

## Submission: Inquiry into the impacts of air quality on health

Lock the Gate Alliance Ltd



Thank you for the opportunity to make a submission on the impacts on health of air quality in Australia. This submission will consider some of the impacts on health of air quality from: (1) coal mining, handling and transport activities, and burning in coal fired power stations; and (2) unconventional gas exploration and production.

### **1. Impacts on human health from air pollution resulting from coal mining, transport, handling and burning**

There has been limited research detailing and quantifying the health impacts of coal mining activities on human health in Australia and no overview of the health impacts on affected communities in coal mining regions in this country. However, overseas research and an increasing body of anecdotal evidence from affected communities, and physicians working in those communities, document well recognised and very serious human health risks from coal related air pollutants. Doctors for the Environment Australia<sup>1</sup> maintain that there is strong evidence from other countries that coal mining communities have an *“increased risk for developing cardiopulmonary disease, chronic obstructive pulmonary disease, hypertension, other lung diseases and chronic kidney disease. Death rates for these diseases [are] higher in coal-mining areas compared to non-mining areas.”*

In discussing the health impacts of coal pollutants Doctors for the Environment Australia<sup>2</sup> have stated that *“Each phase of coal’s lifecycle: mining, disposal of contaminated water and tailings, transportation, washing, combustion, and disposing of post-combustion wastes,*

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<sup>1</sup> [http://dea.org.au/news/article/the\\_mining\\_and\\_burning\\_of\\_coal\\_effects\\_on\\_health\\_and\\_the\\_environment](http://dea.org.au/news/article/the_mining_and_burning_of_coal_effects_on_health_and_the_environment)

<sup>2</sup> [http://dea.org.au/news/article/the\\_mining\\_and\\_burning\\_of\\_coal\\_effects\\_on\\_health\\_and\\_the\\_environment](http://dea.org.au/news/article/the_mining_and_burning_of_coal_effects_on_health_and_the_environment)

*produces pollutants that affect human health...Communities in which coal mining or burning occurs have been shown to suffer significant health impacts."*

Further detailed information on the health impacts of coal can be found in the following documents:

1. *DEA Position paper on the health Impacts of Coal*, Doctors for the Environment Australia<sup>3</sup>
2. *Health and Social harms of Coal mining in Local Communities*, Beyond Zero Emissions<sup>4</sup>
3. *The Mining and burning of Coal: Effects on health and the Environment*, W.M. Castleden et al.<sup>5</sup>

### **Sources and effects of particulate matter**

The sources of particulate matter in coal extraction, processing and burning are multiple. Particulate pollution and nitrous oxide arise during blasting and other operations at coal mines and dust from uncovered coal trucks and trains is also a source of air pollution during coal transport.<sup>6</sup> There are also many potentially toxic elements that are released with coal combustion for power generation. According to Doctors for the environment Australia, "burning coal releases mercury, lead, chromium, carbon monoxide, arsenic and sulphuric acid and fine particulates. The most harmful pollutants are the smallest particles (PM 2.5) which are inhaled deep into the lungs to cause inflammation and large quantities are being produced in mining and power generation."<sup>7</sup>

### **Recommendations**

The Lock the Gate Alliance urges the Committee to examine the sources and effects of particulate matter by undertaking the following actions:

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<sup>3</sup> [http://dea.org.au/images/general/Briefing\\_paper\\_on\\_coal\\_2011.pdf](http://dea.org.au/images/general/Briefing_paper_on_coal_2011.pdf)

<sup>4</sup> [http://media.bze.org.au/coal\\_health\\_Report\\_FINAL.pdf](http://media.bze.org.au/coal_health_Report_FINAL.pdf)

<sup>5</sup> [http://www.fof.org.au/uploads/media/MJA\\_Coal.pdf](http://www.fof.org.au/uploads/media/MJA_Coal.pdf)

<sup>6</sup> [http://dea.org.au/images/general/Briefing\\_paper\\_on\\_coal\\_2011.pdf](http://dea.org.au/images/general/Briefing_paper_on_coal_2011.pdf)

<sup>7</sup> [http://dea.org.au/resources/file/coal\\_health\\_poster](http://dea.org.au/resources/file/coal_health_poster)

- It is recommended that the Committee examine pollution data from coal mines and coal fired power stations including: open cut coal mines in the Hunter Valley, NSW, in South-east Queensland, and in the Bowen Basin, Central Queensland; Bayswater, Lidell, and Eraring power stations in NSW; Collinsville and Gladstone power stations in Queensland; Hazelwood and Loy Yang power stations in Victoria; uncovered coal trains from south-east Queensland through Brisbane to the port, and the port itself; uncovered coal trains from the Gunnedah Basin, through the Hunter Valley, to the Newcastle ports and the ports themselves as a source of pollution.
- It is recommended that the Committee examine the quantity of particulate, nitrous oxide and other air pollutants released by open-cut coal mines and coal-fired power stations in the Hunter Valley and Lake Macquarie in NSW, the La Trobe Valley in Victoria and the Bowen Basin in Queensland and seek advice from regional medical practitioners, and experts in the field on the impact this pollution is having on the health of surrounding communities.

### **Populations most at risk and causes putting them at risk**

It is those communities living in close proximity to coal mining operations and power stations that bear the disproportionate health impacts of coal related air pollution. In response to the systemic failure of legislation, regulation, processes and Government agencies to address coal mining related health issues, many regional communities in Australia have formed community groups to try to address health and other issues from coal mining activities in their local areas. These community groups have been at the forefront of the battle to document the health risks of coal mining and burning, gather air pollution data in their local area and push for better regulation of coal mining processes by government. Some local communities are now funding and designing their own studies into the health effects of coal dust and particulate pollution. Sharyn Munroe's "Richland, Wasteland: How Coal is Killing Australia"<sup>8</sup> documents the personal experiences of individuals and

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<sup>8</sup> <http://richlandwasteland.com/chapter-summary/>

communities across regional Australia and the impacts that the encroachment of coal mining activity has had on their health and well being.

### **Recommendations**

The Alliance urges the Committee to gather evidence from the populations most at risk from coal mining activities in their local area by scheduling Inquiry Hearings in affected communities, in particular:

- It is recommended that the Committee visit coal affected communities in Victoria, New South Wales and Queensland to hear the testimony of local residents on the impacts of particulate pollution on their health and well being. In particular, those regions and towns with the largest concentration of open cut coal mining activities, particularly the Bowen basin in Queensland, South East Queensland and the Hunter Valley in NSW.
- It is recommended that the Committee gather testimony about the impact of particulate pollution in communities where there is extensive anecdotal evidence of health impacts from coal operations, including Camberwell, Warkworth, Jerry's Plains, and Newcastle (particularly the suburbs of Mayfield, Carrington and Stockton) in NSW, and Collinsville, Moranbah, Dysart, Blackwater, Acland, Oakey, Jondaryon and Louisa Creek in Queensland, as well as all the suburbs of Brisbane affected by the movement of uncovered coal trains and port facilities.

### **Standards, monitoring and regulation of air quality at all levels of government**

Current air pollution standards in Australia are implemented by an agreement under the Council of Australian Governments - the National Environment and Protection Measure for Ambient Air Quality ("NEPM"). Under this scheme the States are responsible for implementing measures to regulate 6 different air pollutants.

The number of pollutants regulated under the scheme is inadequate to cover many emissions from coal and gas mining and the standards set for pollution of small particulates are inadequate. The Commonwealth has no way of enforcing compliance with the scheme - in the Hunter Valley, for example, air quality standards are regularly exceeded due to coal mining without any penalties being imposed.

Local communities already impacted by coal mining air pollutants, or likely to be impacted by new coal mines and mine expansions, are concerned by a range of failures in the current regulatory, approvals and monitoring processes.

For example the Maules Creek Community Council<sup>9</sup> maintains that: “Despite these very serious [health] risks, there has been no health impact assessment conducted in the Maules Ck area, and the cumulative air quality impacts of the three proposed mines have not been properly assessed.” They continue: “The Planning Assessment Commission which was tasked with conducting a merits review of the mines did not consider the cumulative impacts of all three mines on air quality. Instead of requiring the work to be done before the mines are approved, it recommended that the mines are approved first and then the air quality is ‘monitored’ afterwards. We think this is putting the cart before the horse, with serious risks to our health and communities, and believe it breaches the Terms of Reference set for the Planning Assessment Commission.”

This community also has grave concerns about the lack of independent monitoring: “Another reason why the community has little faith in air quality monitoring is because it is controlled by the mining companies who are reticent to fund it properly and the equipment that they use currently is archaic.”

Recent studies by community groups in the Hunter Valley have revealed high levels of exceedance of national standards for PM<sub>10</sub> in areas adjoining coal rail-lines and coal dumps<sup>10</sup>. There is no mandatory requirement for the covering of coal trains or coal dumps in most parts of Australia.

## **Recommendations**

The Alliance makes the following recommendations in relation to the review and amendment of the approvals and regulatory processes for coal mining and power generation:

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<sup>9</sup> <http://maulescreek.org/health-impacts/>

<sup>10</sup> [http://www.hcec.org.au/sites/default/files/CoalDustMonitoringStudyCTAG2013\\_web.pdf#overlay-context=20130308/testing-finds-coal-dust-levels-top-national-standards-5-days-7](http://www.hcec.org.au/sites/default/files/CoalDustMonitoringStudyCTAG2013_web.pdf#overlay-context=20130308/testing-finds-coal-dust-levels-top-national-standards-5-days-7)

- It is recommended that the Federal Government develop a comprehensive set of national standards on air quality and incorporate them into the *Environment Protection Biodiversity Conservation Act 1999* or another piece of legislation.
- The standards should be binding on States and provide the Federal Government with a compliance role in enforcing them.
- It is recommended that a national framework for monitoring compliance with state and territory air quality regulations is established.
- It is recommended that the Federal Government implement a national standard for PM<sub>2.5</sub> be adopted of 24 hour average concentration of 25µgm<sup>3</sup> or better.
- It is recommended that the Federal Government conduct further research as to whether standards should be set for even finer particles, ie PM1.
- It is recommended that exclusion zones (e.g. 2km) be implemented around all residences and residential areas so as to minimise the risk of exposure to harmful air pollutants from coal mining.
- It is recommended that the approvals processes for all proposed open cut coal mines within 2km-5km of a dwelling be suspended pending the outcome of the inquiry and full investigation by State and Federal authorities of the health impacts of coal production and handling.
- It is recommended that mandatory baseline air quality monitoring is required prior to the development of any new coal mine or power station, and that full health impact assessments are integrated as a mandatory component of planning assessment processes.
- It is recommended that the efforts of coal affected communities in getting proper monitoring of air quality impacts and research and analysis of the health impacts from coal mining and burning be supported with adequate resourcing from government.
- It is recommended that the Committee investigate the lack of transparency, consistency and precaution in the Queensland system for establishing, reporting and enforcing conditions and standards for particulate pollution in Environmental Authorities for open cut coal mines.
- It is recommended that the Committee seek information from the Queensland Department of Environment and Heritage Protection and Department of Natural

Resources and Mines, and from coal companies operating in the Bowen Basin to determine the degree of compliance with Environmental Authorities and enforcement of conditions by government agencies.

- It is recommended that information relating to resource company compliance with environmental conditions be made more accessible to the public.

## **2. Impacts on human health from air pollution resulting from unconventional gas exploration and production**

Unconventional gas (UG) includes coal seam gas, tight gas and shale gas and consists of methane with other hydrocarbons, carbon dioxide, nitrogen and hydrogen sulphide.

Unconventional gas extraction differs from conventional gas in that many wells need to be drilled to extract the gas, many of which incorporate horizontal drilling and the hydraulic fracturing process (often undertaken a number of times over the life of a well.) The large number of wells needed in UG extraction means that unconventional gas fields cover an extensive surface area and also require extensive pipeline networks and other infrastructure for gas processing and transmission.

Whilst there have been no investigations of the health impacts of unconventional gas operations in Australia there are a number of sources from the United States that identify a range of health effects of exposure to air pollutants from UG operations. Further detailed information on the air pollutants emitted during UG operations and their health impacts can be found in the following documents:

1. *Citizen Investigation of Toxic Air Pollution from Natural Gas Development July 2011*, Global Community Monitor.<sup>11</sup>
2. *Gas Patch Roulette: How Shale Gas Development Risks Public Health In Pennsylvania*, October 2012 Earthworks' Oil & Gas Accountability Project <sup>12</sup>

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<sup>11</sup> [www.gcmonitor.org](http://www.gcmonitor.org)

<sup>12</sup> [www.earthworksaction.org](http://www.earthworksaction.org)

3. *Human health risk assessment of air emissions from development of unconventional natural gas resources*, Lisa M. Mckenzie, Roxana Z. Witter, Lee S. Newman and John L. Adgate,<sup>13</sup>
4. *UNEP Global Environmental Alert system Gas fracking: can we safely squeeze the rocks?*<sup>14</sup> UNEP.
5. *An exploratory study of air quality near natural gas operations*, Colbern et al.<sup>15</sup>
6. *Hydraulic Fracturing in Coal Seam Gas Mining: The Risks to Our Health, Communities, Environment and Climate*, National Toxics Network.<sup>16</sup>
7. *Unconventional Natural Gas Development and Infant Health; Evidence from Pennsylvania*. Elaine L. Hill. A working paper prepared for the Charles H. Dyson School of Applied Economics and Management Cornell University, Ithaca, New York.

### Sources and effects of particulate matter

Air pollution arises from several sources in unconventional gas fields; including equipment engines, drilling rigs, pump jacks, boilers, heaters, generators, combustion flares, storage tanks, injection pumps, dehydrators, vehicles, and oil and gas skimmers, with compressor stations being one of the most significant sources of air emissions. As part of these UG operations a variety of pollutants are emitted, ranging from nitrogen oxides, volatile organic compounds (VOCs), carbon monoxide, and sulphur dioxide, to particulate matter.<sup>17</sup> A range of toxic air pollutants are also released during gas processing, flaring and venting.<sup>18</sup> Volatile organic Compounds (VOC's), many of which are highly toxic,<sup>19</sup> are released at all stages of UG production.<sup>20</sup>

The health impacts from harmful air pollutants released during UG operations include:

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<sup>13</sup> *Science of the Total Environment* March 21, 2012

<sup>14</sup> [http://na.unep.net/api/geas/articles/getArticleHtmlWithArticleIDScript.php?article\\_id=93](http://na.unep.net/api/geas/articles/getArticleHtmlWithArticleIDScript.php?article_id=93)

<sup>15</sup> *Hum Ecol Risk Assess*(in press)

<sup>16</sup> <http://ntn.org.au/wp/wp-content/uploads/2012/04/NTN-CSG-Report-Sep-2011.pdf>

<sup>17</sup> US National Library of Medicine, [http://toxtown.nlm.nih.gov/text\\_version/locations.php?id=150](http://toxtown.nlm.nih.gov/text_version/locations.php?id=150)

<sup>18</sup> [http://www.hsph.harvard.edu/research/niehs/files/penning\\_marcellusshale.pdf](http://www.hsph.harvard.edu/research/niehs/files/penning_marcellusshale.pdf)

<sup>19</sup> <http://www.epa.gov/iaq/voc.html>

<sup>20</sup> <http://ntn.org.au/wp/wp-content/uploads/2012/04/NTN-CSG-Report-Sep-2011.pdf>



higher risks for respiratory and neurological effects based on their exposure to air pollutants; and a higher excess lifetime risk for cancer for residents living less than .5 miles from wells<sup>21</sup>. Another study found a strong association between symptoms and proximity to gas facilities with the symptoms reported in 108 surveys<sup>22</sup> including: nasal & throat irritation (60%), sinus problems (58%), eyes burning (53%), shortness of breath (52%), difficulty breathing (41%), severe headaches (51%), sleep disturbance (51%), frequent nausea (39%), skin irritation (38%), skin rashes (37%), dizziness (34%).

## **Recommendations**

The Lock the Gate Alliance urges the Committee to recommend the following processes be put in place to properly assess the air emissions from UG operations and the potential health impacts of these pollutants:

- Mandatory baseline air quality testing prior to any UG activities being undertaken and on-going monitoring during UG exploration and production, of both particulate matter and VOCs.
- Mandatory baseline testing of background methane levels prior to any UG activities being undertaken and on-going monitoring during UG operations.
- Comprehensive health impact assessments taking into account all exposure routes prior to any approval for UG activities being granted.

## **Populations most at risk and causes putting them at risk**

The rapid expansion of the UG industry in Australia, in particular the expansion of coal seam gas (CSG) production across Queensland, has meant that many residents in rural areas are facing the rapid industrialization of their local area for gas extraction. In the area around Tara in the Surat Basin, Queensland, residents living adjacent to CSG wells and other infrastructure have reported a range of unexplained health symptoms that are similar to those reported in the US by residents exposed to UG air pollutants. These symptoms

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<sup>21</sup> Lisa M. McKenzie, Roxana Z. Witter, Lee S. Newman and John L. Adgate, Human health risk assessment of air emissions from development of unconventional natural gas resources. *Science of the Total Environment* March 21, 2012

<sup>22</sup> Gas Patch Roulette: How Shale Gas Development Risks Public Health In Pennsylvania, October 2012 Earthworks' Oil & Gas Accountability Project [www.earthworksaction.org](http://www.earthworksaction.org)

include: severe headaches, nausea, vomiting, nose bleeds, rashes, eye and throat irritations and severe skin irritations.

### **Recommendations**

The Lock the Gate Alliance urges the Committee to gather evidence from the communities most at risk from UG operations in their local area by scheduling Inquiry Hearings in affected communities, in particular:

- To conduct hearings in the Tara area of Queensland and any other areas where UG operations are in close proximity to residences.

### **Standards, monitoring and regulation of air quality at all levels of government**

The current regulatory requirements for UG operations in Australia do not adequately address the health risks from air pollutants released during unconventional gas exploration and production. These frameworks do not mandate precautionary standards for the full range of harmful pollutants released during UG operations nor do they take into account the risks to human health from chronic low level exposure to air pollutants and the impacts of real world mixtures of air pollutants.

The current regulations for CSG operations allow gas infrastructure within 200 metres of residences thereby placing individuals, families and communities at significant risk. The current monitoring procedures in UG operations are inadequate to assess the level and scale of air pollutants being released from UG operations that may be negatively impacting human health.

### **Recommendations**

The Lock the Gate Alliance urges the Committee to recommend the following changes to the regulation of air pollutants from UG operations:

- The implementation of regulatory standards for a full range of VOCs, criteria pollutants and particulates based on precaution.

- Implementation of Australian precautionary guidelines and standards that takes into consideration low level, chronic exposure to air pollutants and the impacts of exposure to real world mixtures of air pollutants.
- UG exclusion zones (e.g. 2km) be implemented around all residences and residential areas so as to minimise the risk of exposure to harmful air pollutants from UG operations.