

## **The management of the Murray-Darling Basin**

### **Terms of Reference**

The management of the Murray-Darling Basin, and the development and implementation of the Basin Plan, with particular reference to:

- (a) the implications for agriculture and food production and the environment;
- (b) the social and economic impacts of changes proposed in the Basin;
- (c) the impact on sustainable productivity and on the viability of the Basin;
- (d) the opportunities for a national reconfiguration of rural and regional Australia and its agricultural resources against the background of the Basin Plan and the science of the future;
- (e) the extent to which options for more efficient water use can be found and the implications of more efficient water use, mining and gas extraction on the aquifer and its contribution to run off and water flow;
- (f) the opportunities for producing more food by using less water with smarter farming and plant technology;
- (g) the national implications of foreign ownership, including:
  - (i) corporate and sovereign takeover of agriculture land and water, and
  - (ii) water speculators;
- (h) means to achieve sustainable diversion limits in a way that recognises production efficiency;
- (i) options for all water savings including use of alternative basins; and
- (j) any other related matters.

### **Inquiry into management of the Murray Darling Basin – impact of mining coal seam gas**

The Rural Affairs and Transport References Committee, as part of its inquiry into management of the Murray Darling Basin, is examining the impact of mining coal seam gas on the management of the basin.

The committee will examine:

The economic, social and environmental impacts of mining coal seam gas on:

- the sustainability of water aquifers and future water licensing arrangements;

- the property rights and values of landholders;
- the sustainability of prime agricultural land and Australia's food task;
- the social and economic benefits or otherwise for regional towns and the effective management of relationships between mining and other interests; and
- other related matters including health impacts.

## **Submission by J. Wiltshire- member of The Toowoomba Coal Mine Action Group**

I am a member of a group of approximately 1000 concerned residents who have come together to protect the semi-residential and good agricultural land of Toowoomba and surrounds from the impact of inappropriate mining activities- including coal mining and coal seam gas mining. I include a copy of our objectives and aims as a group for your perusal.

### **Objectives**

We are an apolitical group, who, whilst not opposed to all mining, are deeply concerned when it has the potential to directly and indirectly impact on the health and well-being of humans, flora and fauna. We are concerned for its impact on water ways and water reserves and its negative impact on sensitive environmental areas.

### **Aims**

1. To represent the community, which is being affected directly and indirectly by the threat of mining.
2. To become well-informed individuals so as to educate and guide the community into an understanding of the ramifications of localised mining activities.
3. To notify the Queensland Government of our individual and collective concerns and urge them to re-evaluate and repeal, a) the applications for EPCs; b) granted EPCs; c) and change current legislation regarding mining with special reference to protecting heavily populated communities, fertile food-producing land and sensitive environmental areas including fauna habitats, water ways and water reserves ensuring more than adequate buffer zones around these are stipulated.
4. To facilitate Community Information Meetings regarding mining proposals and associated activities adjacent to local communities on the eastern Darling Downs
5. To work with like-minded groups and associations in achieving Objects 1, 2, 3 & 4.

Please find following a submission from our group on some of the key areas that your committee is examining.

**(a) The implications for agriculture and food production and the environment;**

The majority of our group live within the Darling Downs- an areas known for its agriculturally rich soil and for its high rate of food production. This area has been acknowledged under strategic cropping legislation as containing high quality agricultural land. At present the Darling Downs already hosts a number of mines with many projects currently being undertaken. There are approximately 200 exploration permits covering the Darling Downs for coal and other resources. There has already been approval granted for projects involving approx. 40,000 Coal Seam Gas (CSG) mines in southern Queensland and it should be noted that there are over 100,000 more planned.

For this part of my submission I will refer first to the impact of open-cut coal mining on the environment before proceeding to a brief overview of my concerns regarding the Coal Seam Gas industry.

**Open Cut Coal Mining**

I refer you first to appendix One : “Coal is Toxic”.

To quote the author of this article:

“The effect of low dose accumulation of multiple toxic metals in plants, animals and humans is almost certain to exert a compounding of individual harmful effects and cause ultimately a catastrophic breakdown in health to those affected.

There is no doubt that coal will be seen as a toxic substance in years to come when studies into the effect of toxic metals on the human body are complete. In the short term, no amount of ‘green, clean’ solutions for burning coal will ameliorate the toxic contamination that coal causes the moment its secure, storage compartments underground, those that Mother Nature designed specifically to avoid just such contamination of water, land and air and consequent harm to biological life, are breached.”

The recent promises made by companies such as Shenhua Coal (a foreign owned company who recently purchased 43 farms in NSW in order to proceed with large-scale open-cut coal mining) that they will “leave no trace” on the flora and fauna of the region following their 30 years of mining is unfounded and laughable when these claims are viewed against the stark reality of open-cut coal mining and it's environmental impact in areas such as Acland, QLD. We cannot trust these foreign-owned companies to look after our country for us when they make such ridiculous claims. I have viewed many rehabilitation projects following mining. There is yet to be an area that has been

rehabilitated back to its original state. Flora and fauna are destroyed by open-cut mining. For the residents of Toowoomba we acknowledge that across our local area especially we would see a devastating impact. Under EPC 1979 we see prime koala habitat and the activities at Acland mine have already resulted in reduction in the koala population. Local groups have been documenting the impact on the koala population and have been campaigning on this basis alone for the environmental impact of mining to be known. All other flora and fauna in this area is under threat under proposed open-cut mining operations as noted in the environmental impact study produced by New Hope Coal (see pages 11-13 of the Executive Summary of Acland Stage 3 produced by New Hope Coal).

Human health is of even greater concern when it comes to open-cut coal mining. I draw your attention to Appendix 2: Coal Opencasting and health” by Dr Dick Van Steenis- an expert in this field. I believe that Alan Jones (National radio presenter) is correct when he labels coal dust as “the asbestos of the future”. One has to wonder how currently operating coal mining companies are going to compensate the people of towns such as Acland and Jondaryn- all local QLD towns containing residents who live less than 2kms from these open-cut projects. While at present the residents of these towns complain of noise and dust pollution and loss of property value, health and lifestyle this will no doubt increase in years to come as the links between health and coal mining in heavily residential areas are further demonstrated.

### **CSG Industry threat to the natural and agricultural values of the MDB region.**

The CSG industry is proceeding in southern Queensland, without comprehensive research and study of the environmental threat which the industry poses.

The CSG industry's use of large retention ponds for evaporation of “produced water” (backwash from the CSG bores) containing “fracking fluids” which the Companies may or may not be injecting in to the aquifers and coal seams appears to pose significant risk to the environment. The water on the surface in these retention ponds was once deep water safely contained within a highly saline environment, hundreds of metres below the surface. Now it is lying on the surface, exposed to potential flooding and hence to washing over the soil surface, and into rivers and the entire MDB system.

When “fracking fluids” are pumped to the surface in the CSG extraction process (as “produced water”) they pose an as yet un-researched risk to the health of people, livestock and to the environment. The risk of retention ponds being flooded must never be discounted, especially after the flooding experiences of the last two years in Queensland.

### **Over-allocation of GAB Water.**

The estimates of the total extraction of produced water from the CSG bores has been analysed by the National Water Commission.

Source: [http://www.nwc.gov.au/resources/documents/Coal\\_Seam\\_Gas.pdf](http://www.nwc.gov.au/resources/documents/Coal_Seam_Gas.pdf)

They conclude that: “Current projections indicate the Australian CSG industry could extract in the order of 7,500 gigalitres of co-produced water from groundwater systems over the next 25 years, equivalent to **~300 gigalitres per year**. In comparison, the current total extraction from the Great Artesian Basin is approximately 540 gigalitres per year.”  
Position Statement Page 1.

That level of extraction of GAB water would appear to be unsustainable, and of course, coming from Southern Queensland mostly, that GAB water is inextricably linked with MDB water sharing plans and allocations and the environment.

**Depleting the GAB of this water is unsustainable.**

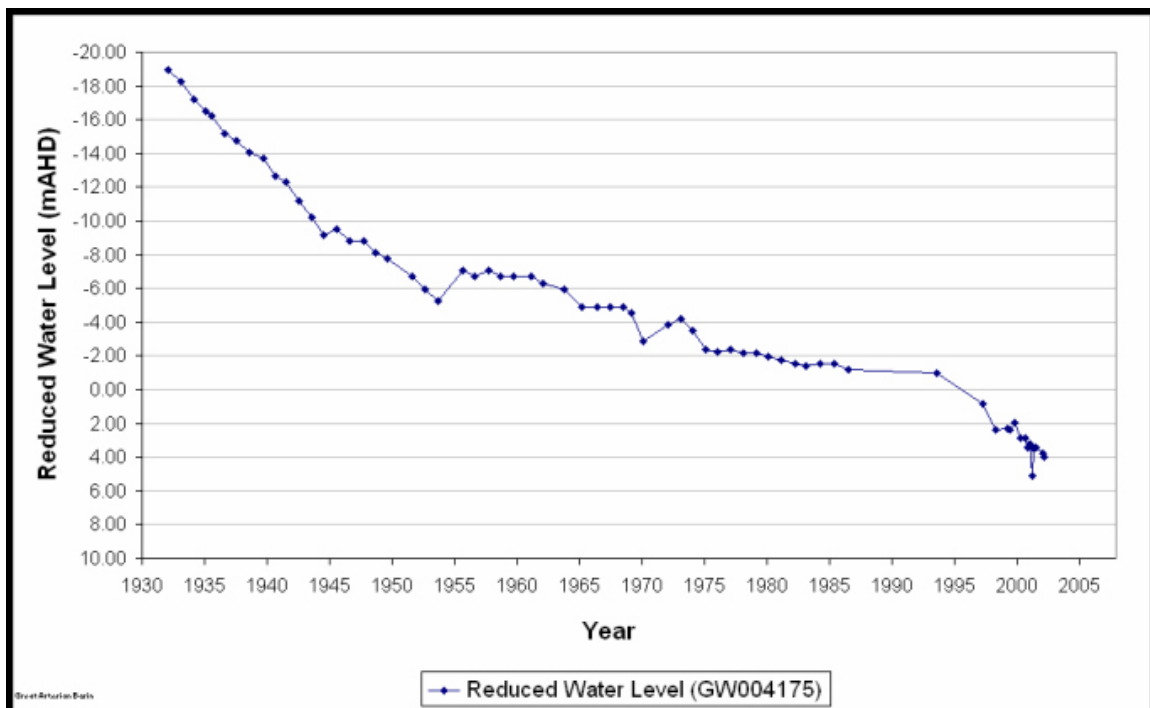
**Poisoning of the aquifers is unsustainable and irresponsible.**

**Relying upon evaporation of “produced water” (from CSG bores) is inadequate and unsafe.**

The National Water Commission has a basic website on the GAB. Its figures are now 6 years out of date, and many of the links have not been maintained.

[http://www.water.gov.au/RegionalWaterResourcesAssessments/SpecificGeographicRegion/TabbedReports.aspx?PID=QLD\\_GW\\_AP12072x](http://www.water.gov.au/RegionalWaterResourcesAssessments/SpecificGeographicRegion/TabbedReports.aspx?PID=QLD_GW_AP12072x)

It gives a basic introduction.



Historic over-use has been draining the Great Artesian Basin.

This is a trend which is being perpetuated and even accelerated by increased CSG extraction in the Surat and Bowen Basins.

**The resources of the GAB are too important to rural Australia to be threatened by a short-term industry such as the Coal Seam Gas industry.**

**Supposed “treatment” of the CSG industry’s “produced water” can not guarantee to remove dangerous chemicals.**

We are regularly told by the CSG industry that they can “treat” their “produced water”. Plans are being drawn up for selling produced water to rural towns on the Darling Downs in Queensland.

It appears “treatment” of produced water (even by reverse osmosis procedures) cannot remove **radioactive trace chemicals, and nor can that process remove “endocrine disruptor chemicals”**. This has enormous implications for health and public liability issues relating to the CSG industry.

Source:

[http://www.endo-society.org/journals/scientificstatements/upload/edc\\_scientific\\_statement.pdf](http://www.endo-society.org/journals/scientificstatements/upload/edc_scientific_statement.pdf)

It appears any molecule smaller than an H<sub>2</sub>O molecule will pass through the reverse osmosis membrane. So any radioactive or toxic compounds, heavy metals or endocrine disruptors with smaller molecules than H<sub>2</sub>O remain in the water.

[Australian drinking water standards](#) only measure for particular contaminants. So some tests of treated water only measure for whether or not these contaminants can be removed, not all possible contaminants.

A number of these environmental concerns have been raised by Prof. Gary Jones in his March 31 2011 Blog posting “Inside Water” on Coal Seam Gas and water. He writes:

“A number of water use, environmental and public health concerns have been raised. They include:

- Potential cross contamination between aquifers of differing water qualities, brought about by unsuitably controlled and monitored fracking
- Contamination of surface water with the toxic chemicals used in the fracking process, including the so-called BTEX group (benzene, toluene, ethylbenzene and xylene). Note, BTEX usage has now been banned in Queensland
- Leakage of methane gas from poorly sealed wells or fractures into aquifers or into atmosphere. (This is (presumably) what has led to the ignitable drinking water in the USA, highlighted in the documentary ‘Gasland’)

- The volume of groundwater that is brought to the surface which needs to flow somewhere (potential stream impacts). The pumped groundwater may be re-injected in some cases to re-pressurise exhausted seams.
- Potential subsidence of the surface, which would change drainage and erosion patterns in surface water flows. A potential cumulative regional-scale impacts of multiple developments have been highlighted in a recent report by Geoscience Australia (more on that next time)
- Salinity – Pumped groundwater typically contains significant concentrations of salts. The salinity of CSG water is variable but total dissolved solids values may vary from 200 to more than 10,000 milligrams per litre (cf. good quality drinking water which has total dissolved solids values of up to 500 milligrams per litre).”

### Release of Methane from poorly designed wells and pipelines.



**(substance starts off foamy, then gradually becomes more watery and an airborne vapour)**

This is a recent incident at a well at Glen Alpine (near Campbelltown, NSW) spraying “foam” from a well. The foam is visible – **the methane gas carrying the foam up into the atmosphere is not visible.**

This is just one example of the CSG industry’s practices which is highly damaging to the Environment. As the Committee’s inquiry is related to the MDB, it is worth noting that

40000 such wells have been approved by the Federal Environment Minister in Queensland and another 1000 are being proposed in the Pilliga region in NSW.

In the light of the claims that the CSG industry is “cleaner than coal” I draw your attention to the attached Cornell University study which disproves those claims.

“Preliminary Assessment of the Greenhouse Gas Emissions from Natural Gas obtained by Hydraulic Fracturing. Robert W. Howarth, et al.

Methane is far more potent as a Greenhouse Gas than Carbon Dioxide. Methane is variously rated between 22 times more potent and 70 times more potent (than CSG) depending upon the immediate effect or the relative life-cycle of the two different gases in the atmosphere, before they break down. Either way, the practices of the CSG Industry in releasing methane from the wells, and potentially though untraceable releases through rock fractures and through river beds is unsafe, un-accounted for and ought to be stopped immediately.

**(b) the social and economic impacts of changes proposed in the Basin;**

The social impact on our community of current mining exploration has been immense. Local residents first became aware of the exploration for coal permit (EPC) that had been granted over our suburb in February 2011. As local residents many of us are aware of the story of the town of Acland- a local town that has been completely decimated by open-cut coal mining. We had met the displaced residents of Acland and heard their despairing stories of how they had been told that the open cut coal mine would bring jobs and prosperity to the town and then the gradual expansion of the mine to its current size- with only 1 original resident of the town remaining. These people have been described as “broken” by their treatment at the hands of the Government and the Mining Company responsible (New Hope Coal). Imagine local residents' distress when they discovered from a front page newspaper article that “Gowrie (is to be) the next coal ghost town”. Fears were hardly allayed when internet searches revealed that the name of the potential Gowrie project had been labelled “the New Acland Project”. Gowrie Junction residents and their neighbours were quick to respond with community uproar at the prospect of coal exploration in what is an outer suburb of Toowoomba. Approximately 4000 residents reside in Gowrie Junction and this area is considered a “growth corridor” for the city of Toowoomba- the largest inland city of Queensland with an estimated population of approx. 128 600 residents. Initial information released by the mining company (Blackwood Resources) to the stockmarket demonstrated an 8km by 8km lease with the “target area” for initial drilling covering several residential estates. These new estates were residential areas filled with average to mid-range priced predominantly newly built brick homes. An initial community meeting organised by locals drew a crowd of 700 concerned, upset and visibly angry residents. Finding out via a front page article in the local paper that your home is covered by an EPC understandably creates a huge emotional impact for residents. Since this initial meeting



a core committee of committed residents have ensured that concerned residents are able to join an incorporated committee designed to represent their rights. Community information sessions have been run for other concerned locals at our own expense as a group as the **local Council, the government and the Mining Companies do not acknowledge residents rights to information that has a direct relationship to their future health, livelihood, property prices and future plans.** Since February and our initial community meetings real estate in Gowrie Junction has slumped to an all-time low with residents complaining that they are unable to sell their homes and carry through with their prior plans. I have heard from several residents whose retirement plans and health concerns have had to be put on hold as this exploration and the subsequent loss of interest in local real estate has had a direct impact upon them. There is no current pathway for the government to rescind the granting of an EPC once it has been approved and the residents are left in limbo until the lease comes up for renewal.

The **mental health and well-being of many within our community has been directly affected by the granting of EPC 1979 and others that cover heavily residential areas of Toowoomba.** Many of our local residents have already been forced off family farms and properties in nearby Acland to make way for open-cut coal mining. After many years of stress fighting for their rights against that mining company they have moved closer to Toowoomba expecting to be able to feel safe in this semi-residential area only to find themselves again stuck in limbo at the hand of a mining company that provides no information regarding their plans and a stalled real estate market that takes away the possibility of getting away from this limbo. Several new cases of depression and anxiety have been diagnosed in local residents as a direct result of uncertainty over mining exploration. When “uncertainty over the future” and “feelings of helplessness/hopelessness” are so associated with the onset of depression why is it that people in power turn a blind eye to the impact of mining activities (even in the exploration stage) on residents?

We have met, written and implored all Government representatives to re-think the legislation that allows mining companies to plan all kinds of projects with no thought of the impact on residents of the land. We have been continually head-nodded at and reassured that our concerns are understood and then we see no change to legislation and the continued granting of inappropriate EPCs over rural-residential areas that are heavily settled or contain prime agricultural land.

The social and economic impact on communities of mining activity is largely under-rated or over-looked. When parents suffer from depression/anxiety and stress their children demonstrate a higher rate of mental illness as adults and a generational tendency to unhelpful coping strategies can be established. **The short term economic advantages of mining in heavily residential areas are outweighed by the long term physical and emotional impacts for generations of residents.** Speaking in purely financial terms, some experts now believe that the physical and mental health impacts on residents and

the subsequent costs to the public and private health systems far outweigh any economic gain that may result from mining activities in these heavily populated areas.

J. Wiltshire

Toowoomba Coal Mine Action Group

Appendix one: Coal is Toxic

COAL IS TOXIC

BY PAULINE ROBERTS PHD., B.SC. (HONS)., DBM.

Mother Nature knew what she was doing when she buried organic coal sediments deep underground within sedimentary layers of rock. She did not want coal's toxic components near the fertile and life-giving topsoil, competing for absorption with life-giving elements and thereby entering and adversely affecting the food chain, plant and animal health. Neither did she want them contaminating the aquifers by allowing water to filter through the strata and mobilise toxic compounds. Nor did she want coal's radioactive particle load disseminated in the local airflows or intercontinental jet streams.

WHAT IS COAL?

Coal is an organic, combustible sedimentary rock that also contains minerals and inorganic material, within the organic matter. The compressed organic matter laid down in typically saline inland sea basins or swamps millions of years ago, is interspersed with finely weathered rock material, known as shale. The heaviest metals accumulate in the coal and shale strata because their densities and electronic charge mean they tend to concentrate in depositional environments. Coal and coal shales therefore concentrate and accumulate the heaviest of metals, amongst other elements, most of which are bio-toxic and some of which are also radioactive.

WHY IS IT TOXIC?

Coal is toxic because:-

- Elements such as arsenic, mercury, lead, cadmium, selenium, nickel, vanadium and copper are accumulated and concentrated within coal and associated strata.
  - o For example, coal seams can have 6 x as much arsenic, 5 x as much uranium, 4 x as much mercury, 3 x as much lead compared to a typical basalt (hard igneous rock).
  - o These elements are referred to as toxic metals or toxic, heavy, metals because of their negative physiological effects, both chronic and acute on plants, animals and aquatic life and, for the latter, their physical density and atomic weight.
- Radioactive elements such as uranium, thorium and radium (the latter which decays to radon gas) are also accumulated and concentrated within coal strata. These are toxic in their own right and toxic via the radioactivity they emit.
- Coal seams, even those considered 'low sulphur' contain significant amounts of sulphur and sulphides whose bio-toxicity increases when exposed to air or water.
- The fine particulate nature of coal dust, and the toxic constituents therein are readily inhaled and lodge in the lungs as well as being ingested.

- Coal strata also contain hydrocarbons and benzene-ring derivatives within their organic layers that are considered carcinogenic.
- Coal seams outgas methane when their layers are disrupted.
- Any water that is found within coal strata will be saline in nature, contaminated with organic derivatives and toxic and heavy metals.

#### WHAT DOES THIS TOXICITY DO TO OUR ENVIRONMENT?

- The disruption of strata below ground by mining causes heavy metals to be oxidised and mobilised into water within or near the coal strata. Since multiple strata are impacted by the immediate act of mining or through tension-generated slumps or earth faulting in the aftermath, this contaminated water, now unconfined, can seep into quality water veins and aquifers. The result is town, irrigation and horticultural water supplies that are contaminated with heavy metals and other non-beneficial organic components from the coal strata.
  - o For example, concentrations of arsenic are of particular concern and there are well-documented cases of the poisoning of ground water by arsenic near coal-mining sites. The US Environmental Protection Agency places arsenic in Group 1A of its toxins listing: known human carcinogen.
- Salinity levels will also be increased generally due to the contact of these waters with salt-heavy coal strata and surrounding shales.
- Above ground, whether wind-blown from dried-up tailing ponds, coal heaps or coal transportation these toxic metals will concentrate in the sediments of streams and surface water supplies. The cycle of accumulation and concentration starts again causing stream and river sediments to be less conducive to aquatic life, decreasing biodiversity and health of the waterways.
- Given its particulate nature, and its toxicity, it is all the more surprising that coal loads are not covered during transportation, although grain loads have to be. This anomaly seems to have more to do with economic pressure - cost of coverage and process efficiency than any environmental concern.
- On exposure to air or during combustion at the power station, the sulphurous compounds within coal strata form highly toxic sulphur dioxide and trioxides. On exposure to the moisture in the air, or the water in rivers and streams, these gases form sulphuric acid and acid rain.
- Acid conditions mobilise (release) heavy metals from coal heaps, overburden piles or tailing ponds more rapidly, increasing their dissemination and widening the area of contamination. Acidity also increases the absorption rate of these metals by plant and animal life. (Many of Australia's arable soils are already acidic due to the long-term effects of fertilisers, hence take up of heavy metals is increased).
- Overburden piles also contain more silicious matter which is finely divided and readily wind-blown spreading contaminants and fibers that can cause the full spectrum of respiratory conditions from irritation to lung cancer. High levels of silicious matter has been shown to overwhelm immune function in this regard.

- Radioactive elements within coal strata are concentrated when coal is burned in power stations. Some is emitted to the atmosphere as 'fly ash', despite electrostatic scrubbers, some transferred to cooling ponds, most is removed from the power station as 'deposited ash'. Since Australia produces >7 Mt of ash per annum, the production of radioactive waste and heavy-metal contaminated waste from coal-fired power stations and its safe containment/disposal is not an inconsiderable issue.

- Radioactive particle emission has been shown to be higher from coal-fired power stations than nuclear ones.

- Methane gas escaping from mines has been shown to destroy soil and plant life on the surface through which it seeps.

- As a comparison, quarrying or mining of harder rock strata containing heavy metals is not so environmentally damaging because metal concentrations are less and the compounds are not as easily mobilised from within the harder rock's structure as they are within the finer particulate, sheet-like and loosely bound coal strata.

In conclusion, the liberation of heavy metals and radioactivity into our environment has been shown to be persistent ie. non-biodegradable, concentrated in water sources and sediments and cumulative in plant and animal tissue resulting in both acute and long-term bio-toxicity.

WHAT DOES THIS TOXICITY DO TO HUMAN HEALTH?

- Coal can contain bio-toxic levels of cadmium, lead, chromium, selenium, nickel, vanadium, copper, sulphur and fluorine as well as radioactive elements such as uranium, thorium and radium, amongst others.

- o For example, teeth and bone fluorosis has been documented in cattle (UK) and humans (China) exposed to the combustion of fluorine-rich coals in power stations. Fluorine is highly phytotoxic, as was demonstrated by its adverse effect on vines downwind of a power station in NSW, Australia.

- o Radioactive particles have been shown to increase rates of lung cancer and coal dust is of a particle size that is readily inhaled and absorbed into the lungs.

- These elements are capable of being taken up by plants and farming animals in toxic levels and thereby enter the food chain of humans.

- Many of these elements have been implicated in causing cancers, cardiovascular, gastrointestinal and respiratory diseases. Certain heavy metals have been shown to impair immunity, cause both hepatic and renal disorders, be neurotoxic, especially to children, and are implicated in numerous other neurological and neurobehavioural problems, diabetes, bone disorders, blood disorders and general oxidative damage.

- Most of the toxic metals exert their effect by being absorbed 'accidentally' or taken up preferentially if the required nutritional minerals (eg. calcium, magnesium, zinc) are in deficit. Similar electrochemical charges and sizes can 'fool' the body's normal mechanisms for metal ion uptake. Once within the body, toxic metals interfere irreversibly with enzyme processes, like ramming a key into a lock that does not fit or block a process outright. The resultant dysfunction or

cessation of biochemical processes is thought to account for the disorders that follow.

- Alternatively, the body may try to excrete these toxic metals. Arsenic is particularly toxic in this regard because the body's own methylation processes, which it uses to release nutritional metals, actually make the mineral more toxic to human tissue.

- Excretion of heavy metals, once inhaled, ingested or absorbed by dermal contact is therefore problematic in animal tissue as there are very limited pathways for this to occur, since the body has not adapted over time to deal with such toxins.

- o For example, the excretion of cadmium has been linked to hypertension and kidney damage.

- Thus the tendency is for heavy metals to be stored in the bones, fatty tissue such as the breast or the prostate or in organs such as the liver and spleen.

- o For example, cadmium has been implicated in prostate cancer as it is known to impair immunity and compete with zinc, required for prostate and immune health amongst its many bio-functions.

Scientists and health professionals are only just beginning to research the effects of low to medium toxic metal exposure on human health from the effects of extracting coal and coal-related sedimentary strata. Safe exposure levels for such metals in the air and drinking water are continually being revised downwards in the US as more light is shed on their deleterious action within the human body. Active and disused mines are proving much of the toxicity data.

Children, with their increased needs for minerals are particularly at risk from heavy metal toxicity. Some of these metals, like lead, have half lives in the body of 20 years, which means that their effects will only be truly known over several decades.

## CONCLUSION

Coal does not just contain one harmful material but many. The effect of low dose accumulation of multiple toxic metals in plants, animals and humans is almost certain to exert a compounding of individual harmful effects and cause ultimately a catastrophic breakdown in health to those affected.

There is no doubt that coal will be seen as a toxic substance in years to come when studies into the effect of toxic metals on the human body are complete. In the short term, no amount of 'green, clean' solutions for burning coal will ameliorate the toxic contamination that coal causes the moment its secure, storage compartments underground, those that Mother Nature designed specifically to avoid just such contamination of water, land and air and consequent harm to biological life, are breached.

We are already in a hole with coal, time to stop digging.

[Pauline Roberts is a researcher and alternative medicine practitioner who observes, on a regular basis, the low-dose, accumulative effects of toxic metals on human health. She is concerned at the continuing pollution of the land, radioactive contamination of the air and mining of water supplies caused by the

short-term, expedient energy policies of the Australian government and its industry masters.]

#### Appendix Two: Coal opencasting and health- by Dr Dick Van Steenis

My work has been peer reviewed by professors in the UK and USA and describes just a small portion of the health damage and cumulative effects caused by opencast mining. For 13 years I have researched industrial air pollution (including opencasting) with its consequential health damage of illness and premature deaths. Published research confirms that both PM1 & PM2.5 particulates produced by opencasting of coal, especially if toxic waste is present due to known or unknown tipping, CAUSE new cases of asthma to develop in children and adults as well as exacerbating those who already have it. There will also result increased incidence of chronic pulmonary obstructive disease, heart attacks, generalised premature deaths, strokes, type 2 diabetes, clinical depression and in addition other conditions resulting from any toxic waste contaminating the site which would include cancers, hormone disorders, birth defects, skin rashes, eye inflammation, nausea etc. due to pollutants such as organic compounds, heavy metals, dioxins (rife in North East Derbyshire), and even radio-active matter. Fuel quality used by equipment & vehicles is also critical as fuel used is normally of much inferior quality than city diesel.

Studies in NE Derbyshire (1994-2000) comprising school medical records, school asthma inhaler use, microscopy of dust outside and within buildings, and PM 2.5 monitor readings with filter analysis, at 5 schools covering a 3 year period, all confirm a rise in asthma to affect 33% of primary school children living within one mile, a cumulative rise to 21 % at two miles and even up to 12% at three miles. Welsh Office studies at Gwaun Cae Gurwen also discovered 33% of children in three schools to have developed asthma at one mile, based on peak flow readings. West Glamorgan studies found coal particles plus diesel particles in the PM10 filters partly upwind of the opencast, over the top of a large mountain. Peakflow measurements and asthma inhaler use worsened as particulate levels rose in direct proportion, and this happened irrespective of home conditions and social factors. A Lanarkshire study (1998) proved that hospital admissions for asthma rose with opencasting of coal, again within three miles or so, with cumulative rises year after year, falling when opencasting ceased. A Liverpool University study even showed a rise in asthma in schools within 2km of moving coal at the docks, irrespective of smoking habits and unemployment. Hospital admissions for asthma in the Tinsley area, since opencasting began at Orgreave, rose to 11 per 1000 population as against 3 per 1000 at Sheffield City Centre and 1 per 1000 in Worcestershire. All three areas have motorways. GP doctors in the area of SE Sheffield, namely Handsworth area etc., have noted a large rise in asthma incidence in their area since Orgreave opencasting began. They are clear of the M1. The rise at Tinsley is not confined only to asthma, also diabetes, due to possible dioxin or arsenic contamination contained in PM2.5 particulates (which produce oxidative radicals). In London 0.5 miles away from the millennium dome site, the asthma incidence rose from 11.9% of school children in early 1996 to some 50% in November 1998, with the only change being the "opencasting" of that waste site development at Greenwich, which would have contained nickel, phenols etc.

Findings of microscopy and particle analysis, presented at the Royal Microscopical Society in London in July 1998, revealed that asthma caused by opencasting is due to:

- a) Cut quartz particles of which 36% were found to be less than PM0.3, which are second to asbestos in terms of serious effects on the lungs. The body has

to wall off these particles, causing fibrosis, which was called silicosis in underground miners, but which equally applies above ground.

b) Coal particles around PM 1 in size that cause an inflammation in the lungs lasting up to seven days after each dose. Repeated doses then lead to fibrosis, which is called pneumoconiosis in miners. That is why it only needs a weekly dose of fine coal dust from the workings to keep asthma active in the population living within three miles. That is just say one or two days a week, with the weather and wind determining who breathes the dust. Macrophages can only cope with a small amount of PM1 & PM2.5 particles at a time. All excess gets walled off producing COPD, even at age 10 years, as was discovered in a large study of Californian children. Coal dust by opencasting is as small as PM 1.

It only needs an increase of 14.3ug/m<sup>3</sup> of PM2.5s for 3 hours to cause a heart attack in a vulnerable patient. Peak levels of PM2.5 in Derbyshire exceeded 150ug/m<sup>3</sup> in 2000. Peak levels of PM1 measured at Hollingdean (Brighton) brown field site development by 4 bulldozers June 2007 reached 1100ug/m<sup>3</sup> of PM1 (safe level around 5ug/m<sup>3</sup>) and 375 ug/m<sup>3</sup> of PM2.5 (safe level around 7ug/m<sup>3</sup> Remember only particles smaller than PM3 (3 microns) get into the depths of your lungs. The UK only measures PM10 with monitors checking PM4 to PM10 none of which get into the lungs and most instruments can be adjusted downwards. It must be stated that readings of PM2.5s rise and fall entirely separately from PM10s so PM10 monitors are totally useless in the UK for commenting on health damage.

c) Fuel emission particles of acidic carbon with heavy metal contaminants of the fuel, especially nickel sulphate, cause a lung inflammation lasting several days (maximum effects on the heart arising second day) plus heart attacks, strokes, cancers years later from the cocktail of metals including arsenic and cadmium. Analysis of PM2.5s in Derbyshire discovered high cadmium levels plus substantial levels of arsenic and mercury from a brown field site, mixed in with coaldust. Two polyaromatic hydrocarbons emitted in the vehicle exhaust fumes are carcinogenic, as happens from smoking cigarettes, due to disruption of the p53 gene allowing cancers caused by the heavy metals, PAHs and dioxins to grow. The particles leaving the engine are as small as PM0.02 but coalesce together to PM0.2, and then finally coalesce to PM1 to PM2 size, all of which remain in the lung when inhaled. Even healthy human volunteers revealed significant increases in white cells, histamine etc, in the lungs by just 6 hours after

inhaling road diesel exhaust, with increased white cells and platelets in the peripheral blood. A rise of just 14.3ug/m<sup>3</sup> of PM2.5s for 3 hours has been proved to increase heart attacks (p=0006). The fuel used by such heavy equipment in the UK is normally industrial diesel, which can contain toxic waste oils and solvents. The solvents can cause brain damage and any heavy metals and/or other contaminants cause cancers. A single earth moving machine could release as many as 145 million billion ultra fine particles per minute, equivalent to some 900,000 Volvo V70 petrol cars. That is why the PM1 reading in Brighton 2007 reached as high as 1100ug/m<sup>3</sup> away from the site. Young babies die of the inflammation set up by raised PM1 to PM2.5 levels.

An American study involving x-rays annually for twenty years, showed 55% of opencast workers had developed lung damage, proven by x-ray by year twenty. The UK government is paying compensation to above ground miners

for this same lung damage caused by coal dust inhalation. In USA many dozens of train staff have been paid compensation for COPD caused by inhalation of emissions from diesel fuels. The USEPA has brought in laws to improve this off-road diesel quality including reducing sulphur content by 99%.

Local government named planning officers and councillors who vote for a proposal, ignoring this evidence, could be sued by victims who live within a three-mile radius of an opencast site.

At a public inquiry in early 1997, concerning Shortwood Farm, Nottingham my evidence was tampered with and rewritten with different conclusions in the inspectors' report to my document agreed and accepted when I gave evidence. Furthermore RJB Mining had illegally been allowed to insert in their submission in the inspectors' report an allegation about my map being concentric, which had not been brought up when I was cross examined and hence was added after the inquiry, as admitted by their barrister at the Hoodcroft public inquiry, which I won. In fact in the Dolk Report in the Lancet 1998, the graph revealed a concentric critical distance of 3 miles radius around waste sites for a rise in birth defects. The inspector recommended approval of the opencast and public footpath applications, but in early 1999 at a high court challenge, the DETR admitted that decision was incorrect, overturned the approval, and offered costs to the councils involved.

In Wales in February 2008 the Minerals Planning Policy Draft Minerals Technical Advice No. 2:Coal was published for consultation with responses closing 23 May 2008 . They insist on a health impact assessment (done by Cardiff University for Kenfig Hill proposal which led to refusal) and a 350m buffer zone (likely to become 500m). But a true buffer zone should be I maintain 3km downwind at least to protect public health.

All my medical evidence concerns PM2.5 particles and below. These are man-made, and are the ones that enter the lung. PM10 printouts in the UK cannot be relied upon for accuracy or to comment on health effects. The DETR has admitted that the figures are massaged down and are not accurate. This is confirmed by the Environment Agency who also has admitted that their data is not always "accurate, complete, up-to-date or valid." If PM IOs are an issue, then note that Professor Harrison's latest survey (1998) shows a contribution from the continent of Europe reaching the UK, of PMIOs around 1 ug/M3 only, certainly regarding NE Derbyshire. Also note that PM IOs recorded in January 1997 for this area, showed figures between 46 and 60ug/M3. Later months cannot be relied upon for reasons given. The highest PM 10 figures in the UK have been not from the highway traffic but from sites such as the opencasting of brownfield land in Brighton and of a burning coal tip in Standish and around the Castle Cement plant at Clitheroe (recordings of up to 250ug/M3 were found in a hospital and 600ug/m3 of PM2.5s downwind outside in the open).

Experience gained at Arkwright proves that the alleged ability to control dust by opencasters is a fallacy. I was present when the television filmed the emissions at Arkwright with separate clouds of coal-dust and vehicle emissions. PM2.5s rise, and can stay suspended in the air for up to one week while travelling downwind, totally dependent on the weather as to where and when they land to ground level where they may be inhaled into the lungs. Maximum grounding takes place at 11 pm and 4am when the air is cooled, confirmed by monitors. Motorways nearby increase the problem, by adding more vehicle emissions and generating heat, which keeps the particles suspended for a longer period, facilitating spread. The alleged developers



mitigation measures are almost irrelevant as they do not resolve the real problem which includes use of non road diesel quality fuel. The PM2.5 and PM1 dust cannot be controlled.

PM2.5 measurements in the latter half of September 1998 have revealed higher levels at Grassmoor and Hasland, Derbyshire some 2.1 miles from Arkwright opencast than at Tupton and Wingerworth at about 3.1 miles from Arkwright. Levels at Grassmoor were as high as 42.5ug/M3, which is 4.25 times the WHO and US EPA recommended maximum levels. Peaks of PM2.5s in Oct. 1998 reached 80ug/M3 in the Hasland area and 150ug/m3 in 2000. This confirms the cause of the higher asthma incidence at Grassmoor and one could now expect those exposed to that sort of level, to have their lives shortened by some six years. Interestingly those in Arundel live some six years longer. Analysis of the filter heads confirmed that coal dust was the main ingredient.

The NHS is paying the bill. With cost limited frozen budgets now affecting both hospitals and PCTs, which patients will be denied treatment to pay for those made ill or who die, through opencasting? In USA, costing for health damage is being added to production costs prior to decision-making. Dare we?

What knowledge of medicine and toxicology has a Mineral Planning Authority got? What training has an environmental services department in medicine and toxicology? What postgraduate tuition in toxicology have public health directors received and from whom? COMEAP have huge conflicts of interest and their references are years out of date. Dr. Pless-Mullooli admitted 1997 at CwmBran

that her Newcastle report was "all fraud" and "political" and proves nothing due to a fraudulent protocol and methodology. There was no before-during-after data. There were no peak flow measurements. Ages 1 to 11 were supposed to fill in forms. In area 5 medical records of 38 patients were taken when parents had DECLINED consent. Figures were "adjusted" and "cleaned" and discarded to suit. The controls were chosen with equally bad pollution & one overlapped. There were no coal or diesel particles found in filters. Numbers of returned forms were very low despite reminders. GPs were not involved. In one area GP data revealed 28 children were asthmatic but the report stated none. A PM10 reading of MINUS 4.9ug/m3 was rewritten as PLUS 0.5ug/m3. There were found numerous errors in numbers, scale, directions etc. totalling over 100.

Will named councillors and public health doctors who pass unsafe applications be forced to compensate? Article 8 of the Human Rights Convention should be used in the courts to force disclosure of raw pollution data and relevant health authority data, in consideration of public health risks of imposition by government agencies. The GMC in March 2002 stated that disclosure of health data in the public interest is justified. Article 16 states that use of one's rights (to opencast etc) must never ruin somebody else's rights. Article 2 provides for right to life.

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References and data were obtained from Dr D Williams, Mr P Ordidge, Royal Microscopical Society Conference July 1998, Epidemiology July 1995, West Glamorgan HA, Lanarkshire HA, Ken Coates MEP, English Partnerships (and CPL data), USEPA Research & Harvard School of Public Health, Health Effects Institute report May 2000, Respiratory Morbidity in Merseyside

School Children exposed to coal dust and air pollution, in Archives of Disease in Childhood 1994;70:305-312 & Doctor Salvi et al AM J RESPIR CRIT CARE MED 1999; 159: 702-709. Also Proc R Coll Physicians Edinb 1999; 29;1115- "Health Effects of Respirable Dust from Opencast Coal Mining" by Doctors Munro and Crompton. This article backs up my research. What Car magazine of June 1999 contains an article analysing vehicle particle emissions from PM0.01 to PM 1, which reveals the scale of the problem just from ULSD. How much worse in content must emissions be with industrial vehicles using lower quality diesel/fuel? I append 218 relevant references.