.

“I basically spend my time cleaning the bath because it’s full of the black stuff.”

Mrs Hadley, a retired school teacher, said she believed the health and environmental consequences of the mining boom would linger long after its financial benefits had past.

“It seems that our government, which represents all of us, doesn’t seem too fussed about sacrificing small towns and the people in them for the greater good,” she said, “assuming the destruction of farmlands and possible destruction of rivers et cetera does represent the greater good.”

HEALTH ADVICE Stay in and shut doors

THE Department of Health has advised Upper Hunter residents to head inside and close the doors and windows if they see a blast plume approaching.

The advice, in the fact sheet Mine Blast Fumes and You, explains the potential health effects of exposure to the toxic fumes.

Nitrogen dioxide and nitrogen oxide are the most dangerous gases produced from blasting.

“Gases produced during blasting usually disperse rapidly and pose no acute health risk. Under certain conditions the gas plume may persist and can affect nearby people or residents who are downwind of the blast site,” the fact sheet says.

Symptoms from high-level exposure may include eye, nose and throat irritation, coughing, dizziness and headache, shortness of breath and wheezing or exacerbation of asthma. Serious lung inflammation has also been known to develop several hours after exposure to high levels of nitrogen dioxide.

Anyone exposed to plume gas should wash their eyes thoroughly and clear their nose and throat.

“If you experience respiratory symptoms you should seek immediate medical attention and inform the doctor of possible nitrogen dioxide exposure,” the fact sheet says.

Hunter New England Health public health physician David Durrheim said blast fumes should be reported to the Environment Protection Authority’s environment line on 131555.

They can also be reported on 65753405.

ACTION PLAN EPA collaboration call

THE Environment Protection Authority has released the Upper Hunter Air Particles Action Plan to provide better information about air quality and the actions under way to improve the region’s air quality.



RED ALERT: Bulga woman Jan Hedley (pictured at right) wants the community to be aware of potential health risks associated with open-cut coalmine explosions, such as the one that sickened her. She took this photo of a plume over Putty Road on Friday. the photograph was taken seconds after the blast.

Blast scare



WARNING: Jan Hedley with a photograph of a similar incident in Queensland.

By Paul Maguire

BULGA woman Jan Hedley has been sickened by the toxic red and orange plume from an explosive blast at the Mount Thorley Warkworth open-cut coalmine.

It caused a pounding headache, she went pale, felt nauseous, had a tight chest, developed breathing difficulties like an asthma attack and experienced high blood pressure.

Mrs Hedley saw a doctor for about two hours immediately afterward and returned to the doctor yesterday for a check-up to ensure her health had set-

led down.

Mrs Hedley said it was lucky she was only caught by the edge of the plume, which she saw travel over several kilometres after a 12.15am blast last Friday.

Her car was engulfed near the intersection of Putty and Wallaby Scrub roads by remnants of the fumes after waiting until she thought it had cleared before continuing to drive down Putty Road.

Mrs Hedley's husband, Ian, said the community should be aware that such plumes could be fatal.

Pounding headache

"When I first saw the plume, it was red and I thought something was on fire," said Jan Hedley.

"I waited until it had passed, took a few photos, drove on and didn't think any more about it until I got a pounding headache.

"It concerns me that they want to expand this mine to be about two kilometres from the community living in the Bulga village."

•Continued page 2

Health scare after mine blast leaves orange plume

•From page one

Mrs Hedley's husband, Ian, said the community should be aware that such plumes could be fatal.

He pointed to an American Mine Safety and Health Administration report that says mine blasts generate potentially harmful gases such as carbon dioxide, carbon monoxide, oxides of nitrogen, ammonia and sulphur dioxide and reduce the oxygen concentration in air.

Breathing contaminated air after a blast may kill a person in a few minutes, the report says.

A report by the explosive firm Orica said the acceptable level of nitrogen dioxide in a plume was five parts per million and it turned orange-red when

the concentration was between 50 and 250 parts per million and a deep red from 250 parts per million up.

State Planning Department spokesman Jim Hanna said the department had received no complaints about Friday's red and orange plume.

As a result of an *Argus* inquiry, departmental officers said they would request a detailed report from the mine operator which would be checked against the mine's approval conditions.

Questions related to the health risks of blast plumes should be referred to the state health department, Mr Hanna said.

Mount Thorley Warkworth spokesman Graham Witherspoon said company officials would conduct an

internal investigation with the intent of using what was learned to reduce the potential for future incidents.

"We put in place precautionary measures before undertaking the blast, including taking into account the wind direction and closing a section of Putty Road to the public," Mr Witherspoon said.

"Fume generated by the blast was observed to migrate in a north, north westerly direction, passing over Putty Road and dissipating at height over the Warkworth mine.

"The road was inspected by Mount Thorley Warkworth blasting personnel prior to being reopened to ensure the blast fume had dissipated and was safe for public access."

Complain

Residents are reminded to use the coalmine compliance line if they believe a coalmine has breached consent conditions.

All matters can be reported to a local telephone number on 6575 3405.

Complaints are then investigated by the state government's planning department compliance officers.

They are now investigating a mine blast on Friday. Anyone exposed to the contents of such a blast should seek medical advice.

ABC NEWS



Bulga

Bulga residents fear toxic plume

Posted Fri Jan 14, 2011 6:45am AEDT | Updated Fri Jan 14, 2011 1:44pm AEDT

Upper Hunter residents say it's crucial mine blasting activities are better regulated after a large plume, feared toxic, was seen over Bulga.

"When conducting blasting, mines are required to take wind speed and other environmental factors into account to minimise dust emissions and blast plume drift."

The EPA's plan will provide better information about air quality and the actions under way to improve the region's air quality.

EPA chief executive Barry Buffier said it was clear mining emissions in the Upper Hunter had increased and there is a need for government agencies to collaborate to improve air quality.

Thus an interagency taskforce with representatives from NSW Health, the Department of Planning and Infrastructure and the Department of Trade and Investment, Division of Resources and Energy has been established to improve collaboration and accountability.

The plan includes a particle reduction target, which aims to reduce emissions of particulate matter less than 2.5microns in diameter (PM2.5) in the long term.

"The initial target focuses on PM2.5 due to its greater potential to impact on human health," Buffier said.

In total there are 18 actions outlined in the plan, which includes the Dust Stop program to reduce dust from mines, and a new initiative to reduce diesel emissions from off-road vehicles and equipment at coal mines, Buffier explained.

Late last month the NSW Environment Minister Robyn Parker announced **new dust pollution reduction programs for the Hunter Valley.**

A move welcomed by the NSW Minerals Council, the programs use daily weather forecasts to plan on-site operations and to look for better ways to manage dust on haul roads and from overburden.

Late last year, the EPA also developed new blasting guidelines in consultation with the mining industry and is currently looking to adopt those guidelines in its licensing conditions.

NSW Minerals Council chief executive Stephen Galilee said the mining sector has invested significant time and money into reducing the impacts of its operations.

"Air quality is a very important issue and we do take it seriously," Galilee said.

"That's why the Hunter mining industry funds the Upper Hunter Air Quality Monitoring Network.

"That's why we recently welcomed the release of the mine Pollution Reduction Programs by Environment Minister Robyn Parker.

"The industry has also been working closely with the Environmental Protection Authority on the issue as well."

Jerrys Plains resident Judy Hadley told the Newcastle Herald she believed the health and environmental consequences of the region's mining operations would linger long after its financial benefits had past.

"It seems that our government, which represents all of us, doesn't seem too fussed about sacrificing small towns and the people in them for the greater good," she said.

In December *Australian Mining* reported community group Coal Terminal Action Group had raised funds to **buy its own industry-standard air quality monitoring equipment and planed to begin monitoring air quality along the Hunter coal corridor.**

"Communities in the Hunter Valley are increasingly worried about coal dust and its health impacts, especially with new coal mines and terminals," Coal Terminal Action Group spokesman James Whelan said at the time.

Australian Mining also reported that the Hunter Valley Protection Alliance last year called for **dust-level alerts to be issued in the same way as nuclear radiation alerts.**

At the time the group wanted to see the current 24-hour rolling-average, which the Upper Hunter Air Quality Monitoring Network (UHAQMN) use to measure air pollution, replaced with real-time alerts.

The group believes people living in close proximity to open-cut mines should have the same protection as those living near nuclear sites, such as the Lucas Heights reactor.

Hunter residents potentially exposed to toxic fumes and dust

15 April, 2013 Alex Heber

0 comments

Tweet 17

+1 1

Like 26

Falling air quality in the Hunter Valley has angered health professionals who are demanding increased protection for residents from mining dust and blast chemicals.

The demands follow Department of Health advice to residents to head indoors to avoid potential contamination from toxic fumes, **Newcastle Herald reports.**

Doctors are also concerned about the long-term health effects on children who have been exposed to blast toxins and mining dust.

"The long-term impacts can vary depending on the level of exposure but we do know that those tiny particles can get into people's blood streams through their lungs," Doctors for the Environment spokeswoman Dr Linda Selvey said.

The Department of Health has released a factsheet entitled 'Mine Blast Fumes and You' which advises Upper Hunter residents to head inside and close the doors and windows if they see a blast plume approaching.

The factsheet also explains some potential health effects exposure can cause.

"Gases produced during blasting usually disperse rapidly and pose no acute health risk. Under certain conditions the gas plume may persist and can affect nearby people or residents who are downwind of the blast site," the factsheet states.

It also outlines some symptoms from high-level exposure including eye, nose and throat irritation, coughing, dizziness and headache, shortness of breath or exacerbation of asthma.

The calls for increased protection come as residents prepare to present evidence of how their lives have been affected by poor air quality at a Senate inquiry in Newcastle next week.

One Hunter resident who is concerned about the health impacts of poor air quality is mother-of-five Di Gee.

Three of Gee's children have been diagnosed with asthma, and 16-year-old Courtney is the worst affected.

"I can't prove it but I think her [Courtney's] condition is connected to the fact that she was born at the start of the mining boom," Gee said.

To improve her family's breathing Gee has had her home air conditioned.

"The reality is you can't live in a bubble," Gee said.

"When the air changes and the dust increases, so does the asthma."

Recently released is the Environment Protection Authority's Upper Hunter Air Particles Action Plan, which aims to improve the region's air quality.

Ensuring mining activities remain within appropriate environmental and health standards is the aim of the Environment Protection Authority a spokeswoman said.

"As a condition of operation, mines have set limits for ground vibration and overpressure [blast waves] as part of their environment protection licences.



Latest News

Vale ups iron ore exports to China over next five years

Clough acquires US LNG engineer

Curtis Island strike at Day Five and counting

BC Iron to acquire Iron Ore Holdings

Wenco wins Whitehaven Coal fleet management contract

AIOH Position on Diesel Particulate and its Potential for Occupational Health Issues

Summary

Although the adverse health effects of the gaseous fraction of diesel emissions have been known for some time, only in the last two decades has research indicated that the particulate component (DP) of the diesel exhaust has the potential to induce various health effects. In addition, it is associated with non-health aspects such as malodour, visual and nuisance pollution.

Methods to monitor workplace exposures to diesel particulate (capture of the submicron aerosol fraction and analysis as elemental carbon) are now readily available and control technologies have been developed for industries of known elevated exposure (eg underground mining).

Based on some of the animal and epidemiological studies, it is apparent that diesel particulate is a potential carcinogen. However, due to information deficiencies in the literature particularly regarding past exposure conditions, the AIOH has serious concerns as to the degree of potency being assigned to diesel particulates by some regulatory authorities. It is most likely that as with many low potency substances the issue may never be completely defined owing to the lack of sufficient exposure data and control of confounders (eg cigarette smoking) in the studied populations. There is little doubt that this area of the health debate will continue for some time within the scientific and regulatory community.

There is an emerging trend within the occupational hygiene community to take a pragmatic approach to measure and control exposures of the noxious, irritant and malodorous emissions without attempting to define a dose response based exposure standard.

Notwithstanding the lack of a defined dose response relationship, experience has shown that when workplace exposures are controlled below 0.1 mg/m^3 DP (measured as submicron elemental carbon), irritant effect decreases markedly. AIOH believe that such a level should result in a reduced lung cancer outcome if such a carcinogenic effect is actual for the population.

In the absence of any more definitive data, the AIOH supports the use of an exposure standard of 0.1 mg/m^3 DP (measured as submicron elemental carbon).

What is Diesel Particulate?

Over the past 115 years the invention of a compression ignition engine by Rudolph Diesel in the 1890's has contributed significantly to the productivity of many nations, owing to the widespread use of larger diesel powered equipment in most industrial activities. The down-side in terms of occupational health has been the exposure of a large number of workers to the complex mixture of toxic gaseous, adsorbed organics and particulate components found in the raw exhaust emissions.

The gaseous phase of diesel exhaust consists largely of the same gases found in air, such as nitrogen, oxygen, carbon dioxide and water vapour.

The particulate fraction of diesel exhaust consists mainly of very small particles (typically 15-30 nm diameter) which rapidly agglomerate together to form “chains” or clumps of particles which are themselves typically <1 µm aerodynamic size. High resolution electron microscopy has demonstrated that the basic diesel particulate particles consist of an irregular stacked graphitic structure, nominally called elemental carbon.

The graphitic nature and high surface area of these very fine particles means they have the ability to absorb significant quantities of hydrocarbons (the organic carbon fraction) originating from the unburnt fuel, lubricating oils and the compounds formed in the complex chemical reaction during the combustion cycle.

In terms of health outcome, the very small particle size of diesel particulate (DP) is important as this means it can reach the deep parts of the lungs. Particulate overload rather than chemical composition is thought to be the major mechanism leading to toxic effect

How do we Measure it?

Methods for the quantification of employee exposure to diesel particulate have been developing over approximately 30 years. The most advanced and specific method involves capturing the submicron fraction of the workplace aerosol and then determining the amount of the core component of diesel particulate (elemental carbon; EC). Recent commercial developments provide ease in routine submicron sampling using a single use impactor cassette fitted into a respirable aerosol cyclone which is necessary when sampling in dusty atmospheres to prevent clogging of the cassette impactor holes. Sample analysis on the captured aerosol is best conducted using NIOSH method 5040 (NIOSH 2003) for determination of carbon species (especially elemental carbon), however care needs to be exercised to minimise errors due to sampling, blank filter interpretation and instrument operating parameters (Davies & Rogers, 2004).

Hazards Associated with Diesel Particulate

In 1988 the US National Institute of Occupational Safety and Health (NIOSH) published Criteria Bulletin No. 50 (NIOSH 1988) which proposed a potential link between occupational exposure to diesel exhaust and lung cancer. The NIOSH finding was based on the consistency of toxicological studies in rats and mice and limited epidemiological evidence, mainly from the railroad workers.

The International Agency for Research on Cancer (IARC) evaluation 2A (probable human carcinogen) is based on limited evidence in humans and sufficient evidence of carcinogenic risk in animal studies (IARC, 1989).

The Health Effects Institute (HEI, 1995) undertook a review of the toxicological studies including acute and chronic effects. It also included the 30 epidemiological studies of workers exposed to diesel emissions in occupational settings for the period 1950 – 1980. About half of these epidemiological studies indicated an increase risk of lung cancer and the remainder showed no increase in lung cancer risk. HEI after examining the positive outcome studies concluded that the epidemiological data indicated weak associations between exposure to diesel exhaust and lung cancer with a relative risk of 1.2 – 1.5. They issued a note of caution indicating that all the studies lacked definitive exposure data for the populations

Health Effects of Diesel Exhaust Particulate Matter

Diesel engines emit a complex mixture of air pollutants, composed of gaseous and solid material. The visible emissions in diesel exhaust are known as particulate matter or PM, which includes carbon particles or "soot." Diesel exhaust also contains a variety of harmful gases and over 40 other known cancer-causing substances. In 1998, California identified diesel PM as a toxic air contaminant based on its potential to cause cancer, premature death, and other health problems. Those most vulnerable are children whose lungs are still developing and the elderly who may have other serious health problems. Each year in California, diesel PM contributes to 2000 premature deaths and thousands of hospital admissions, asthma attacks and other respiratory symptoms, and lost workdays. Overall, diesel engine emissions are responsible for the majority of California's known cancer risk from outdoor air pollutants. In addition, diesel soot causes visibility reduction and is a potent greenhouse agent involved in global warming.

Summary of the Health and Environmental Effects of Diesel PM Exposure for California*

- Premature deaths (2000 per year)
- Lung cancer (250 per year)
- Decreased lung function in children
- Chronic bronchitis
- Increased respiratory and cardiovascular hospitalizations
- Aggravated asthma
- Increased respiratory symptoms
- Lost workdays
- Reduction in visibility (10 to 75% of total)
- Global warming (2nd to carbon dioxide)

*Except for lung cancer, the health effects are based on the assumption that diesel exhaust PM is approximately as toxic as the general ambient PM mixture.

Diesel Particulate Matter (PM) Contributes to Premature Death

PM is a contributing factor to premature death from heart and/or lung diseases, based on studies of over 500,000 people (Pope et al., 1995, 2002), and independently verified with a reanalysis requested by industry and the U.S. Congress (Krewski et al., 2001). Average life expectancy was reduced by about 1.5 years, comparing the cities with highest and lowest high PM levels (Brunekreef, 1997). This translates to a loss of about 14 years of life for people who died from diseases associated with PM exposure (USEPA, 1999). These studies serve as the basis for PM air quality standards by ARB, U.S. EPA, the World Health Organization guidelines for Europe, and other countries.

Very few studies have investigated the responses of human subjects specifically exposed to diesel PM, and none of the available epidemiologic studies have measured the diesel PM content of the outdoor pollution mix. However, the extensive animal toxicology literature on the health impacts of diesel exhaust PM leads to the conclusion that diesel exhaust PM is at least as toxic as the general ambient PM mixture. ARB has made quantitative estimates of the public health impacts of diesel exhaust PM based on this equivalency assumption. We estimate that current Statewide levels of diesel PM contribute to 2,000 deaths (range: 970 to 3,000) annually, and that PM formed from diesel engine emissions of oxides of nitrogen (NO_x) contributes to an additional 900 deaths (range: 440 to 1,400) annually (Lloyd and Cackette, 2001).

Specific studies that link motor vehicle-related PM exposure to premature death include:

- Elderly people living near major roads had almost twice the risk of dying from cardiopulmonary causes (Hoek et al., 2000).
- PM from motor vehicles was linked to increased mortality (Tsai et al., 2000).
- Fine PM (PM_{2.5}) from mobile sources accounted for three times the mortality as did PM_{2.5} from coal combustion sources (Laden et al., 2000).

PM Contributes to Illness

PM is also a contributing factor to hospital admissions and emergency room visits for cardiopulmonary causes (Pope, 1989; Schwartz et al., 2003; Sheppard, 2003; Zanobetti and Schwartz, 2003), asthma exacerbation (Whittemore and Korn, 1980), and lost work days (Ostro, 1987). We estimate thousands of hospital admissions for cardiopulmonary causes, emergency room visits, asthma attacks, and millions of lost work days each year in California due to PM (CARB, 2002). At least 10% of these impacts (see below) are related to diesel PM. In addition, preliminary evidence suggests that diesel PM exposure may facilitate development of new allergies (Diaz-Sanchez et al., 1999; Kleinman et al., 2005). By age 18, children exposed to higher levels of PM_{2.5}, NO_x, acid vapor, and elemental carbon (all products of fossil fuel combustion, especially diesel) are five times more likely (7.9% versus 1.6%) to have underdeveloped lungs (80% of normal, equivalent to 40-year olds) compared to teenagers living in communities with lower pollutant levels, and will likely never recover (Gauderman et al., 2004).

In addition, several "intervention" studies report significant reduction in the number of adverse health impacts following either removal or reduction of a PM emission source. For example, the Southern California Children's Health Study reported improved lung function growth rates for young children who relocated from a high PM area to a lower PM area (Avol et al., 2001).

Diesel PM is a Significant Component of PM

There is no unique marker for diesel PM, so directly measuring outdoor levels is difficult. However, we have estimated that the average Statewide exposure to diesel PM in 2000 is 1.8 µg/m³ (CARB, 1998). Thus, using an average Statewide PM_{2.5} exposure of 18.5 µg/m³ (CARB, 2002), diesel PM makes up about 10% of total PM_{2.5}.

Calculations performed for an air pollution episode in Southern California show that NO_x emitted from diesel engines could account for a significant fraction of the PM_{2.5} measured at inland locations. When both these diesel contributions are considered, the diesel PM contribution could increase to an upper limit of 40% during a severe PM_{2.5} episode (Mysliwiec and Kleeman, 2002).

Diesel PM is Emitted in Urban Areas Resulting in High Exposure

Many diesel emission sources are concentrated near densely populated areas such as ports, rail yards, and heavily traveled roadways. Thus, on average, every ton of diesel emissions in populated areas leads to higher exposures and greater health consequences than emission sources that are further removed from population centers. This point is illustrated by in-vehicle exposure studies conducted in California. Even though Californians average about 6% of their time on roadways, 30 to 55% of diesel PM exposures occurs in vehicles (Fruin et al., 2004). Moreover, self-pollution (i.e., pollution from the vehicle itself) has been observed on every school bus tested in California, regardless of the age of the bus. The cumulative exhaust inhaled by the 40 or so kids on a self-polluting bus is comparable to, or in many cases larger than, the cumulative amount inhaled by all the other people in the South Coast Air Basin (Marshall and Behrentz, 2005).

Diesel PM Deposits in the Lung and Components can be Absorbed in the Body

The majority of diesel PM is less than 1 µm in diameter (1/70th the diameter of a human hair). In general, particles 10 µm or less in diameter can be inhaled into the lungs (U.S. EPA, 2004). Not all inhaled particles deposit in the lung, and many are exhaled. Particles about 0.5 µm in diameter are minimally deposited in the airways, with higher deposition rates for particles both smaller and larger than 0.5 µm in diameter. Chemicals adsorbed on particles can dissolve in the fluid lining the airways, and then be absorbed into the body. Insoluble particles are cleared by more complex mechanisms.

Diesel PM Contains Compounds Known to Damage DNA and Cause Cancer

Diesel PM contains toxic chemicals including compounds that are known to cause damage to genetic material (DNA) and are considered to cause cancer. For example, one class of compounds typically present on diesel PM is polycyclic aromatic hydrocarbons, or PAHs. Some PAHs have been classified as probable human carcinogens by the U.S. EPA and by the International Agency for Research on Cancer (IARC, 1989), a World Health Organization group. These compounds have also been shown to damage DNA and also be absorbed into the bloodstream after diesel PM exposure, and are therefore considered to be available to damage cells in tissues such as the lung (U.S. EPA, 2002). Benzene, the first toxic air contaminant listed by the State, and a known human cancer causing agent for leukemia, has been reported not only in the gaseous phase of diesel exhaust, but also is present on diesel PM itself (U.S. EPA, 2002). Other cancer causing compounds such as formaldehyde, acetaldehyde, acrolein, and 1,3-butadiene are present in diesel exhaust (IARC, 1989; U.S. EPA, 2002) primarily in the gas phase. Diesel exhaust is also considered to pose a respiratory hazard to humans based on extensive studies that show that inflammation is

using two rodent species exposed over their lifetime to engine emissions, and they will be evaluated for carcinogenicity and for non-cancer endpoints. The engine emissions will also be chemically characterized in detail for toxic and criteria air pollutants.

References

Avol EL, Gauderman WJ, Tan SM, London SJ, Peters JM. Respiratory effects of relocating to areas of differing air pollution levels. *Amer. J. of Resp. and Crit. Care Med.* 164: 2067-2072, 2001.

Ayala, A., Kado, N.Y., Okamoto, R.A., Holmen, B.A., Kuzmicky, P.A., Kobayashi, R., and Stiglitz, K.E., 2002. Diesel and CNG Heavy-duty transit buses over multiple driving schedules: regulated emissions and project overview. *SAE Trans.J.Fuel Lub.* 2002. 111, 735-747 (see also: *SAE Paper* 2002-01-1722).

Battye W., Boyer K., Pace TG. Methods for improving global inventories of black carbon and organic carbon particulates. Report No. 68-D-98-046. Prepared for U.S. Environmental Protection Agency. Research Triangle Park, NC, by EC/R Inc., Chapel Hill NC, 2002.

Bond TC, Streets DG, Yarber KF, Nelson SM, Woo J-H, Klimont ZA. Technology-based global inventory of black and organic carbon emissions from combustion. *J. of Geophys. Res.*, 109 D14203, 2004.

Brunekreef B. Air pollution and life expectancy: is there a relation? *Occ. Environ. Med.* 54:781-784, 1997.

CARB 1998 Proposed Identification of Diesel Exhaust as a Toxic Air Contaminant. Appendix III. Part A: Exposure Assessment, available at: http://www.arb.ca.gov/toxics/summary/diesel_a.pdf. 1998.

CARB 2002 California Air Resources Board and Office of Environmental Health Hazard Assessment. Staff Report: Public Hearing to Consider Amendments to the Ambient Air Quality Standards for Particulate Matter and Sulfates, available at: <http://www.arb.ca.gov/research/aaqs/std-rs/pm-final/pm-final.htm>. 2002.

CARB 2003a. California Air Resources. Staff Report: Proposed Diesel Particulate Matter Control Measure For On-Road Heavy-Duty Residential And Commercial Solid Waste Collection Vehicles, available at: <http://www.arb.ca.gov/regact/dieselswcv/isor3.pdf>. 2003.

Diesel fumes major threat

By **MATTHEW KELLY**

DIESEL exhaust emissions from mining industry vehicles have emerged as one of the biggest threats to the health of Upper Hunter communities in the past decade.

Air emissions inventory data shows that off-road diesel emissions, which include those from locomotives, have risen in direct relationship to the mining boom.

The emissions predominantly contain the finest particulate particles, which pose the greatest threat to human health.

In addition, the World Health Organisation elevated diesel fumes to the category of a "known carcinogen" from its previous classification of "probably carcinogenic" in 2012.

While emission limits for non-road diesels exist in many other countries, no such standards exist in Australia.

The NSW Environment Protection Authority is pushing for the introduction of tighter controls in NSW in an effort to protect communities, such as those in the Hunter.

"The EPA has identified a need for leadership on non-road diesel emissions in light of the lack of national standards, growth in emissions from this sector, increasing evidence of adverse health impacts from diesel, and the availability of standards and proven technologies to reduce diesel

emissions," EPA chief environmental regulator Mark Gifford said.

The EPA hopes to have a diesel emission management strategy in place by the end of the year.

The authority is also working with the Commonwealth government to develop national measures to reduce diesel emissions. This includes the development of a national clean air agreement by 2016.

As with non-road engines, no regulations apply to limit exhaust emissions from diesel locomotives in Australia.

A report into reducing locomotive emissions in NSW estimated about 80 per cent of Australian locomotives do not meet any US emission standards. The NSW fleet is generally older than the national average and is less fuel efficient.

The evaluation of studies of particle emissions from rail in the Hunter have highlighted the contribution that locomotives make to particulate levels. This data is the subject of further analysis.

"The age of a locomotive used in Australia does not necessarily reflect its emission performance because even new locomotives are not required to meet any standards," Mr Gifford said.

"The diesel emission management strategy will contain actions that the EPA will be taking to address the air emissions from locomotives."

Coal trains create same dust as others

HUNTER coal trains do not produce more dust than other trains, a second round of coal wagon dust emissions has found.

The Australian Rail Track Corporation yesterday published the results of the testing conducted at Raymond Terrace Drive in Melford from November 30 2012 to January 2013.

It found loaded coal trains passing through the site did not have a stronger association with elevated particulate matter concentrations than other trains.

It did, however, reveal that average concentrations of total suspended particles and particulate matter associated with unloaded and loaded coal trains were higher compared to no trains.

Environment Protection Authority chairman and chief executive Barry Buffler said: "The EPA will not consider imposing additional requirements on industry, such as covering of coal loads, unless clear evidence becomes available which demonstrates the need for further studies or measures to control coal dust emissions from loaded coal trains."

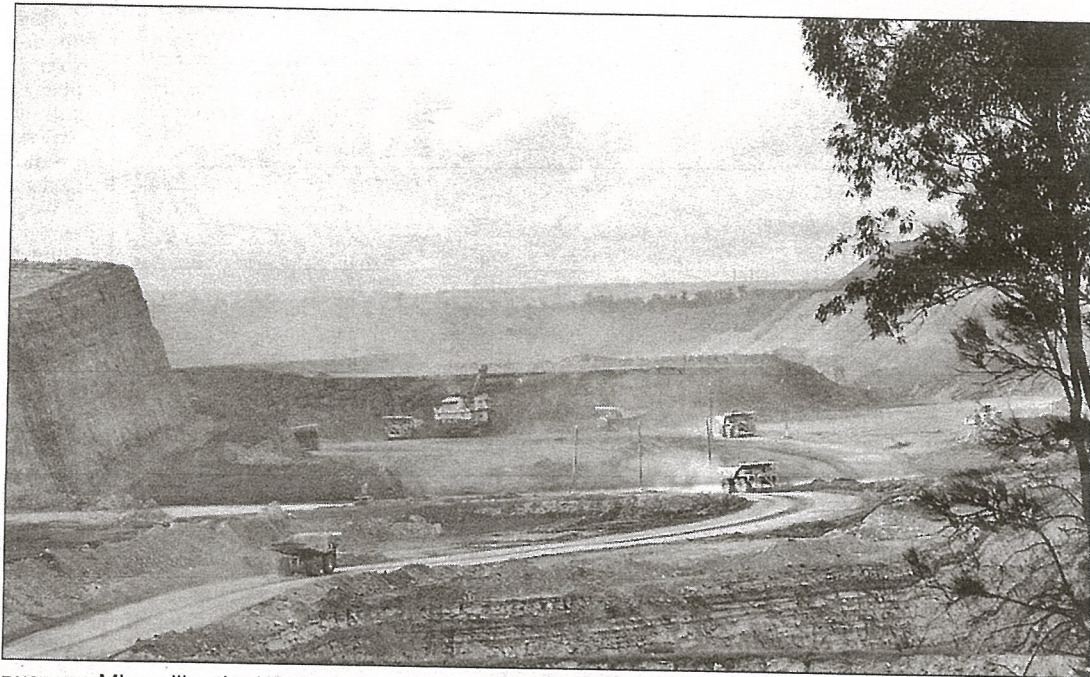
However, Coal Terminal Action Group spokesman James Whelan said the study did not address community concerns.

"The Environment Protection Authority instructed the ARTC to monitor particle pollution because community members wanted to know how much coal dust we're being exposed to and how to control it, not because we wanted to know if there's a difference between coal trains, freight trains and passenger trains," Dr Whelan said.

The group will start fund-raising on Monday for a second coal dust study to monitor particle pollution.



WORRIED: Wendy Bowman, resident of Camberwell, has long been concerned about the health and other effects of coal mines in her area.



DUST PIT: Mines like the Warkworth open cut mine create a lot of dust, which can be a health hazard

Experts not considered due to rush

By **MATTHEW KELLY**

THE opinions of public health experts were not considered before the Department of Planning recommended Rio Tinto's proposed modification to its Warkworth open cut mine be approved.

While the NSW Ministry of Health regularly makes public submissions on mining-related projects, the tight 15-day exhibition period for the Warkworth project meant the ministry was unable to make a submission.

Its previous submissions have raised issues including the health

effects of air quality, noise and blasting.

Six government agencies, including the Environment Protection Authority, Office of Environment and Heritage and the Department of Primary Industries did make submissions on the Warkworth project.

The Department of Planning recommended the project for approval on December 4, three days after the public exhibition period closed.

The Ministry of Health's submission will now be considered by the Planning Assessment Commis-

sion, which will determine the proposal. A ministry spokesman said a draft submission was under internal review and would be submitted within an agreed extended time frame.

"Hunter New England Population Health forwarded their draft submission on the proposed extension to the Warkworth mine to the Ministry of Health for technical advice and approval," he said.

The Bulga-Milbrodale Progress Association protested last week that the Department of Planning hadn't considered its submission



Coal killing Hunter, residents say

September 15, 2013

[Read later](#)

Natalie O'Brien

[Email article](#) [Print](#) [Reprints & permissions](#)



"The issue is, when is enough mining enough?" *Photo: Supplied*

It is one of the most beautiful and productive regions in the country, dotted with award-winning wineries, famous horse studs, olive groves and beef and dairy farms.

But the picturesque Hunter Valley is in danger of being ruined, residents say, by clouds of pollution they believe are generated by mining. They say their health and livelihoods are threatened.

Hunter Valley Wine and Tourism Association spokesman on mining, Ian Napier, said people in the valley were sick of being told mining and wine could co-exist.

"They can't," he said.

Advertisement

As he scraped black dust off solar panels at his Wombat Crossing Vineyard, Mr Napier said it was time the government looked at the cumulative effects of mining pollution.

He said, despite the fact the worst of the dust pollution was usually confined to certain times of the year, tourism would die if the mines were allowed to devour the valley.

"This is the second most visited region in the state," Mr Napier said. "The issue is, when is enough mining enough?"

Since January, 147 official air pollution alerts in multiple locations across 18 days have been issued by the Office of Environment and Heritage (OEH).

These alerts warn people pollution particles in the air have exceeded national health standards.

It might only be 18 days of pollution levels bad enough to trigger an alert but a farmer from the tiny town of Bulga, John Krey, said the pollution levels were "unacceptable". "We came here for the

clean air," he said.

James Whelan, from the Hunter Community Environment Centre, said residents were particularly concerned because public health experts advised that there was no safe level of air particle pollution, and that "it is killing more Australians each year than car crashes".

Dr Whelan said health experts had found particle pollution at concentrations well below the national standard were contributing to a range of cardiovascular and respiratory ailments.

Associate professor Nick Higginbotham, from the Centre for Clinical Epidemiology and Biostatistics at the University of Newcastle, said the latest review from the World Health Organisation, warned shorter periods of exposure were more harmful than had been previously believed, particularly for people with pre-existing health conditions.

But if the high number of incidents being recorded was not bad enough, Dr Whelan said, the way environmental regulators treated the alerts on air quality was fuelling community outrage.