CSG REVIEW SUBMISSION

Graeme Healy to: csg.review 26/04/2013 06:37 PM

History: This message has been replied to and forwarded.

Please find attached submission and covering letter from the Barrington-Gloucester-Stroud Preservation Alliance.

Graeme Healy
Chairperson

CSG Chief Scientist Review Covering Letter.docx CSGReviewBGSPA.pdf

Barrington-Gloucester-Stroud Preservation Alliance Inc.
(Incorporated under the Associations Incorporation Act, 1984)
Incorporation No. INC9885807

PO Box 174 Gloucester NSW 2422 • bgspalliance@yahoo.com.au • www.bgsp-alliance.asn.au

Chairperson
Graeme Healy
(Tel) 02 6558 8159

Deputy Chairperson
Steve Robinson
(Tel) 02 6558 7428

Secretary/Treasurer
Penny Drake-Brockman
(Tel) 02 6558 1845

26 April 2013

Professor Mary O'Kane
NSW Chief Scientist & Engineer
csg.review@chiefscientist.nsw.gov.au

Dear Professor O'Kane

Review of Coal Seam Gas Activities in NSW

Please find enclosed a submission by the Barrington-Gloucester-Stroud Preservation Alliance (BGSPA) with respect to your review of coal seam gas (CSG) activities in NSW.

You will no doubt be aware that conditional approval was granted in February 2011 for the development of a 330 well CSG field in the Gloucester basin. There is deep concern within the community about this proposed development, particularly given the complex nature of the geology of the basin, the potential risks to ground and surface water and the lack of rigorous hydrogeological investigation that has been undertaken to inform the approval.

The attached submission seeks to address the specific Terms of Reference of your review in the context of our local circumstances and experience.

In addition, BGSPA submits that one of the fundamental reasons for the widespread community concern and opposition to the development of the CSG industry generally, is the fact that there has been no rigorous, independent scientific research undertaken to properly assess the risks.

Communities are being asked to simply accept glib reassurances by the proponent companies and their industry body, APPEA, while the experience in the field is anything but benign and reassuring. We note that even the Deputy Premier has publicly admitted that he wouldn't want a CSG well near his home due to the potential risk. (7:30 NSW ABC 22 February 2013.)

Accordingly BGSPA strongly advocates that the NSW Chief Scientist be tasked with the responsibility to:

- Commission rigorous independent scientific research to properly assess the risks of CSG extraction;
- Identify best practice methods for baseline monitoring of health impacts, water resources, air quality, soil quality and fugitive emissions;
- Identify areas where CSG extraction should not be permitted due to unacceptable risks and impacts;
- Review the impacts of CSG extraction on agriculture and other industries such as tourism.

Finally, we respectfully suggest that it will be necessary to undertake site inspections to successfully complete this review. We would welcome your visit to Gloucester to better understand the issues identified in our submission.

Yours sincerely
Graeme Healy
Chairperson

Submission to the
NSW Chief Scientist

From The Barrington Gloucester Stroud Preservation Alliance Inc

April 2013

The Geology of the Gloucester Stroud Valley

The Stroud-Gloucester Syncline is the major geological feature of the Western Myall Block, which forms the most easterly section of the Hunter-Myall Geological Region. The syncline was formed by intense east-west folding pressure in conjunction with major plate movement, volcanic action and complex erosion processes. It contains exceptionally complex geological features that make it the most vulnerable of all the areas so far identified for coal seam methane gas extraction in Australia.

The Loughnan report notes that:[1]

> Perhaps no other area within the State presents such a unique opportunity for studying the rapid succession of different tectonic environments as the Stroud-Gloucester Trough …Undoubtedly the most remarkable feature of the area is that [feature] caused by a late E.-W. compressional stress of some magnitude, which superimposed new structures on pre-existing ones, causing the development of tear fractures and the displacement of whole blocks of country.

and:

> The ubiquity or river gravels at every possible level of the present topography is indicative of the numerous cycles of erosion to which this area has been subjected, and as shown above, the valley has embarked upon a further cycle of base levelling, undoubtedly brought about by a tributary of the Karuah extending its headward reaches to capture the ancestors of the Ward's River-Johnson's Creek system, which prior to this capture, flowed northward.

The Loughnan report further notes that the complicated geology, the steepness of coal beds and the 'remarkable east-west tear faults', which are most intensive north of Craven, made past attempts to mine coal in that area difficult and dangerous. It follows that methane gas extraction is equally hazardous.

The valley's geology is not 'flat bed' or 'layer cake' geology represented by flat or near flat continuous strata overlaying continuous strata. The limbs of the syncline are extremely steep and dip at more than 60°, in some situations they are nearly vertical and at the northeast some faulted blocks are slightly overturned.[2] Between the limbs of the syncline the strata are deeply dipping, heavily folded and buckled and in many situations terminate abruptly at faults or in complex zones of major and minor shears. The issue arising from this is that coal seam gas geological studies to date have concentrated on areas with flat or near flat 'layer cake' geology, resulting in a paucity of knowledge about highly complex geological areas such as the Gloucester Valley.

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1. FC Loughnan, *Permian Coal Measures of the Stroud-Gloucester Trough,* 1954, NSW University of Technology, see pages 4, 6, 8, 9.

2. John Roberts, Brian Engel & John Chapman, *Geology of the Camberwell, Dungog, and Bulahdelah 1:100,000 sheets 9133, 9233, 93333,* 1991, NSW Department of Mineral Resources, p.283.

This in itself would be a matter of serious concern but becomes a matter of critical concern when it is considered that the Gloucester Valley is the most vulnerable and least understood of all areas so far identified for coal seam gas extraction in Australia. One feature that is not understood and yet represents a risk of the highest magnitude is the extreme variability of the geology from one point to another. Tests undertaken at one location may have little relevance to other locations, even if they are in close proximity.

Professor Alex Grady, when commenting on the variability of valley's geology and hydrology noted:[3]

> The area in question has been intensely faulted, involving several intersecting arrays of often closely spaced faults. This is the kind of geological situation in which the rocks are usually strongly fractured (fractures due to compaction-contraction during lithification, together with those due to brittle failure during folding and faulting). This gives rise to secondary porosity/permeability - which can vary considerably from place to place. Most particularly, such effects can produce locally high porosity/permeability zones in rock units that have low primary porosity/permeability (producing what are called "fractured rock aquifers").
>
> There are sandstone stratigraphic units within the geological sequence, ones that could well be fairly good local aquifers (although the water quality might not be particularly good). [The sedimentary units in the Gloucester Valley area are not pure "layer cake stratigraphy", i.e., sedimentary units are not perfectly continuous (in extent or thickness - particularly from east to west). This applies also to the character of the mapped rock units, eg., the distribution of potentially good sedimentary aquifers.] The fact that their drilling activity in the pilot project area didn't intersect any, doesn't preclude their existence within the proposed Gas Field area.

In conclusion, the geological studies undertaken to date show that there is a complex relationship between the valley's ground water systems and its complicated geology. The Alliance considers that only a full independent expert study that addresses all aspects of the valley's hydrology, including surface water, can provide the standard of scientific information required to determine where and how the industry would be safe to proceed or if it is safe to proceed at all.

WATER MANAGEMENT

The Stroud-Gloucester Valley - Geology and Ground water

3. Professor Alex Grady, (geologist with extensive field experience in NSW, Sth Australia, WA, the NT, NZ and Eastern Indonesia, Member Geological Society of Australia). Emails communications to writer December 2009, March 2011.

The following comments are not intended to attack the AGL environmental assessment specifically; that assessment is of general industry standard. The purpose is to illustrate the inadequate standard of coal seam gas environmental assessments generally as well as to emphasise the risk that has been imposed on the Stroud-Gloucester Valley by this project.

The Alliance is particularly concerned at the inadequate hydrogeological assessment undertaken by the AGL Gloucester Project in regard to the area's highly susceptible complex geology. In this respect the Alliance relies on the definitive geological study of the region, Geology of the Camberwell, Dungog and Bulahdelah 1:100,000 sheets1991, Department of Mineral Resources, and on comments by Professor Alex Grady concerning the AGL Environmental Assessment.

The 1:100,000 map Dungog 9233 shows the Stroud-Gloucester Valley generally and particularly the northern end to be extremely complex geologically with a high number of major and minor faults. These cause severe pollution risks to ground water supplies in regard to gas extraction and coal mining. The assessment of the valley's coal resources in the above study considers that coal cannot be mined safely and economically in the northern end of the valley and yet the AGL project has been approved to extract gas in the same area, and with critical issues including impact on water left unassessed.

Professor Alex Grady commented at the conclusion of his commentary on the area's geology and the AGL environmental assessment:

> *I think that you can see from what I have written, that I sense a major lack of understanding of the potential hydrogeological situation, together with a consequent lack of an adequate monitoring system and program, required in order to understand the hydrogeological repercussions (short and long term) of what is proposed in the project.*

Lack of a Flood Study for the Project

This again underlines the lack of a proper environmental assessment in the Stroud-Gloucester Valley for this project and the inadequacies inherent in coal seam gas environmental assessments generally.

A complete flood study of the project area has not been undertaken ever. No flood assessment was undertaken in the AGL Environmental Assessment, yet the Gloucester and Avon Rivers are known to suffer severe flooding. This serious omission should be rectified by a full study that addresses all flood impact including frequency, depth, velocity and impact on infrastructure, land use and flood plain erosion. We believe that a flood study was required under both ground water hydrology and risk assessment but was omitted by the applicant.

Impact on downstream water users

This includes MidCoast Water, which supplies water to the Gloucester-Wingham-Taree-Forster-Tuncurry area as well as rural properties that draw domestic or farm irrigation water from the Manning River system. This matter was not identified specifically in the Director-General's EARs and was not addressed in

the AGL Environmental assessment, again illustrating the inadequate standard of assessment that is general throughout the industry.

The matter has caused considerable comment and even a degree of alarm. The *Manning River Times*, 15 March, reported that concern as per the following extract;

> *MAYOR of Greater Taree City, Cr Paul Hogan said coal seam gas mining could have '"a terrible effect'" on the environment, and should not be permitted in any area where water supplies might be affected.*
>
> *As a delegate to MidCoast Water, he was horrified to learn that MidCoast had not been included in the consultation or preliminary design stage which led to the State government's approval of the initial 110 gas wells earlier this month.*
>
> *Gloucester Shire Council, Great Lakes Council and the NSW Office of Water were invited to a planning focus meeting at which the development was discussed, but potential impacts on drinking water in downstream catchments were not raised, he said.*
>
> *He described MidCoast Water's omission from the discussions as "like shutting the gate after the horse has bolted".*

Robert Oakeshott, independent Federal Member for Lyne, similarly commented 'for this decision to have been made by the NSW Government without even asking MidCoast Water to the table simply beggars belief'. (Media release 17 March 2011)

The BGSP Alliance Inc considers that the matter cannot be rectified by discussions and monitoring after the event, it was a critical component of the assessment process and the environmental process is deeply flawed by its omission.

A Review of Water Connectivity

Dr Philip Pells was engaged by community groups to analysis the AGL report and the Evans Review. Pells accepted the facts derived from the study as they were provided and went on to analyse if the scope of the facts was adequate and if the interpretation was accurate.
Pells considers that the facts presented are not adequate because:

- They investigated only 0.25% of the total area (7% of Stage 1) in a region of acknowledged complex geology that is highly faulted and of various ages and origins.
- Most of the data came from only 10 months of monitoring
- Only rainfall data from 1976 to present was used when it is available from 1889. Some of the big flood events and dry periods were just ignored.
- There is no mention in the model of the quantity or quality of the water produced during the life of the project nor how it will be stored.

Pells went on to analyse their model and in his opinion the model is oversimplified to the point of being quite inadequate.

- It only contains 4 layers in a multi-layered geology and it does include any geological faults in a highly faulted region.
- Even if he was to accept their model with these limitations, it does not lead to the stated conclusions.
- So even if their assumptions are true the conclusions are flawed.

The conclusion of the AGL report and the Evan's Review was that there is no evidence of connectivity between shallow and deep groundwater flow. In Pells' opinion neither the data studied nor the modelling done support this conclusion.

HYDRAULIC FRACTURING (FRACKING)

General

The Alliance remains deeply concerned not only by the inadequate and, at times, dishonest information being provided by coal seam gas companies generally but by the use of the fracking process, the amount of water that is withdrawn by the process and the use of any chemicals being injected into the water supply.

We note the following issues as being relevant to the fracking process:

- The gas will flow into undetected old boreholes with gas migration having the potential for burning and even explosion.
- The water now flowing through the coal seam will pick up carcinogens, heavy metals and other contaminants from the coal seam and flow into aquifers that supply domestic drinking water and agricultural water.
- Fracking and drilling chemicals will be added, most of which have not been evaluated by NICNAS, and enter domestic and agricultural water, again poisoning 'man and beast'.

We are particularly concerned that the fracking process is seen as a 'one size fits all' approach. The fracking process always imposes a high level of environmental risk but this can be extreme in areas of complex geology, such as the Gloucester Basin. However, the gas extraction companies are concerned only with the economics of the fracking process from a recovery consideration and appear incapable of understanding the geological problems of different areas.

The Fracking Process in the Valley

AGL advised (SMH August 2011) that the estimates of reserves in the Gloucester Basin may have to be downgraded because of the incidence of fracking that will be involved. It is clear that AGL will be relying on or agitating for substantial use of the fracking process. This is a particularly disturbing situation given the Gloucester Basin's extremely vulnerable geology.

The Gloucester area has already experienced incidents of methane gas migration during exploration as noted in the report Coal Bed Methane Hazards in New South Wales, by CM Atkinson, 2005 (see below).

FUGITIVE EMISSIONS

Coal seam gas is advertised as "clean and green" because its combustion produces less carbon dioxide than coal and that it is therefore the ideal intermediate fuel to take us to the next stage of reducing greenhouse emissions. This is a misrepresentation based only on the gas produced during the power generation-burning process. However, this is an incomplete assessment at best and a completely misleading and dishonest assessment if viewed totally. There are a number of claims that the amount of greenhouse emissions have been significantly understated, but even leaving that aside, there are other serious concerns. Professor Robert Howarth from Cornell University (research on the life-cycle carbon cost of CSG1) estimates that over a twenty-year period, CSG produces at least as much greenhouse effect as coal and potentially much more.

Such is the level of concern from scientists in the USA that the Council of Scientific Society Presidents wrote to President Obama in 2010 warning that some potential energy bridges such as shale gas have received insufficient analysis and may aggravate rather than mitigate global warming.

Methane is a far more potent greenhouse gas than carbon dioxide and it is the 'fugitive emissions' that cause concern. These escape into the atmosphere during the production process (flaring, drilling, fracking) and due to losses from the transmission pipelines. The ABS estimates transmission losses for natural gas over 2001-022 at 1.5% of all piped natural gas. Howarth estimates that between 3.6% and 7.9% of the methane from shale gas production escapes to the atmosphere over the lifetime of a well.

We also note that the gas emissions produced in the extraction and processing (principally but not confined to the high use of diesel motors) has not been taken into consideration.

The cumulative risk caused by the complex geology and the multiple coal exploration and production leases in the Gloucester Valley presents a substantial risk that emissions will be much greater than would otherwise by probable. The BGSP Alliance members are very concerned about the reports being received about fugitive emissions in the industry generally and by the reports being received regarding fugitive emissions resulting from the current exploration processes. Accurate, confirmed details cannot be provided for these and there appears to be a general cover-up process instigated by AGL. However, details of one CSG eruption were published by the Atkinson Report in 2005, an extract from which follows.[4]

Molopo Australia Limited has a 25% interest with the operating company AJ Lucas Coal technologies Pty. Ltd, in the Stratford gas prospect near Gloucester, approximately 100 kilometres north of Newcastle. Drill hole LMG-03 was one of two test production drill holes completed by the partners and four coal zones with an aggregate thickness of 16 metres of coal had been fracture stimulated with sand and water. A 6-12 months testing period began in late August 2004.

4 C.M. Atkinson, *Coal Seam Methane Hazards in New South Wales*, January 2005, p.10. Prepared for Tony Davis & associates.

However, Molopo announced on 7th September that all tests had been halted after methane had erupted from a number of old boreholes in the area. At the time a strong gas flow of 280,000 cubic feet/day had been recorded even though the water level was still about 300 metres above the coal seams. Two and a half months later Molopo Australia Limited announced that test pumping of LMG-03 had resumed. Three boreholes from an earlier coal exploration had started producing methane, and these along with eight other boreholes had now been sealed with concrete, the company explained. The project manager explained in November that this accidental methane eruption had shown how good the lateral connections were in the reservoir.

This incident was in the current AGL gas field as Lucas-Molopo sold out to AGL.

In this case there were apparently no serious injuries and the methane gas migrated into nearby boreholes rather than houses, essential water supplies or livestock areas. This example shows that even with only a partial withdrawal of the hydrostatic pressure, methane will migrate quickly and in unpredictable directions. If the drill site conditions laid down by the State Government are similar at Stratford to those elsewhere, the most visible safety precautions would have been a wire fence and a locked gate.

HEALTH IMPACTS

The Stroud-Gloucester Valley

The potential health damage from CSG Mining comes from a combination of water contamination, air contamination, noise and a range of psychosocial stressors causing stress effects.

In NSW the two CSG projects furthest advanced are the Camden Gas Project, a small field which has been in production for several years and was due to expand, and the Gloucester Gas Project which has been given a conditional licence to produce but has not yet completed those conditions, so has not yet entered production.

Health Damage from Air and Water Pollution

The potential for health damage from unconventional gas mining was highlighted in the film Gaslands and there has been uncertainty as to what extent this applied to our local NSW situation. At Tara in Queensland there is a production CSG field and the community have reported a variety of health problems similar to those reported from the US. Recently a team of researchers from Southern Cross University measured the methane in the air at Tara and found a threefold increase in the air methane level. The association of these two worrying phenomena rang alarm bells for local health experts. At the same time AGL were describing plans to expand production of their Camden gas field using horizontal drilling to go under residential areas.

NSW Health Department advised in January 2013 that a detailed investigation needed to take place to evaluate the level and types of risk before any further expansion of CSG mining took place.

Three months have now elapsed since that opinion was delivered from the most senior State environmental health advisor and yet no studies have commenced.

The Camden and Scenic Hills communities protested and the NSW government put these developments on hold. Soon after they released guidelines including stating that there should be a 2km buffer zone around residential areas.

Amazingly Gloucester was told that it was not covered by these announcements.

The Gloucester Gas Project has drilled more than 40 wells (including 17 pilot production wells) and the majority of these have been fracked. The productive exploration wells have been capped and are ready to go. This project is only financially viable if the whole field of 330+ wells are developed. Approximately 4,000 people live in the area covered by the Gloucester Gas Project are at risk while nothing is done to properly assess their health risk.

We have already witnessed presumed fugitive gas emissions with blow outs, gas escaping through bore holes and up into puddles in areas close to fracking and evidence from water tests highly suggestive of connectivity between groundwater and surface water.

Potentially carcinogenic BTEX chemicals are found in the coal seams and frequently emitted with the methane. Dangerous volatile organic compounds are found in the fumes caused by flaring the wells in exploration. Many drilling fluids and fracking chemicals have not had proper safety evaluations. The central processing unit planned for Stratford, not far from Stratford School, is yet another potential source of toxins. Other carcinogens are present in the diesel fumes from the pumps and vehicles associated with each well.

If any rigorous conclusions about the health effects of CSG extraction are to be drawn it is essential that base-line studies of both community health and of levels of potential toxins are performed before any further extraction takes place.

Effects of Noise on Health

Noise from the pumps and processing unit will result in sleep disturbance impairing learning, concentration and memory. Emotional and behavioural disturbances are frequently associated with disturbed sleep. Noise also impairs communication. Sleep disturbance results in excessive daytime sleepiness the next day.

Psychological Health Damage

Unwanted noise, especially at night-time is one cause of psychological stress and this is accompanied from social stresses of falling house prices, the fouling of a beautiful heritage landscape and the depression, anger and anxiety from having to change life plans. Brain damage caused by the toxic hydrocarbons further compounds the potential damage.

The large majority of the Gloucester community do not want this CSG Mining or the deaths and disability that inevitably accompany such mining when it occurs

in populated areas. There is no social license for CSG mining in the Gloucester Valley community. We demand a similar halt to CSG activities in this valley whilst the local risks are evaluated and the NSW Health Dept conducts the study it has recommended.

Summary of Concerns

Social, Economic and Cultural Heritage Qualities

We acknowledge that these matters do not fall within the review's Terms of Reference. However the scientific matters referred to in the Terms will potentially influence the valley's economy and lifestyle.

The Stroud - Gloucester Valley is a popular tourist destination and a lifestyle resettlement area as well as an important agricultural area. The Stroud-Gloucester Valley has been nominated for entry on to the NSW Heritage Register and the Australian Heritage List and has been widely acclaimed over many years for its scenic-heritage qualities. The CSG and coal mining projects have the potential to impact severely on the Valley's agricultural and scenic-heritage qualities and from that on to all aspects of its economy and lifestyle including the tourism industry, property values and health.

Cumulative Impacts

The Stroud-Gloucester Valley already has two coalmines operation within its boundaries, with further expansions and new mines being planned. It is critical that the cumulative impact of all of these developments be considered, not just the (usually understated) impacts of individual projects, prepared as if they all operate in complete isolation.

The AGL project and the coalmines severally contribute to risks to human and environmental health and wellbeing in the valley. In their project proposal, AGL did not mention once the active coalmine adjacent their proposed central processing area.

It is as if all miners and Department of Planning Officers have a vision defect. If more than one project is present in an area, they can only see one at a time.

Inadequate Water Study

The Barrington Gloucester Stroud Preservation Alliance considers that only a full and independent expert hydrology study can properly address the environmental challenges presented by the coal seam gas industry in the Gloucester-Stroud Valley. The Alliance is particularly concerned that failure to address these challenges could result in serious and long term damage to the valley's water supply in all its qualities. The Gloucester Valley is the most vulnerable of all the areas so far identified for coal seam methane gas extraction in eastern Australia

but its complex geology has not been adequately considered and is poorly understood by the CSG industry.

Serious concerns were raised regarding the initial Environmental Assessment undertaken by AGL, the lack of independence shown by the Department of Planning and the Planning Assessment Commission and the inadequate conditions attached to the approval as a result. The Alliance remains deeply concerned that the ongoing tests being undertaken are selective and fall far short of the standard required to understand the valley's geology and hydrology and from that, the severe risks that area imposed by the project.

Nothing less than a comprehensive independent water study is adequate.

Lack of Data

The evaluation of all the major issues including health, water security, greenhouse gas effects and the conversion of a rural and tourism area into an industrial one suffer from one acute deficiency: the absence of reliable data and unbiased analysis.

Abandoning The Precautionary Principle

The Precautionary Principle is that if the science behind a proposal is uncertain as to its consequences for current and future generations then we ought to proceed with caution until better understanding is obtained.

AGL have turned this on its head with "adaptive management". This means: if there is problem because of inadequate scientific understanding, they will do their best to fix it before it is too late.

If the damage to human health and the environment cannot be fixed what then?

Submission by the Barrington-Gloucester-Stroud Preservation Alliance

on the
AGL GLOUCESTER COAL SEAM GAS PROJECT

(MP080154)

ENVIRONMENTAL ASSESSMENT

This submission is in response to the Environmental Assessment prepared for the AGL Gloucester Coal Seam Gas Project (MP080154). The submission addresses the issues in the sequence they are addressed in the AGL Environmental Assessment. This has presented some problems because some topics are considered in more than one section of the AGL assessment. However, it provides a reasonable sequence and allows the relevant section(s) to be located. The issues addressed in the submission do not cover all areas of concern but cover the issues that could be addressed within the limited time available. In this sense they should be seen as illustrative examples rather than an exhaustive coverage.

Authors of the document

David Hare-Scott
Retired software developer and project manager

Graeme Healy
Retired Human Resources and Marketing Consultant.

Jeffrey Kite
Retired water resources engineer

Gerald McCalden
Urban geographer and regional economist

Steve Robinson
Retired medical practitioner and psychiatrist

Garry Smith
Environmental and heritage consultant

Commentary on the area's geology
Professor Alex Grady
Geologist

Published by:
The Barrington-Gloucester-Stroud Preservation Alliance
PO Box 174 Gloucester 2422 NSW January 2010

Contents

SECTIONS 5, 12, 13 - WATER

Production Water

The disposal of produced water generated by the extraction of CSG is addressed in some detail in the concept plan. The preferred option to partially purify the produced water using reverse osmosis, to sell the treated water for local agricultural use and to separately dispose of the solids removed is attractive on the face of it. There are a number of issues that have not been addressed adequately or in some cases at all.

Treated Water Quality

No commitment is made to treating the water to any specified standard. It is said that it will be treated to 'acceptable standards' without saying what standard or to whom it might be acceptable.

In the illustrative example of Stage One development 2ML per day would be processed, which initially contains TDS of 2000 mg/L to yield 250 KL per day of brine which would contain 3 tonnes of solids. This implies that the treated water of 1.75 ML/day would carry the remaining 1 tonne of solids and so contain about 570 mg/L TDS. In terms of TDS alone such water would be suitable for stock drinking water and could be suitable for irrigation of some crops depending on the nature of the soil that the crop was grown in. As the soils of the area often have high clay content the risk of damaging the soil with sodium salts needs to be evaluated before any farmer plans long-term irrigation.

The volume of the produced water and its solid content is based on few trial wells and cannot be extrapolated to the whole gas field.

No reference is provided about the existing quality of water in the local rivers. Monitoring by local groups suggests that the TDS varies with rainfall between 110 and 260 mg/L. Discharging high volumes of water with much higher TDS will impact the rivers. How significant the impact will be requires further study.

No data has been supplied on the pH of the produced or treated water nor is there any analysis of the solid content. So the possibility of the long-term application of treated water producing a harmful accumulation of metals or other toxins in the soil or stock is unknown, as is the effect on local waterways.

Treated Water Disposal

The direct discharge of treated water into local waterways is foreshadowed in the case of demand for irrigation being reduced because of rain. No analysis is provided of how often or how much such discharge might be. We have already seen how miners in the district can be unduly optimistic about containing waste water during wet spells. This matter is put off to a future study.

The possibility that farmers may not want the treated water due to unsuitable quality, irrigation being uneconomic or any other reason is not considered. In that case there would be little option but to discharge the balance into the rivers.

Thus we are left with the possibility that under full development of the project up to 5.25 ML per day (using the proponent's figures) of water of unknown quality will be discharged into local waterways for 15 years or more. It may be that the volume of produced water and its dissolved solids has been underestimated. This discharge would be on top of the water already discharged by Gloucester Coal's Stratford mine, a cumulative impact that is not considered.

To give approval in principle to this project before any study is conducted as to the likelihood, or volume of discharge, or its consequences to the river systems would be irresponsible. Given the multitude of uncertainties it is hard to understand how water management is rated only a medium priority in the Executive Summary.

Ground Water

The concept plan concedes that the geology of the concept area is complex and highly faulted. Coal miners in the area have confirmed this in their diggings. The proposal gives very little information about the depth and flow of aquifers. The hydrology of the valley is generally poorly understood.

The following opinion by Professor Alex Grady outlines the extent of this problem. (Professor Grady has 35 years as a geologist specialising in structural geology and also has extensive experience as a geological field mapper. He has extensive field experience in NSW, South Australia, Western Australia, the Northern Territory, New Zealand and Eastern Indonesia. He was during that time a Member of the Australasian Institute of Mining and Metallurgy and of the Geological Society of Australia and retains membership of the Geological Society of Australia.)

> The area in question has been intensely faulted, involving several intersecting arrays of often closely spaced faults. This is the kind of geological situation in which the rocks are usually strongly fractured (fractures due to compaction-contraction during lithification, together with those due to brittle failure during folding and faulting). This gives rise to secondary porosity/permeability - which can vary considerably from place to place. Most particularly, such effects can produce locally high porosity/permeability zones in rock units that have low primary porosity/permeability (producing what are called "fractured rock aquifers").
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>
> The complexity of the faulting is likely to have juxtaposed the coal seams with potential sandstone aquifers in many places. This has the potential to make the coal seams 'leaky' in such places.

The proponent asserts that their test wells did not "appear to have affected the water levels in alluvial aquifers". The inference being offered that this is some sort of evidence that the same situation would apply across the gas field is not supported by current knowledge of the geology.

Prof. Grady is also of the opinion that:

> Their report of what happened to neighbouring core drill holes (DDH20C and "an unnamed core hole " about 400m north of LMG03) suggest greater permeability/porosity than they otherwise admit, within the coal seam sequences (not just within the coal seams).

The proponent makes much of the efforts they will make to case and seal each well into its surrounding strata. The possibility that fraccing may open up communications between wells (old or new) or between permeable strata that were previously isolated is not considered.

A monitoring regime to detect production wells that are extracting water from aquifers is proposed. The remedy offered if that problem is identified is to shut down the well. No indication is given how many wells might be so affected, probably because nobody knows.

The proponent intends to devise contingency measures if other adverse impacts are detected. Whether the monitoring regime is capable of detecting such problems, such as water or gas flows other than out of the wells, in a reasonable time is unclear, as is what might be done about it. If fraccing has opened an undesirable communication pathway then shutting down a well is not going to fix it unless the pathway is only to that well.

All the indications are that a detailed hydrological study would be required to determine the impact of the project upon ground water because at present there is no solid information about it and there are indications that there will be effects. The proponent has committed to such a study but only after stage 1 GFDA is providing data (see 26.2.1 #12). Likewise the Groundwater Management Plan has been put off until after approval. How is this possible given the uncertain environment?

The monitoring installations will only collect useable data once the wells of GFDA 1 are established and in production. They can only be put into production once the CPF and pipeline are available unless all the gas will be flared locally. So in practice the hydrological study will be undertaken after the project is approved and operational.

Is the proponent prepared to gamble a huge capital investment on the outcome of such a retrospective study? Or are they assuming that no matter what the outcome of the study, no matter what environmental consequences may be revealed, they will not be compelled to take any action that would seriously compromise production?

Conclusion and Recommendations

An independent study of the disposal of produced water and of groundwater hydrology is required. This should be conducted before the concept plan is approved unless the State Government is prepared to gamble along with the proponent that no serious harm can come to the environment as a result of the uncertain water management of the project.

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BGSP Alliance submission - health

SECTION 6 – HEALTH

HEALTH IMPACTS ARE THE HIGHEST PUBLIC PRIORITY AND ARE CUMULATIVE.

In any Environmental Assessment (EA) the general public will usually believe the impact on humans is the most important factor and highest on their priorities will be any adverse health impacts a project may have. Traditionally in EA's whilst multiple factors are assessed, strangely there is no health impact assessment routinely requested. Regrettably this EA also omitted to specifically address this vital aspect. Noise and Air Quality assessments cover some of the health impacts but the psychological impact is totally neglected. Health impacts are invariably cumulative and this current proposal overlaps the area impacted by Stratford Coal Mine. The principal emissions from the gas project also are common to some of those from Stratford Mine.

It is imperative that any proper Environmental Assessment estimate the extent of the already existing health damage from Stratford Mine and the health consequences of adding further physical and psychological stressors to an already compromised population. (The total failure of the Cumulative Impacts section of this EA to recognize that the local community is already overwhelmed by the cumulative impacts of multiple mining projects casts serious questions about whether AECOM and AGL are being deliberately deceptive or just incompetent in this regard). It is regrettable the Dept of Planning does not automatically require input from the Dept of Health on projects which pose significant risks to public health. The health risks to stock have similarly been overlooked.

AIR QUALITY ASSESSMENT

The health impacts of gas mining are virtually un-researched, which should breed extreme caution in planners. (References provided in this submission relate to the health effects of coal dust but some of the most toxic chemicals are also emitted in Gas Mining). Five dangerous chemicals emitted during flaring and production are nominated in the EA but the discussion of them includes many mistakes and serious omissions. The dangerous substances (principally heavy vehicle exhaust emissions) emitted during the construction phase were not discussed. Flaring emissions have not been analysed. The interaction of these emissions with the emissions from Stratford Mine was totally neglected despite the preferred site for the CPF being close to the Mine.

The most serious misconception relates to PM10 particles. This size of particle should be described as coarse (not 'fine'). It is produced by mechanical processes such as earth moving involved with the construction phase. Particles of this size are a nuisance but they are too big to enter the lung tissue and are largely irrelevant to health damage effects. The particles which enter the lung have to be less than PM3 and particles of this size are mainly produced by combustion processes (heavy machinery use, flaring). These fine particles constitute the principal dangers associated with this project. Because they are derived from a totally different source the PM10 levels bear no relationship to PM2.5 and PM1 levels which are what need

to be monitored. Many much smaller ultrafine particles will also be produced but they probably are too small to have the devastating effects of PM1 and PM2.5 particles.

Stratford Mine has started informing the NPI of its PM2.5 output this year but whether this is a 'guestimate' or a proper study needs to be determined. The lung function of Stratford residents may well be already compromised by these fine particles coming from the heavy vehicles exhaust gases, blasting gases and burning coal seams of the mine. Fine particulate matter travels much further than PM10 so that PM2.5 released at the top of a 12metre stack at the CPF will potentially travel on the wind for kilometres until the cool of the evening causes the particles to settle.

In the UK, Dr van Steenis stated tests showed a large bulldozer may emit the same number of particles as 900,000 P70 Volvo cars. These particles are of the harmful, fine PM2.5 and PM1 size range. Short-term exposure will trigger asthma attacks in the predisposed and long term exposure will cause new cases. Bulldozers and other machinery emitting diesel fumes need to have the maximum possible exhaust suppression equipment.

Nitrous Oxides react with substances in the air to form fine PM2.5 particles and they combine with water in the atmosphere to form nitrous and nitric acid. This interacts with coal dust deposited in peoples gutters and releases heavy metal poisons such as cadmium, lead, mercury, arsenic etc. The Stratford village has a school and residences with tank water and this will need careful monitoring as of course will all the 118 residences i.e.300+ people in the GFDA. The site of CPF7 is only 300metres from the nearest private residence. Fraccing chemicals have caused health damage to humans and stock in the past and a condition should be placed on any gas project now that non toxic chemicals be used in this procedure.

Stock in the area, like the humans, will be at risk of compromised lung function in the short term and other organ involvement with long term exposure. The action of carcinogens and substances causing genetic malformations in the VOC's will apply to humans and stock. Dairy farmers should be very vigilant for contamination of milk with heavy metal poisons released from coal dust settling on pasture and interacting with nitrous oxide fumes from gas mining.

NOISE

Once again the inappropriateness of a development such as this to be sited in a comparatively densely populated rural community can be seen:-
The conclusion of Atkins is that "some well construction works in the GFDA including drilling and preparing for fraccing will occur 24hours a day……Noise modeling has shown there would be situations where construction noise levels exceed the target assessment goals"

If AECOM had sought community input they would have discovered the 118 residencies within the GFDA were part of a community survey on impacts of mining taken by 'The Alliance' in 2006. Noise was complained of by 85% of respondents and was the most common problem nominated. The notion of what is acceptable from the

Department's point of view seems to be widely disparate from what is distressing to the resident in an affected area. Again the cumulative impact of mining noises is very relevant. Noise is invariably complained about at night-time when temperature

inversions etc make it more noticeable and it disturbs sleep. The frustration and sleeplessness play a big part in the psychological problems e.g depression and anxiety which will be further increased should this project go ahead. Constant noise impairs concentration and learning and this (along with PM2.5 induced vascular damage) almost certainly contributes to the reduction in IQ's and increased behaviour problems found in children in mining areas. Sound proofing of Stratford School needs to be implemented.

Noise Monitoring needs to include low frequency, subsonic noise which can resonate in cavities of a room or body cavities such as the skull and chest and impair function. Noise monitoring should not be restricted to outside measurements where this effect does not come into play.

PSYCHOLOGICAL STRESS

Gloucester is a town in crisis that has been caused by the effects of multiple, largely unwanted mining ventures. This has lead to a public meeting with 1000 people objecting to proposed mining and also to the spill of our previous mayor. The 2006 'Alliance' mining effects community survey showed a number of components combined to cause stress in an individual. For some the changed appearance of the landscape was very distressing. This is described in detail in the literature about 'Solastalgia'. The section of the report on 'Visual Impact' belittled this aspect by stating only half of the residences would be able to see a well or the CPF with its stacks and lightning diverters.

Obviously it is not just what you can see from your house that has an impact on you. For many the necessity to change life plans was a stressor. For others it was the decrease in real estate value amounting in some cases to the impossibility of being able to sell their property to escape. The powerlessness of being a victim in a larger game in which they had no influence promoted feelings of depression. Increased stress tends to lead to a reactivation of past psychological disorders currently in remission but may also result in new cases. Psychological stress also causes physical health problems such as raised blood pressure. This aspect needs to be monitored.

SAFETY

The public perception of the gas and oil industry is that it is a dangerous industry. This is not without foundation with disasters such as the 177 deaths in the Piper Alpha disaster, the Moura mine explosion killing 11 men, the Longford Gas explosion with 2 deaths and 8 serious injuries, the June 2008 explosion at the Apache Energy gas plant in West Australia on Varanus Island etc, etc.

Locally in 2004 a gas migration incident occurred at Stratford and shut down operations. This resulted from one of the unknown several thousand old bore holes in this area linking up with gas released by fraccing. The very fractured nature of the

local geology together with the many unknown old holes makes this type of incident likely to be repeated. The section on Hazard Analysis makes no mention of this incident or the above factors and this glaring omission hardly engenders confidence in their conclusions.

The report points out the proximity of houses particularly in the Craven area to the planned pipeline with the nearest residence being only 15metres away. Inevitably risks such as bushfire, subsidence from unknown old excavation and lightning could cause a disastrous explosion and close to Newcastle earthquakes are another unpredictable possibility. Steel pipes can succumb to brittle fracture such as occurred at the Longford gas explosion etc. It is inappropriate to lay a pipeline so close to people's homes. Flare operation risks were not assessed because of the uncertainty of the exact siting of wells. Will they ever be assessed?

GLOBAL WARMING

This project will further accelerate global warming which has numerous adverse health impacts summarized in a document from the US Physicians for Social Responsibility.

CONCLUSION

Health impacts of this project need total revision. Community rage about health damage is leading to class action being planned elsewhere. If this project goes ahead AGL and the State Government need to put aside many millions of dollars to cover this problem which is the new 'asbestos' in our community.

The mining industry wants to make a profit and this inevitably brings about pressures on individual workers to cut corners. Human beings are never perfect and mistakes inevitably happen from time to time. The interaction of these two factors explains many of the numerous disasters that occur. Each disaster is followed by an inquiry and each inquiry by another disaster. The safest course of action is to limit mining to very sparsely populated areas. Gloucester is a relatively densely populated rural area which already has coal mining inappropriately situated. This inappropriate mining needs to be gradually withdrawn, not added to.

References (Copies included)

1) Death, disease and dirty power. Oct 2000 Report of US Clean Air Task Force
2) Coal, Open casting and health. March2008 report by Dr Dick van Steenis
3) Coal's Assault on Human Health Nov 2009 Report from Physicians for Social Responsibility

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SECTION 12 - FLOOD IMPACT

(A flood assessment of the stage 1 project area and the concept area is required under the Director-General's Environmental Assessment Requirements to assess Surface and Ground Water and also under Hazards and Risk Impacts.)

1. SUMMARY

This submission considers a full and proper assessment of flood impact has not been undertaken and urges the Minister to ensure that approval for both the Stage 1 project and the Concept Plan not be considered until this has been completed.

Data and evidence describing the extent and nature of flooding in the Gloucester and Avon River floodplains are provided further below in this submission.

2. THE AGL ENVIRONMENTAL ASSESSMENT FAILS TO ADEQUATELY ADDRESS FLOOD IMPACT

Issues not addressed

The AGL Environmental Assessment fails to adequately address flood impact because it fails to determine the extent and nature of potential flooding in the Gloucester and Avon River valleys in regard to both the Stage 1 area and the Concept Plan Area. The environmental assessment has not properly addressed the locations of the gas wells and related infrastructure in relation to flood liable land. It therefore has not adequately addressed the impact of the wells and related infrastructure on water flow and has not adequately addressed the risk impact of flood on the wells and related infrastructure.

Flood risk on the Avon River is far in excess of that envisaged by the assessment
It is clear that some well head sites on the Avon River and Waukivory Creek floodplain flats could be at risk of serious flooding, for example more than a metre depth, persisting for more than a day. Total depth and duration of inundation has not been assessed because a flood assessment has not be undertaken. A resident in this area (details can be supplied) advises that his property on the Avon River has experienced rises during light flooding of six metres and that AGL crews are drilling on his property on areas that were inundated. This raises the critical issue that the environmental assessment has seriously underestimated the flood risk and that flood levels of this nature could have serious impact on all aspects of the development.

The absence of details concerning the number, exact location and construction of the brine ponds is an omission. There is a serious risk of major longterm environmental damage if the operation of the brine ponds is compromised by excessive rainfall, surface run-off or flood inundation. The brine ponds are acknowledged as having high containing walls but intensive rainfall incidents, flood depths and flood velocity have not been assessed. Data concerning flood risk and rainfall variability is provided further below in this submission.

Examples of deficiencies noted in the Environmental Assessment. (These are illustrative rather than exhaustive).

- The Environmental Assessment identifies that the Avon River experiences flooding (page 12-2) but does not assess to what extent in terms of area, depth and velocity. The section then attempts to downgrade flood risk.

- Claims wells will not impede flood flow (page 12-22) but has not assessed flood flow and provides no supporting evidence of this claim.

- Acknowledges possible 'localised' flood disruption by plant and equipment (page 12-17) but does quantify or define in any way.

- Acknowledges the need for a flood warning system and that a flood warning system will be implemented (page 12-23) but provides no details. This is a critical matter that must be addressed before approval is given.

- Will relocate unsecured equipment when flood warnings are received (page 12-22) but provides no indication of how this will happen, who makes the decision and how it will be made.

- Acknowledges the risk of damage to plant and infrastructure and the need to rehabilitate plant and infrastructure after flood (page 12-23) but provides no detail of what damage may occur and what rehabilitation will be necessary.

- Acknowledges need to avoid having structures on flood prone area (page 12-28) but does not justify having wells and infrastructure on flood prone areas.

- Acknowledges the need to keep construction spoils and earth away from flood prone areas (page 12-23) but has not defined those areas and cannot therefore fill this requirement.

3. HISTORIC EVIDENCE OF THE VALLEY'S SUSCEPTIBILITY TO FLOOD

A full flood study has not yet been undertaken

A flood study of these two river valleys has not yet been undertaken. The Gloucester Flood Management Study 2004 assessed the 'floodplain process' for Gloucester township and its immediate environs only. This means that a flood study has not been undertaken for the major part of the project area. The extrapolation of data from the flood management plan to those areas not addressed in the management plan would be fraught with potential error if a reliable document is sought. However, sufficient anecdotal evidence, newspaper reports, recorded or photographed evidence and insurance claim data are available to show that a substantial part of the area is flood prone, both by way of water rising from the Gloucester and Avon Rivers to inundate surrounding land or by water unable to drain quickly from the area because of unsuitable gradients and obstruction to surface flow.

There is evidence of major flooding occurring from 1857, which is the first recorded

flood. Files from the Gloucester Historical Society reproduced in the study by Willing
and Partners, 2001, provide evidence of floods in 1857, 1867, 1875, 1878, and 1893 with two smaller events reported in 1871 and 1872. The February 1929 flood was the highest recorded and inundated shops in Gloucester's main street to a depth of approximately 1200mm. Later floods occurred in 1956, 1957, 1974 and 1978.

Characteristics of the Gloucester floods.
Historical evidence shows that the flood waters rise quickly and travel quickly, and this was noted as a feature of the Gloucester floods in the Gloucester Flood Study, Supplementary report 2004. In the 1878 flood two men lost their lives crossing The Billabong and in the 1929 flood two men lost their lives while attempting to cross between the Royal Hotel and Park Street to rescue hotel guests.

The Gloucester River appears to be the faster flowing of the two rivers but an assessment of velocity has not been undertaken. It is urgently required. However, a second characteristic affects the Avon River - the long gradual gradient from south of Stratford and the reduction in drainage velocity because of the wetlands in its lower reaches near Gloucester cause localised flooding that is sometimes inconsistent with other river flows in the catchment area. To complicate the matter, this is potentially being altered by changes to the river's drainage at the Gloucester wetlands and tree planting programs being carried out in the same area.

Rainfall variation and future flooding
Official rainfall data from the New South Wales Bureau of Meteorology shows that the Gloucester area and the Manning River catchment area have a rainfall variation factor that is consistent with the New South Wales coastal plain and eastern highlands generally. Considered as a simple measurement of extreme variation, the wettest 12 months receive approximately double the average annual rainfall and the driest twelve months receive approximately half the average annual rainfall. Gloucester, as a representative station for the total catchment area, is consistent with this – the average annual rainfall is 984 millimetres, and 1894 as the wettest calendar year received 1875 millimetres. However, that is increased by considering the twelve months period from November 1892 to October 1893, during which time 2068 millimetres fell.

However, the most relevant statistic is not so much the annual rainfall but the intensive falls in shorter periods of a week or less. Statistics to assess this were not available but falls for individual months give some basis for assessment. The big flood of February 1929, for example, is highlighted by a massive 752.4 millimetres during that month. Although conclusive predictions cannot be drawn, the available data indicates that the recorded floods may not be the most severe to affect the area, both in the past and in the future. Rainfall over the entire catchment, in terms of the amount, the duration or intensity and the sequence in which the various parts of the catchment receive rain are all factors.

There are further factors that need to be taken into account – the greater extent of land clearing in modern years, for example since the 1929 flood, and predictions of increased storm activity due to climate change argue for increased flood susceptibility.

SECTION 9 - AIR QUALITY

This section of the Environmental Assessment considers the effects of the proposed development on air quality in the Gloucester Stroud Valley as a consequence of the proposed gas field and ancillary developments. It is associated with an Appendix, prepared by the same firm of consultants, which presents the outcomes from various pollutant dispersion modelling exercises.

The first significant statement in this chapter of Volume I of the EA is found at the beginning of Section 9.2.1. It reads:

> Air quality in the Gloucester basin is predominantly agricultural emissions with lesser contributions from coal mining operations and vehicular traffic moving along the Bucketts Way.

The opening sentence of Chapter 3.0 in Appendix F reads:

> The main sources of air pollution in the Gloucester basin are coal mining operations. Vehicle traffic along the main roadway (The Bucketts Way) and wood smoke during the colder months would also contribute to pollutant levels.

The contrast between the two above statements is striking and can only be viewed as an attempt by the authors to exclude the impacts of Gloucester Coal's open cut mining, coal washing, and transport operations from consideration in assessing the existing air quality profile of the Gloucester- Stroud Valley.

Appendix F goes on to remark that :

> No publicly available air quality monitoring data were identified for the Stratford region.

This is puzzling, because Gloucester Coal has been conducting regular monitoring, as required under its mining licence approval, since the commencement of operations at Stratford in 1996. Quarterly reports are presented to the CCC and also forwarded to relevant Government Departments.

A reference is also made to the National Pollutant Inventory (NPI), which uses postcode areas as its geographical reporting unit:

> A review of the NPI was undertaken of the local area (postcode 2422) in order to assess the local air quality. The Stratford Coal Mine, situated 1.5 km to the southeast of Stratford, is the only facility in the Stratford postcode area (which includes Gloucester) required to report to the NPI. The pollutant emissions from this facility are all ranked as low compared to other facilities and pollutant sources.

As no further comment is made, it is not possible to resolve the ambiguity as to whether the **'other facilities and pollutant sources'** referred to are those located in postcode area 2422, or comparable open cut coal mines etc in other postcode areas. In either case the comment has little relevance, since, on the one hand, it is already. acknowledged that GCL is the only significant single polluter in the postcode area, while on the other it is irrelevant how GCL compares with other polluters elsewhere.

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In fact, a study of the NPI data for postcode area 2422 shows that, in aggregate, GCL is responsible for about 30% of all of the emissions covered in the NPI Table1 list.

However, this rises to almost 100% for many items considered individually, including Particulate Matter 10.0 micron. For PM 2.5 micron, associated with high levels of health risk, it is identified as the sole emitter.

But the primary concern here is not GCL's relative standing as a polluter in postcode area 2422, but the fact that its emissions are concentrated in one locality, and that AGL's proposed Stage I development area overlaps the Stratford mining lease to a considerable extent.

The only valid approach to assessing the air quality impacts of the Proposal is to establish the existing level of exposure to pollutants of the population in the vicinity of the Stratford Mining Lease, and then to extend these measures to incorporate the additional effects should the proposed development be allowed to proceed.

As it stands, the EA takes no account of the existing situation, and proceeds to model air quality impacts on a stand-alone basis.(They also seem to consider that air-borne pollutants don't travel far, but this aspect needs another careful reading).

……..

SECTION 14 – NOISE & VIBRATION
This section deals with noise and vibration from a nuisance perspective. Refer to the relevant section for comment on noise and vibration from a health perspective.

General Comments
Noise assessment studies appear to be focused on assessing noise from the perspective of contributing to industrial deafness rather than from the perspective of noise as a nuisance which causes loss of amenity and disturbance of sleep and well being. Mitigation measures which seek to isolate the receiver from the noise source are often suggested eg double glazing of windows rather than measures which seek to reduce the level of noise at the source.

Another weakness of noise assessment studies is that they focus on levels of noise without regard for the source or type of noise. For example, a rushing waterfall in a bush setting may create a sound pressure level that could be described as loud. However, this would be far less intrusive and upsetting than an identical (or lesser) sound pressure level caused by industrial machinery operating in that same environment. Similarly, the sudden, raucous call of a nearby Kookaburra would be louder but less intrusive than a persistent, low level and distant industrial hum.

The stage 1 project area is a relatively closely settled rural environment. It is very peaceful with extremely low-level background noise. Any low-level industrial noise quickly becomes intrusive against this background.

The Stratford coal mine/colliery is the sole industrial activity in the area. The current noise disturbance from the coal mine to people living up to six or more kilometres from the source has shown the impacts predicted by the original noise assessment for the mines approval to be grossly underestimated. Consequently, we are dubious about claims that the project will not result in cumulative noise impacts.

Table 14.16 has been included "to assist with understanding of predicted noise levels". However, the noise assessment is mostly presented in technical jargon and comparative tables which makes it almost incomprehensible. The average reader is expected to be reassured by generalities such as "the noise impacts of an operating well upon surrounding residential properties is considered to be insignificant" (Main Report Page 14-11).

<u>Recommendation</u>
The Noise Assessment is too narrow and technical to enable individual landholders to assess the impact. The report should state clearly in plain, non-technical English at what distance from a wellhead and the CPF noise will no longer be audible

Specific Comments
Indicative well site constraints
The map showing well site constraints (Vol4, Figure 5.4) does not accurately identify all residences in and adjacent to the Stage 1 GFDA.

For example, 5 residences along Glen Rd just outside the GFDA (and visible on the photo underlay) are not marked. All of these unmarked residences are within 2km of

one or more indicative well sites where site clearing and fraccing are predicted to exceed noise target goals at all hours, and drilling is predicted to exceed noise target goals during evening and night time hours.

Recommendation
This map should be redrawn to accurately identify all potentially affected residences. This should include all residences within 3km of an indicative well site.

Predicted Noise Levels from Construction Activities
Predicted noise levels from construction activities in Stage 1 GFDA exceed noise target goals at distances up to 3km from the activity. (Append. H, Table 30)

With the exception of gas gathering system installation, all listed activities exceed the daytime target goals at 1km, and exceed all night time target goals at 2km.
Well construction, site clearing and fraccing exceed evening noise target goals at 3km.

Recommendations
Core noise control and mitigation requirements should be set as conditions of the project approval, and not left for later development in a noise management plan. This is consistent with the Atkins Acoustics' recommendation that the potential for noise impacts be considered in the preliminary planning phase of the project so that noise minimisation can be built into the inherent project design.

Gas well construction (including drilling) and fraccing should be restricted to standard daytime hours at all sites within 2km of a residence.

Use of noise control and mitigation measures such as use of temporary acoustic screens during drilling and wellhead construction should be mandatory at all sites within 2km of a residence.

Measures cited by Atkins Acoustics (Append H p53) as "readily available" should be required to be applied to all activities, particularly drilling and well construction, within the GFDA. These include plant selection, rig orientation and work practices.

Consultations with "affected receptors" concerning noise mitigation and management should include *all* receptors in the radius within which the relevant target goals are expected to be exceeded, eg within 3km for fraccing at any time.

Draft Commitments – Concept Area
The draft Statement of Commitments - Concept Area – concerning noise (s.26.2.1) is so qualified as to be worthless:

> As a guide, the following general principles would be considered when identifying potential well site locations for the Concept Area. The potential for noise impact would be considered in the preliminary planning phase….

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> The full range of available mitigation measures would be considered and applied where necessary to ensure that noise impacts can be maintained at an acceptable level.

Recommendation
Stronger commitments should be required in relation to noise minimisation. At the least, the hedging introduction to item 15 of the commitments should be deleted.

Construction Hours
The project description (section 5.4.13) asserts that drilling activities would need to be undertaken on Sundays as well as during evening and night time hours. Similarly, it is asserted that fraccing would need to be undertaken seven days a week.

A shortening of the total duration of wellhead construction would not justify the noise nuisance and sleep disruption caused to residents within 2-3 km of a well head.

A strong justification should be required for undertaking these works outside the recommended standard hours. No such case has been made.

Recommendation
Approval to undertake construction activity outside standard daytime hours should not be given simply on the grounds of expediency or convenience of the proponent. This is particularly important since these activities are expected to exceed night-time noise target goals as far as 3km from drilling sites.

CPF Operational Noise
Atkins Acoustics concluded that additional secondary engineering controls would be required for the CPF to meet project operational noise goals (Appendix H p.35). Atkins Acoustics has recommended that a further detailed operational noise assessment of the CPF plant be undertaken following final plant selection and detailed design to establish operational noise levels and inform detailed design of noise mitigation for the plant.

There is no indication that the proponent has taken account of the record of actual noise impacts of the Gloucester Coal processing plant (adjacent to one of the possible CPF sites) when modelling the potential noise impacts of the CPF.

Recommendation
To minimise noise impacts of the CPF, the proponent should be required to identify and apply best practicable technology in the selection and operation of noise sources including generators, compressors, cooler fans, pumps and valves and that these be located in the highest standard acoustic enclosures. Modelling of the sound "footprint" of the CPF should have regard to the record of actual sound impacts of the Gloucester Coal processing plant at Stratford, particularly the impacts of intrusive intermittent noise, as evidenced by complaints made by surrounding residents

Well Head Operational Noise
Inadequate information is provided to assess the likely impact of operational noise from the indicative 110 well heads. In particular, more information must be provided on the expected noise levels from the electricity generators to be located at the well heads.

The adequacy of the draft commitment not to establish a well head closer than 200m from a residence should be reviewed in the light of this further information.

Recommendation
Detailed operational noise assessment of the well head plant and equipment should be undertaken following final plant and equipment selection and detailed design to establish operational noise levels and inform detailed design of noise mitigation for the wellhead operations.

No well head should be established where the operational noise impact of the well – after implementation of mitigation measures – would be intrusive, ie where the LAeq 15 min level exceeds the RBL by more than 5dBA.

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SECTION 19 - HERITAGE

1. OVERVIEW

The Environmental Assessment fails to adequately address non-indigenous heritage. It does this by:

- downgrading heritage to low priority despite it being identified in the Director General's Requirements in the a "Key Assessment Requirements' (see Vol. 1, ES 17);

- failing to assess the significance of the *Vale of Gloucester* by dismissing it as not being relevant (see for example Vol. 1 page 19.5; Appendix K 46);

- failing to assess the impact of the proposed development on heritage vistas;

- failing to understand and apply heritage assessment principles.

An understanding of the valley's heritage significance, including its scenic qualities, is of the highest importance in undertaking an assessment of the valley's environmental qualities and its social/economic base. The danger that arises from the inadequate assessment of Stage 1 is that these qualities will continue to be eroded by successive stages of development being assessed to the same standard. The result will be that the valley's special significance will be permanently lost.

This is vividly illustrated by the proposed second stage, which will be located to the north of Stage 1 on and near the Avon River flood plain. This is a most sensitive area environmentally, scenically and socially and will require the most rigorous of environmental assessments if gas extraction is to be accommodated without severe impact on the area's qualities.

The conclusion is that proper assessment standards should be put in place from the beginning.

2. THE VALE OF GLOUCESTER – HERITAGE SIGNIFICANCE

The *Vale of Gloucester* was recognised by the National Trust of Australia (NSW) as a cultural heritage landscape in 1975 and is among the earliest cultural landscapes so identified in New South Wales. The listing for the Vale of Gloucester sits in the National Trust Register along with other highly significant conservation areas such as the Kosciusko Alpine areas, Lord Howe Island, Parramatta Park and the Cumberland Plain Remnant Communities.

The Vale of Gloucester was entered onto the Register of the National Estate but the entry was not finalised before the register was abolished on 1 January 2004, with the result that additions or changes were not allowed after that date.

The above assessments were brief and referred to the Vale's special scenic and historical qualities. The Barrington-Gloucester-Stroud Preservation Alliance commissioned a more extensive professional assessment in 2009, copies of which have been sent to all relevant bodies, including the Department of Planning. The

heritage assessment, *The Stroud-Gloucester Valley & the Vale of Gloucester: A heritage landscape under threat*, considers that the Gloucester Valley has heritage significance at local, State and National levels for historical, aesthetic, social and technical/research reasons. This assessment will be used as a basis to gain formal State and National recognition.

3. THE DIRECTOR GENERAL'S REQUIREMENTS

The Director General's Requirements state that the EA must include an assessment of the key issues, among which is included the following requirement:

Indigenous and Non-Indigenous Heritage – the EA must include a justified and tiered assessment of impacts to indigenous and non-indigenous heritage, including;

… and; sufficient information to demonstrate the likely impacts of the proposal on non-indigenous heritage values (including heritage vistas) consistent with the guidelines in the *NSW Heritage Manual*. Where impacts to State or local non-indigenous heritage items are proposed, a statement of heritage significance must be included and measures identified to mitigate and manage impacts.

4. FAILURE TO MEET THE DIRECTOR- GENERAL'S REQUIREMENTS

The Environmental Assessment downgrades heritage

As noted above, the first step in downgrading heritage issues was to identify heritage as a low priority issue under Prioritisation of Issues, despite the Director-General identifying it as a key issue (see Main Report, Volume 1, ES17).

Failure to assess the significance of the *Vale of Gloucester*

The assessment, both in the Environmental Assessment and in Appendix K, noted the identification of the *Vale of Gloucester* as a culturally significant landscape for historical and scenic reasons but determined not to assess it. Appendix K, page 46 notes that the panel recommended that the *Vale of Gloucester* be assessed but that the Commission deferred it. This is a puzzling decision which means that the principal heritage assessment of the area would not be undertaken and one of the Director-General's key assessment requirements would be ignored. (The 'Commission' was not identified by the Appendix.)

Incorrect statements about the heritage significance of the *Vale of Gloucester*

Failure to undertake an assessment of the *Vale of Gloucester* led to the Environmental Assessment making a number of general statements about the Vale's significance that are incorrect. For example, the Assessment refers to the Vale's significance as being historical but fails to acknowledge aesthetic significance (scenic qualities), scientific significance (geological qualities) and social significance.

The Vale's scenic significance is one of its outstanding qualities that has led to it being described in the most eloquent terms on many occasions and being visited and painted by Australia's greatest landscape painter, Sir Arthur Streeton.

The Environmental Assessment, Volume 1 page 19.8 claims that the historical significance is based on Robert Dawson's discovery of the Vale in 1826. This is simplistic to the point of being erroneous. The Vale's historic significance embraces a broad range of events and themes, among them;

- the beginning of free settlement on the New South Wales North Coast;
- the use of convict labour;
- its association with the Australian Agricultural company as the first of the large scale pastoral companies in Australia;
- its association with the beginnings of Australia's wool industry;
- the growth of later agricultural industries such as dairying;
- the timber industry.

Misleading statements about the percentage of land area impacted upon.
The Environmental Assessment Volume 1, page 19-8 seriously misleads when it states that the Gloucester Field Development Area covers 16% of the area of the *Vale of Gloucester*. The purpose of the statement is to make the area impacted upon appear relatively minor but the assessment fails to note that this is a highly visible, central part of the area. The only part of the valley floor that is perhaps more visible and more susceptible to adverse impact is the area immediately to the north of the field area, which is marked for development in the next stage. The consequences of failing to properly assess the present field area and the next field area could prove disastrous to the valley's scenic, heritage and social qualities.

This failure to properly address the impact is compounded by the claim (page 19-8, last paragraph) that the gas wells will not 'detract from the essentially rural nature of the area' but provides no assessment of how that conclusion is drawn. The further claim that there will be no impact on the 'more outstanding features of the landscape' (the bordering ranges) compounds the failure to address the impact on the valley floor and leads to the inference that an adverse impact is expected.

5. THE VISUAL ASSESSMENT FAILS TO ADDRESS THE DEFICIENCIES IN THE HERITAGE ASSESSMENT

Despite the rhetoric of this section, this section fails to address the scenic impact of the development in a manner that conforms to the Director-General's requirements to assess the impact on heritage vistas. Section 18 Visual addresses the visual impact from areas within the proximity of the development but does not address the impact on 'heritage vistas'. This deficiency applies to development within the Gas Field Development Area generally and to the Central Processing Facility.

As well as the above deficiency, Section 18 provides an assessment that relies on jargon and technical testing methods and is obscure and inconclusive.

6. ASSESSING THE IMPACT ON HERITAGE VISTAS

Understand the valley's heritage significance
The first requirement is to undertake a heritage assessment of the Stroud-Gloucester Valley to gain an understanding of the area's heritage significance. (A copy of *The*

Stroud-Gloucester Valley & the Vale of Gloucester: A heritage landscape under threat has been provided to assist with this assessment.) The relationship between the various components that contribute to the area's significance should be understood. In particular, the community's association with the area's scenic qualities should be acknowledged. This extends beyond mere appreciation of the amenity and meets the requirements for social heritage significance under the Heritage Council guidelines.

Measure the area's scenic significance

A 'measurement' of the area's scenic significance should be made based on the enjoyment and use of those scenic qualities. This method is widely used in a number of overseas countries, particularly the US where it provides that an area's scenic qualities can be classified as being of local, state or national significance. The method involves assessing or estimating the visitation numbers and their locality of origin. It is clear from statistical and empirical evidence that the Stroud-Gloucester Valley has a high visitation rate and that a high percentage of that is from further afield in NSW and Australia.

This leads to the assessment that the valley's scenic qualities are of state significance but that there is also a degree of national significance. This assessment should also consider that the Stroud-Gloucester Valley is adjacent to the Barrington Tops World Heritage Area and that the valley is therefore an area of state and national significance that is complementary to the World Heritage Area.

Assessing views and vistas

The assessment should identify and consider the significance of both individual views and views of a more sweeping nature from within the area and into the area from major vantage points. It should identify important viewing points and lines of travel, particularly those that are widely used, and assess the impact of the development from those. Viewsheds should be calculated for proposed items within the development area to establish their overall visibility and their impact on the area's scenic qualities rather than only their visibility from limited points in the immediate area (the assessment has partially done this but needs to develop this further to provide clearer assessment of the impact on scenic vistas).

……..

SECTION 20.0 - SOCIO-ECONOMIC IMPACT

OVERVIEW

Chapter 20 in the EA purports to deal with the socio-economic implications of the proposal. Of this, the Director General's Requirements (DGR) stated that the EA must include:

> A **conclusion justifying** the concept plan as a whole and each of the part projects taking into consideration . . . social and economic impacts . . . and the public interest

This casts a wide net. The scope of the project under consideration is such that its consequences are manifest at several geographic scales, ranging from the immediate environs of Stratford, to the Gloucester Stroud Valley, and thence to the entire State of NSW, and also to the Nation as a whole.

One example of national concern is the Lower Hunter Wetlands, ranked as being of world significance. As the Commonwealth Government has now taken this aspect under control it is to be hoped that stringent criteria will be applied.

Another is the prudent management of the nation's energy reserves. Arguably, this should be the subject of a Commonwealth policy which balanced present needs against those of future generations, while also giving full weight to other concerns, such as the preservation of agricultural productivity. Unfortunately, as matters stand, this is an area which is subject entirely to the exigencies of state politics.

Provision of a new source of gas supply to residents of the Sydney conurbation is clearly a matter of interest to them, as it is to the politicians whose electorates are situated there. It is also possible that parts of the Lower Hunter sub-region might derive some benefits.

However, whatever benefits may accrue to Sydney residents, these will be achieved at no cost to them. Communities located along the 80 km length of the pipeline will be affected to some extent, and we trust that spokespersons will be found in each of these to articulate local concerns.

It is patent, however, that the main burden of the social and environmental costs of the proposal will be borne by the residents of the Gloucester Stroud Valley. It is here that the 300 or so gas extraction wells will be located, as well as the processing plant, and waste water management facilities. Furthermore, these intrusive activities are forecast to persist for some twenty years or more.

The primary focus of this assessment should therefore be on the residents of the areas directly affected, namely the Gloucester Stroud Valley (GSV) stretching, in this case, from north of the town of Gloucester to the vicinity of Booral, and it is our belief that, in addressing the DGR, the proponents should place primary emphasis on this area.

Indeed, in the opening section to Chapter 20 the authors state that:

> This chapter details the demographics (sic) of the Gloucester Shire LGA, the local and regional economy and workforce trends, and details potential impacts on the local area, the Hunter Region, and NSW.

And they further add:

> This assessment of socio-economic impacts has focussed on the local socio-economic impacts upon the Gloucester Shire LGA, as the Project is considered to have the greatest potential socio-economic impact in this region due to the concentration and duration of activities in the Stage I GFDA.

So far so good. It is against this backdrop of expressed good intentions that the actual content of Chapter 20 can be now be reviewed.

GLOUCESTER SHIRE DEMOGRAPHY

Although Section 20.2.1 promises to describe the population characteristics of Gloucester Shire, in about two and a half pages it provides virtually no relevant detail. A total population of 4,800 persons is cited for 2006, but no comparative values for other Census years are quoted. It then remarks that between the 1996 and 2006 censuses "a total decline in growth rate of -0.2% occurred".

This is doubly confusing, as it is not clear whether the authors are referring to an 0.2% decline in the population ***growth rate*** per se, or to a change in absolute numbers, nor it is clear whether this statistic represents an annual average, or a total for the ten year intercensal period.

The following page (20.2) consists mainly of a comparison of selected population parameters for the State, the Hunter Region, and its sub-regions, with an occasional reference to Gloucester Shire. Sandwiched in is the following observation:

> The ageing demographic (sic) and falling proportion of younger workers indicates the need to provide services and infrastructure as well as incentives to retain and attract young people to the region, **in particular Gloucester**, to maintain the economic viability of the region.

This ignores the fact of an established secular trend in Australia towards an increase in the proportion of the population aged sixty-five and over. In the case of Gloucester it also ignores the presence of a significant proportion of retirees (although this fact is noted elsewhere in the EA).

It is not clear why the authors were motivated to advance this declaration about the economic viability of a region (or sub-region), as they do not elaborate on their statement. One surmises that they are of the opinion that an economy such as that of Gloucester Shire cannot be "healthy", unless some unspecified minimum proportion of the workforce are "young" people. It is possible that there was an intent to imply that if the Proposal were to receive planning approval, then this would contribute to

some extent in correcting the perceived imbalance in the age structure of Gloucester's workforce.

Page 20-3, and the first half of page 20-4, provide further details, of a quasi-anecdotal character, of the industries present in the Shire and of the community services available. This has no apparent relevance to an analysis of the social and economic impacts of the Proposal, either on the residents of the GSV, nor on those of Gloucester and Great Lakes Shires as a whole.

Generally, it appears that the material in Section 2.2 has been largely culled from the HVRF (2008) and HDB (2006) reports, as cited in the bibliography, and has been re-hashed as padding without further consideration of its relevance.

SECTION 20.3

This three page section deals with "Potential Impacts", primarily organised under sub-headings for the construction and operational phases. It is noted that short-term benefits could accrue to the local economy during the construction phase, but no attempt has been made to quantify these. It is also suggested that some construction jobs might be taken up by local residents, but, given that there is already a skilled labour supply shortage in Gloucester, this is hardly a compelling argument for approval of the EA.

Despite the relative temporal spans of the two phases, discussion of the perceived Socio-Economic impacts for the construction phase occupies just over two of the three pages, while those for the operational phases are dealt with in less than one page. Not much is said in the latter. There is a reference to the "foreseen closure" of Gloucester Coal operations, a term which implies imminence, though no timeframe is mentioned. In fact Gloucester Coal's current "Vision" for the GSV envisages open-cut mining continuing beyond 2030, and this date is cited elsewhere (Section 11.3) in the EA.

Still, the opinion is advanced that the Project:

> . . . would potentially offset, to a certain extent, jobs lost in other declining industries in the Shire such as agriculture and forestry.

In their conclusion to Chapter 20 the authors state (rather limply) that:

> The Project is not anticipated to result in significant negative impacts to the socio economics of the local Gloucester Shire … [but the Shire] . . . may experience positive impacts associated with demand for local goods and services . . ..

THE REALITY

It is our contention that Section 20.0, despite contributing eleven pages to the bulk of a 470 page Environmental Assessment, offers no material of significance.

We submit that the proper focus of a "Socio Economic" assessment of the consequences of the Proposal should be on the people who are directly affected, namely those who reside within the proposed gas extraction fields, with the addition of those residing outside that area who might also suffer adverse consequences.

The potential effects may be grouped under five main headings, listed in approximate order of importance:

(1) Physical Health

(2) Psychological Health

(3) Social disruption

(4) Consequences for the local economy

(5) Property value loss.

The first three of these relate more to impacts on people as individuals and as family and neighbourhood group members, and are dealt with elsewhere in this document. The last two items are discussed below.

THE LOCAL ECONOMY

The Gloucester economy is comprised of a nucleated service centre, with a population of about 2,500, together with a service area which embraces the whole of the Shire and extends a little further to the east and south. The population of this service area is of the order of 3,000 people, mainly engaged in primary production, but with a significant proportion of retirees. Tourism is a prominent element of the service sector, as is acknowledged in the EA.

All observable indicators support the proposition that the Gloucester economy is in a state of functional dynamic equilibrium, and that the residents, with the exception of those currently affected by open-cut coal mining, enjoy a reasonable quality of life.

Nothing in the EA as it stands supports a conclusion that the Proposal, if it were to proceed, would make a positive contribution of any significance to the existing economy, nor, with one critical exception, is it likely to have negative impacts.

The exception is tourism. The tourist industry in Gloucester has been built on the area's scenic values, and the opportunity to pursue a range of recreational activities in a pristine environment. It is, quite simply, an attractive and popular holiday destination.

It may be that coal mining has already had an adverse impact on this image, but measures are not yet to hand. The addition of the proponents gas field would have the potential to conclusively reverse this image, so that the GSV would come to be perceived as just another polluted quasi-industrial area.

LAND AND PROPERTY VALUES

As noted in Table 7.5 (page 7-9) of the EA, and again in Table 7.6 (page 7-21), the question of the possible impact of the gas well network on property values emerged as an issue of community concern. In each instance, the right-hand column of the table provides a cross-reference to Chapter 11, where, by implication, one would expect to find a discussion of the issue. **However, Chapter 11 is silent on the matter.**

In fact, a search through Volume 1 of the EA for the terms ***'land value'*** and ***'property value'*** produced no occurrences other than the two cited above. A search on the term ***'valuation'*** did produce some hits, but none which were relevant to the present issue.

So, despite the question of property values having been raised in both agency and community consultations, it appears to have been given no further consideration in the EA.

Yet it is patently obvious that the gas well network in Stage One, which spans the rural subdivisions along Fairbairns Rd, and runs up to Jacks Rd, will have a negative impact on property values there. The effects of later expansion around Gloucester township, if approved, would be even more serious.

CONCLUSION

Chapter 20.0 provides no information of relevance which would contribute to an appreciation of, and insight into, the current structure and operation of the Gloucester economy.

Specious claims are advanced as to possible "benefits" which might accrue to the local economy, but without substantiation, while the possibility of adverse impacts on the tourist industry is brushed aside.

And finally, although the question of property values is acknowledged as a concern, no discussion of this has been provided anywhere in the EA.

…….

SECTION 24 – CUMULATIVE IMPACT

1. CUMULATIVE IMPACT IGNORED

An assessment of cumulative impact has been omitted from the assessment despite its critical importance in assessing all environmental impacts. Section 24 of the Environmental Assessment is a brief and superficial section totalling slightly in excess of one page. It dismisses cumulative impact as not applying to the Stage 1 development area or to the Concept Area, with the exception only of the Queensland Hunter Gas Pipeline (QHGP) Project (MP06-0286) and the Hexham Redevelopment Project (MP07-0171), both of which are at the extreme southern end of the project area. As such they have no bearing on cumulative impact in the Stage 1 area or the project area generally.

Cumulative impact assessment of the Stage 1 area should be undertaken in regard to the Gloucester Coal Ltd present coal mining projects in the Stratford area and the future stages of the AGL gas project in the Gloucester area. The AGL Environmental Assessment should consider future stages of the AGL proposal now because these are known to AGL, form part of the ongoing development and assessment is required under the concept plan application. The total number of gas extraction wells is presently uncertain but advice from AGL and elsewhere indicates that the number will be considerably in excess of 300 and probably about 450. These will extend both southwards and northward and will eventually encircle the Gloucester township.

Cumulative impact will affect all aspects of the environmental assessment. The examples briefly addressed below are illustrative rather than exhaustive.

2. HEALTH

This is addressed under the relative section on health impact but, as noted above, cumulative impact health should be assessed in regard to both future stages of the AGL development and to the existing and proposed Gloucester Coal development. Section 9.2.1 of the assessment states that the pollutants of particular concern to this project area are;
Nitrogen Dioxide (NO2)
Carbon Monoxide (CO2)
Particulate Matter (as PM_{10})
Volatile organic compounds
Formaldehyde
Odour

The impact of these pollutants is not adequately addressed in regard to the eventual number and location of wells and from that the levels of pollutants and their potential toxicity. **Of critical concern is that their combined impact with coal pollutants has not been addressed - these gases will react with the coal dust pollution presently occurring from existing coal mining with potentially toxic results (see the submission on health impact).**

Noise levels from the AGL project have not been adequately assessed as noted in the relevant section; in particular the cumulative impact of noise from the total number of wells and supporting infrastructure has not been assessed. Existing noise levels from

the Gloucester Coal Ltd's Stratford mine are a matter of community concern but the cumulative impact of the AGL project in combination with these noise levels has not been considered. This is a serious omission that urgently requires assessment.

3. LAND USE

The economic impact of the development on agricultural and residential land use has not been adequately considered in the environmental assessment. It follows from this that the cumulative impact with future stages of the gas development and existing coal mining projects has not been assessed. These will cause an increasing encroachment onto both rural and future residential land and an increasing use or sterilization of land for access, safety and buffer zone purposes.

4. HYDROLOGY AND WATER QUALITY

As noted at the relevant part of this submission, the impact of the proposed development has not adequately addressed impact on ground water and surface water. This is of critical concern considering the amount of water that needs to be withdrawn (total withdrawal is required) in the gas extraction process. The cumulative impact of all stages of the development should be considered now as should the cumulative impact of these stages with existing coal mining projects.

5. SCENIC-HERITAGE QUALITIES

The inadequate assessment of the project's impact scenic-heritage qualities is a serious deficiency referred to in the relevant part of this submission. The environmental assessment downgrades heritage impact from a key requirement to low priority and then dismisses the 'Vale of Gloucester' as not requiring assessment.

This deficiency is then compounded by not assessing the progressive impact that the Stage 1 development will have when combined with the further gas mining stages and the existing/proposed coal mining in the Stratford-Gloucester area. The gas project will have an immediate scenic-heritage impact caused by the construction and installation of infrastructure but this will be ongoing because of the developments further stages. The 'Vale of Gloucester' will be marred by the large scale gas fields and their network of access roads and tracks. Combined with coal mining, this will mean that eventually Gloucester will be situated in a scarred industrial landscape devoid of its once important scenic-heritage qualities.

6. CONCLUSION

In conclusion, the failure to address cumulative impact is a serious deficiency that affects the integrity of every part of the environmental assessment.

……

SECTION 28.3 - ECOLOGICALLY SUSTAINABLE DEVELOPMENT

1. SUMMARY

This submission considers that the AGL Environmental Assessment fails to adequately consider the principles of Ecologically Sustainable Development as required by law despite acknowledging the requirement to do so. This submission considers that two principles, the precautionary principle and intergenerational equity, are relevant to the project.

The submission urges the Minister not to approve the project because of this serious omission.

2. THE REQUIREMENT TO CONSIDER ECOLOGICALLY SUSTAINABLE DEVELOPMENT

The requirement to consider Ecologically Sustainable Development is now a settled point of planning procedure. The *Environmental Planning and Assessment Act* 1979 (NSW) states that one of its objects is to encourage ecologically sustainable development. In *Gray v The Minister for Planning,* Pain J considered that there is ample case law that requires ESD principles to be considered in all decisions made under the *Environmental Planning and Assessment Act*, including those made under the Part 3A provisions.

Ecologically Sustainable Development is defined as having the same meaning as the *Protection of the Environment Administration Act* 1991 (NSW), which states that ecologically sustainable development requires the effective integration of economic and environmental considerations in decision-making processes. It then provides that ecologically sustainable development can be achieved through four accepted principles:

- the precautionary principle;
- inter-generational equity;
- the conservation of biological diversity;
- improved valuation, pricing and incentive mechanisms.

As noted above, the submission considers that the precautionary principle and intergenerational equity are applicable to the AGL gas project and are required to be assessed.

3. THE PRECAUTIONARY PRINCIPLE

Background

The precautionary principle has been well articulated in Australian and overseas planning law. For the purpose of this submission, reliance is placed on Chief Justice Preston's judgement in *Telstra v Hornsby Shire Council* [2006] NSWLEC 133 and His Honour's subsequent paper *Principles of Ecologically Sustainable Development*, November 2006.

Preston CJ notes that there are numerous formulations of the precautionary principle but that the most widely employed formulation is 'if there are threats of serious or

irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation'.

His Honour considered that two conditions precedent are required to trigger its application; a threat of serious or irreversible damage and scientific uncertainty as to the environmental damage that may result. Mere suspicion or concern does not meet the threshold required to satisfy a threat of serious or irreversible damage; there must be a level of scientific evidence even if that evidence falls well short of proof with scientific certainty.

The Environmental Assessment incorrectly interprets the Precautionary Principle.

The Environmental Assessment incorrectly states at 28.3.1 (1st paragraph) that 'it requires avoidance of serious or irreversible damage to the environment, whenever practicable'. This is incorrect, the condition 'whenever practicable' is not part of the precautionary principle - the precautionary principle requires avoidance, there is no modifying condition. If this condition existed there would in effect be no precautionary principle.

The Environmental assessment at 28.3.1 (2nd paragraph) that 'the Project has taken on board the precautionary principle by carrying out detailed environmental investigations…'. This premise is not supported by the content of the Environmental assessment, which has avoided a number of key assessment requirements. It should be noted that the Environmental Assessments attempts to postpone a number of issues until after approval is given – this is completely contrary to the concept of the precautionary principle.

The deficiencies in the Environmental Assessment's understanding of intergenerational equity at 28.3.2 can similarly be noted.

Meeting the required threshold to invoke the Precautionary Principle

This submission considers that there is sufficient scientific evidence to invoke the precautionary principle in regard to gas migration, water degradation, water and soil pollution and water table damage, and to therefore place the burden of proof to the contrary on the proponent of the development. The evidence is referred to below.

The F.C. Loughnan report. The Gloucester Basin is particularly prone to methane gas migration for the same reasons that traditional pit mining was considered dangerous. This problem was noted in coal mining assessments in the 1950s when geologist FC Loughnan (1954) concluded that a high water table along with faulting and buckling in the strata make traditional pit mining in the Gloucester Basin extremely difficult. Loughnan further considered that no other area in New South Wales presents such an opportunity to study the rapid succession of differing tectonic environments as does the Stroud-Gloucester Trough. He particularly noted the occurrence of late E-W compressional stress of a high magnitude, which superimposed new structures on the pre-existing structures. These characteristics mean that the Gloucester Basin is also unsuited to coal bed methane gas extraction.

Gas eruption and the Atkinson report. An eruption of methane gas has already occurred in the Gloucester Valley. In September 2004, within a fortnight of test drilling beginning, coal bed methane drill hole LMG-03 at Stratford was shut down when methane gas erupted from old boreholes up to 300m away. The report *Coal Bed Methane Hazards in New South Wales*, by CM Atkinson (2005) notes that this was the first reported case of serious migration of methane gas from coal bed methane operations in New South Wales. That incident resulted in work being halted and a number of boreholes being sealed with concrete.

Commentary by Professor Alex Grady.(Professor Grady has 35 years as a geologist specialising in structural geology and also has extensive experience as a geological field mapper. He extensive field experience in NSW, South Australia, Western Australia, the Northern Territory, New Zealand and Eastern Indonesia. He was during that time a Member of the Australasian Institute of Mining and Metallurgy and of the Geological Society of Australia and retains membership of the Geological Society of Australia.)

Considerable reliance is placed on comments received from Professor Alex who reviewed the AGL Environmental Assessment in relation the geological characteristics of the Gloucester Valley for the purpose of this submission. Extracts from his commentary are noted below and a copy of his commentary follows this section of the submission. We urge the Department of Planning to read this commentary in full.

> It seems to me that their understanding of the local and subregional hydrogeological situation leaves a lot to be desired. The potential for fractured rock increasing porosity/permeability of otherwise "tight" geological formations, raises the possibility that there could be at least local hydrological connectivity between the coal seams and other aquifers. The densely spaced, complex systems of faulting, raise the possibility of fault-induced juxtaposition of coal seams and non-seam aquifers - and hence inducing hydrological connectivity of those seams with other aquifers.'
>
> I think that you can see from what I have written, that I sense a major lack of understanding of the potential hydrogeological situation, together with a consequent lack of an adequate monitoring system and program, required in order to understand the hydrogeological repercussions (short and long term) of what is proposed in the project.

Land degradation has become a major issue in many overseas gas fields, particularly in the United States, but Australian gas fields have not been free of this devastation. Soil poisoning at the Bohena wells near Pilliga New South Wales provides alarming evidence of the extent of environmental degradation that coal bed methane gas extraction has caused in Australia. Atkinson (2005) described it as one of the worst cases of sodic soil poisoning reported and as being worse than the cases described from the Powder River Basin in USA, which have attracted continuing international attention.

There are increasing health concerns supported by increasing data. Overseas issues, mainly in the United States, include stock deaths from grazing in the vicinity of gas wells and increased cancer rates in the immediate areas. These are serious issues that

require full and open examination but are instead being ignored and hidden from examination in the Australian context.

4. INTERGENERATIONAL EQUITY

The Principle of Intergenerational Equity's strongest application is in regard to the scenic-heritage-cultural landscape. It is a settled point by way of relevant definitions and case law that cultural environment is part of the environment and that the principles of Ecologically Sustainable development apply equally to it.

The Stroud-Gloucester Valley was one of the first cultural heritage landscapes identified in New South Wales. It was widely recognised as such by the 1950s and was classified by the National Trust of Australia (NSW) in 1975. This classification depends on the area's early nineteenth century settlement, its outstanding scenic qualities and its geological qualities. These qualities have shaped the area's lifestyle, economic base and self identity. We ask the Department of Planning to refer to the document *The Stroud- Gloucester Valley & The Vale of Gloucester: A heritage landscape under threat*, Barrington-Gloucester-Stroud Preservation Alliance Inc, 2009. A copy of this document was sent to the Department of Planning in July 2009 and a further copy has been enclosed with this submission.

The issue is that the scenic-heritage qualities are being gradually eroded by coal and gas mining. This is intensified by the inadequate assessment of heritage and scenic impact by the AGL Environmental Assessment and its failure to assess cumulative impact. These issues are addressed at the appropriate parts of this submission.

It is clear that the AGL Environmental Assessment fails to understand the impact of the gas project in the Gloucester area, on the landscape generally and on scenery and on vistas that are critical to the area's identity.

Future generations will inherit a degraded landscape that is vastly different to the landscape today. This landscape is not only enjoyed by the present generation but, as noted above, underpins its economic base, lifestyle and self identity.

……

FULL SCRIPT OF COMMENTS BY PROFESSOR GRADY REGARDING THE GLOUCESTER VALLEY'S GEOLOGY

Professor Grady to the writer, Garry Smith, 21 December 2010

'I find aspects of the mapped geology as depicted and the geological cross sections to be problematic. There is clearly a lot more to the geology than is shown on the map (*Dungog Geological Series Sheet 9233* (Edition 1) 1991). Furthermore, the way in which the Stroud-Gloucester Syncline is shown on Cross Section AB is difficult to believe when viewed in conjunction with the map and Cross Sections GH and EF. But we must remember that most geological cross sections associated with regional geological maps are very interpretive.

However, we can use with some confidence the following observations.
1. The area in question has been intensely faulted, involving several intersecting arrays of often closely spaced faults. This is the kind of geological situation in which the rocks are usually strongly fractured (fractures due to compaction-contraction during lithification, together with those due to brittle failure during folding and faulting).

This gives rise to secondary porosity/permeability - which can vary considerably from place to place. Most particularly, such effects can produce locally high porosity/permeability zones in rock units that have low primary porosity/permeability (producing what are called "fractured rock aquifers").

2. There are sandstone stratigraphic units within the geological sequence, ones that could well be fairly good local aquifers (although the water quality might not be particularly good). The sedimentary units in the Gloucester Valley area are not pure "layer cake stratigraphy", i.e., sedimentary units are not perfectly continuous in extent or thickness - particularly from east to west. This applies also to the character of the mapped rock units, eg., the distribution of potentially good sedimentary aquifers. The fact that their drilling activity in the pilot project area didn't intersect any, doesn't preclude their existence within the proposed Gas Field area.

3. The complexity of the faulting is likely to have juxtaposed the coal seams with potential sandstone aquifers in many places. This has the potential to make the coal seams 'leaky' in such places'.

Comments by Professor Alex Grady on the AGL Environmental Assessment, viewed by way of a CD version of the assessment.
'The content of the CD is really quite large (as might be expected), so my reading of it has been fairly restricted - to those sections that, on the surface, relate most directly to the geology and to water issues.

1. Water and in-seam gas. It is encouraging to see several text references to the need to reduce the formation fluid pressure to a very low level before the in-seam gas is released by the coal. In practice this seems to mean that the hydrostatic head at the level for gas recovery, needs to be zero (or all 'formation water' needs to have been removed above the gas recovery level). At the very least this will result in a conical or quasi-conical, depending on coal seam boundary geometry, water-free zone above the gas-recovery level.

2. How do they plan to isolate the desired gas-recovery zone from other geological units? They claim that: (a) the coal seams are the principal deep rock aquifers they are likely to encounter, and (b) their drilling/casing procedures will prevent cross-linking the coal seams with other aquifers.

3. Their report of what happened to neighbouring 'core drill holes' (DDH20C and 'an unnamed core hole' about 300m south of LMG03) suggest greater porosity/permeability, within the coal seam sequences not just within the coal seams, than they otherwise admit (See *Vol 1, Ch 13, p 13.4]*
BGSP Alliance submission - ecologically sustainable development

Note the very limited evidence-base they use to interpret lack of hydrological connectivity between the deep rock aquifer and the alluvial aquifer (same page as Point 3 above.)

It seems to me that their understanding of the local and subregional hydrogeological situation leaves a lot to be desired.

1. The potential for fractured rock increasing porosity/permeability of otherwise "tight" geological formations, raises the possibility that there could be at least local hydrological connectivity between the coal seams and other aquifers.

2. The densely spaced, complex systems of faulting, raise the possibility of fault-induced juxtaposition of coal seams and non-seam aquifers - and hence inducing hydrological connectivity of those seams with other aquifers.

The ***permeability of the fault zones*** is not known at all - you might recall my earlier comments about 'sealed' or 'open' faults. They do refer a couple of times to the possibility that some faults might have "weathered" material within the fault zone. Technically, this is known as 'fault gauge'. It is usually crushed/ground-up rock material that has been mineralogically altered to have a high clay content. If there is much of that material within the fault zones, it can have the effect of sealing the fault zone, preventing the transmission of fluids along that part of the fault. The opposite of this is an effect that can be associated with fault-related fracturing of rock, i.e., increasing the porosity/permeability within the crushed rock. If there is much of this effect along a fault, it can become an efficient conduit for movement of fluids along the fault (in the inland Australian situation, many faults can be traced across the landscape by following the linear arrangement of springs - due to the associated faults being preferred conduits for movement of ground water.)

One of the direct repercussions of these matters is that <u>they haven't properly assessed the potential for dewatered coal seam units to become sinks for water from elsewhere</u> (neighbouring geological units, more remote geological units connected via fracture zones or "open" faults, <u>or from surface waters via alluvial aquifers</u>); in fact it might be very difficult to properly assess these possibilities until production has been under way for some time.

They say that they will seal off production seams if they overproduce water. How will they accurately recognise such a situation? If it happens, what will they monitor in order to understand the processes involved? The monitoring systems that they propose almost certainly won't be sufficient to understand the systems (see comments about Management of Impacts below).

Specific Comments on Table 13.1.
Dewatering of Shallow Aquifers - Mitigation Measures:
They don't/won't know if the production zones are leaky at depth. This could be extremely variable from place to place. Sealing individual coal seam zones in the drill hole won't necessarily solve the problem.

Increased aquifer permeability etc - Mitigation Measures:
Potential problem - the pilot program is not necessarily representative of all geological situations to be encountered.

Reduction in stream flow:
Mitigation Measures statement has nothing to do with mitigation measures (!). It is about **monitoring**, not mitigating.

Management of Impacts (page 13.4.1)
Dot point one: Given the extremely faulted/fractured nature of the local geology, monitoring of target seams and shallow aquifers is unlikely to cover all possibilities. They should at least cover contiguous non-seam deep bedrock aquifers as well.

Dot point 2: This should apply to contiguous non-seam aquifers as well.

Dot point 3: As above.

The final statement is effectively a "motherhood statement". How is "where required" to be defined, and by whom?

I think that you can see from what I have written, that I sense a major lack of understanding of the potential hydrogeological situation, together with a consequent lack of an adequate monitoring system and program, required in order to understand the hydrogeological repercussions (short and long term) of what is proposed in the project'.

Alex Grady.

INQUIRY INTO COAL SEAM GAS

LEGISLATIVE COUNCIL GENERAL PURPOSE STANDING COMMITTEE NO. 5

Submission by Barrington-Gloucester-Stroud Preservation Alliance Inc to the Legislative Council Inquiry into Coal Seam Gas, September 2011

The Gloucester Bucketts, 2010

(Incorporated under the Associations Incorporation Act, 1984)
PO Box 174 Gloucester NSW 2422 • bgspalliance@yahoo.com.au • www.bgsp-alliance.asn.au

Chairperson	*Deputy Chairperson*	*Secretary/Treasurer*
Graeme Healy	Steve Robinson	Penny Drake-Brockman
(Tel) 02 6558 8159	(Tel) 02 6558 7428	(Tel) 02 6558 1845

5 September 2011

The Hon Robert Brown
Chair
Legislative Council Inquiry into Coal Seam Gas
Parliament House
Macquarie Street
Sydney NSW 2000.

Dear Sir,

The Barrington-Gloucester-Stroud Preservation Alliance would be pleased if you will receive our submission to the Inquiry into Coal Seam Gas, Legislative Council General Purpose Standing Committee no. 5.

The Alliance is most concerned at the environmental risks associated with the coal seam gas extraction process and with the low standard of environmental assessment that has become normal for all mining project assessed under the Part 3A provisions of the *Environmental Planning and Assessment Act 1979.* We consider that a complete review of all legislation and procedures associated with the coal seam gas industry is of critical importance.

We have responded fully to the terms of reference and have included a preliminary list of essential recommendations that we believe are critical to undertaking the necessary review of all aspects of this industry.

We thank the Legislative Council for the opportunity to present this submission.

Yours sincerely,

Garry Smith

Project Officer, BGSP Alliance Inc.

INQUIRY INTO COAL SEAM GAS
TERMS OF REFERENCE

That General Purpose Standing Committee No. 5 inquire into and report on the environmental, economic and social impacts of coal seam gas (CSG) activities, including exploration and commercial extraction activities, allowable under the NSW Petroleum (Onshore) Act 1991 (the Act). and in particular:

1. The environmental and health impact of CSG activities including the:
a. Effect on ground and surface water systems,
b. Effects related to the use of chemicals,
c. Effects related to hydraulic fracturing,
d. Effect on Crown Lands including travelling stock routes and State forests,
e. Nature and effectiveness of remediation required under the Act,
f. Effect on greenhouse gas and other emissions,
g. Relative air quality and environmental impacts compared to alternate fossil fuels.

2. The economic and social implications of CSG activities including those which affect:
a. Legal rights of property owners and property values,
b. Food security and agricultural activity,
c. Regional development, investment and employment, and State competitiveness,
d. Royalties payable to the State,
e. Local Government including provision of local/regional infrastructure and local planning control mechanisms.

3. The role of CSG in meeting the future energy needs of NSW including the:
a. Nature and extent of CSG demand and supply,
b. Relative whole-of-lifecycle emission intensity of CSG versus other energy sources,
c. Dependence of industry on CSG for non-energy needs (eg. chemical manufacture),
d. Installed and availability costs of CSG versus other stationary energy sources,
e. Proportion of NSW energy needs which should be base load or peaking supply and the extent to which CSG is needed for that purpose,
f. Contribution of CSG to energy security and as a transport fuel.

4. The interaction of the Act with other legislation and regulations, including the Land Acquisition (Just Terms Compensation) Act 1991.

5. The impact similar industries have had in other jurisdictions.

COMMITTEE MEMBERSHIP

The Hon Robert Brown MLC Shooters and Fishers Party *(Chair)*
The Hon Jeremy Buckingham MLC The Greens *(Deputy Chair)*
The Hon Rick Colless MLC The Nationals
The Hon Greg Donnelly MLC Australian Labor Party
The Hon Scot MacDonald MLC Liberal Party
The Hon Dr Peter Phelps MLC Liberal Party
The Hon Peter Primrose Australian Labor Party

RECOMMENDATIONS

The Barrington-Gloucester-Stroud Preservation Alliance Inc considers that implementation of the following seven recommendations is critical to the proper assessment, implementation and control of the coal seam gas extraction industry in New South Wales.

1. The moratorium on exploration be extended by a minimum of twelve months. Nothing less would allow the many complex issues to be properly considered.

2. The adherence to the principles of Ecologically Sustainable Development as providing the over-arching control. Two sub-principles are particularly relevant; the precautionary principle and the principle of intergenerational equity.

The precautionary principle states;
…where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

Implementation of the precautionary principle is a fundamental requirement to ensure proper management of the coal seam gas industry. There is substantial scientific and empirical evidence that coal seam gas will cause serious or irreversible environmental harm. The evidence is more than sufficient to trigger application of the precautionary principle as considered in legal commentary and decisions in New South Wales, and the onus is therefore placed on the CSG industry to implement procedures so that harm will not be caused and to prove to a high level of certainty that it will not be caused. The precautionary principle is relevant to all aspects of the coal seam gas industry but is particularly relevant to the water quality and health impact in their many aspects.

The principle of intergenerational equity states;
…that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.
There is considerable danger that we will be passing on a degraded landscape to future generations. This will be particularly so in regard to aspects of water, soil and health but will also apply to the degraded visual landscape. It follows from the above that if the precautionary principle is not implemented, that the intergenerational equity principle will be violated.

3. The implementation of adequate legal and regulating procedures to all areas of environment-social-economic assessment and monitoring. This is a complex area that requires terms of reference and submissions in its own right but the following are noted as being particularly relevant.

3.1. Changes to the *Petroleum (Onshore) Act 1991* to provide environmental protection during the exploration stage
3.2. Repeal of the *Environmental Planning and Assessment Act 1979* Part 3A provisions.
3.3 Replacement of the Part 3A provisions with suitable legislation that does not restrict or completely turn-off relevant environmental statutes.
3.4. Curtailment of the excess power given to the Minister for Planning.
3.5. The abolition or upgrading of the Planning Assessment Commission so that it becomes a genuinely independent and informed body.
3.6 Introduction of tighter assessment requirements so that the barely adequate level of current assessments is substantially upgraded.
3.7. The introduction of merits appeals for <u>all</u> CSG and other mining approvals.

4. Greater levels of community participation should be implemented both by way of providing genuine community participation and by providing local government bodies with greater involvement and authority.

5. All mining companies should return a greater percentage of profits to the community, including all parties who are disadvantaged by the mining development and including local councils. However, it is important that the process does not become one of mining companies being able to 'buy' support for their developments or 'buy off' opposing parties to facilitate their developments.

6. Tighter 'policing' of all mining operations is required in all social-environmental regards. The present position is that CSG and other mining companies are able to obstruct, manipulate and 'fudge' environmental monitoring procedures, particularly those for air and water quality and for noise levels.

7. The procedure known as hydraulic fracturing or fracking must be banned totally, nothing less is acceptable.

COMMENTARY

1. THE ENVIRONMENTAL AND HEALTH IMPACT OF CSG ACTIVITIES

Effect on ground and surface water systems

General

The Barrington-Gloucester-Stroud Preservation Alliance considers that the pollution risks created by the coal seam gas extraction process to ground and surface water systems presents the greatest environmental danger yet imposed on the Australian landscape by any mining or industrial process so far undertaken in this country.

Attempts to alleviate fears by claiming different risk levels according to whether the process extracts shale gas or coal seam gas, the depth of the associated water tables and the geological characteristics of a particular area are ill-informed, reckless and without any scientific justification. All processes in all circumstances present a completely unacceptable risk of serious or irreversible environmental damage.

Coal seam gas and shale gas are the subject of growing environmental concern around the world and an increasing number of countries (France, UK, South Africa, USA and Canada) have imposed total or partial bans in relation to the areas that can be subjected to gas extraction or the processes that can be used. Coal seam gas mining in Australia presents similar challenges. Our environment is subject to at least the same level of danger but arguably is much higher, particularly within the area defined as the Great Artesian Basin and in many coastal and tableland areas in New South Wales, which have especially vulnerable geology formed by intense lateral pressure, volcanic action, complex erosion processes and ancient plate movement.

The cumulative impact of multiple land uses on environmental qualities is a neglected area of environmental assessment that has potentially dangerous consequences. Areas subject to coal seam gas exploration or gas extraction in New South Wales are frequently subject to other intense land uses such as coal mining, other forms of mining, agriculture, tourism and increasingly dense settlement patterns. Each mining/extraction industry seeks to have only its direct individual impacts assessed and steadfastly avoids assessment of cumulative impact combined with other mining activity and land uses. This is an inadequate process that has potentially dangerous consequences.

Continuity and quality of water supply is the greatest environmental challenge facing Australia and the world today. It is our most precious resource - more valuable than coal, gas or gold and we must bestow upon it the absolutely highest level of environmental care that is within our power. We note the concerns expressed by informed scientific bodies both in Australia and overseas and quote by way of example the Australian National Water Commission, December 2010, which said the *'potential impacts of CSG developments, particularly the cumulative effects of multiple projects, are not well understood'* and that the CSG industry *'risks having significant, long term and adverse impacts on adjacent surface and groundwater systems'.*

The Stroud-Gloucester Valley
Geology and ground water

The following comments are not intended to attack the AGL environmental assessment specifically; that assessment is of general industry standard. The purpose is to illustrate the inadequate standard of coal seam gas environmental assessments generally as well as to emphasise the risk that has been imposed on the Stroud-Gloucester Valley by this project.

The Alliance is particularly concerned at the inadequate hydrogeological assessment undertaken by the AGL Gloucester Project in regard to the area's highly susceptible complex geology. In this respect the Alliance relies on the definitive geological study of the region, *Geology of the Camberwell, Dungog and Bulahdelah 1:100,000 sheets*1991, Department of Mineral Resources, and on comments by Professor Alex Grady concerning the AGL Environmental Assessment.

The 1:100,000 map *Dungog 9233 shows* the Stroud-Gloucester Valley generally and particularly the northern end to be extremely complex geologically with a high number of major and minor faults. These cause severe pollution risks to ground water supplies in regard to gas extraction and coal mining. The assessment of the valley's coal resources in the above study considers that coal cannot be mined safely and economically in the northern end of the valley and yet the AGL project has been approved to extract gas in the same area, and with critical issues including impact on water left unassessed.

Professor Alex Grady commented at the conclusion of his commentary on the area's geology and the AGL environmental assessment:

> *I think that you can see from what I have written, that I sense a major lack of understanding of the potential hydrogeological situation, together with a consequent lack of an adequate monitoring system and program, required in order to understand the hydrogeological repercussions (short and long term) of what is proposed in the project.*

Lack of a flood study for the project area

This again underlines the lack of a proper environmental assessment in the Stroud-Gloucester Valley for this project and the inadequacies inherent in coal seam gas environmental assessments generally.

A complete flood study of the project area has not been undertaken at any time and no flood assessment was undertaken in the AGL Environmental Assessment, yet the Gloucester and Avon Rivers are known to suffer severe flooding. This is a serious omission that should be rectified by a full study that addresses all flood impact including frequency, depth, velocity and impact on infrastructure, land use and flood plain erosion. We believe that a flood study was required under both ground water hydrology and risk assessment but was omitted by the applicant.

Impact on downstream water users

This includes MidCoast Water, which supplies water to the Gloucester-Wingham-Taree-Forster-Tuncurry area as well as rural properties that draw domestic or farm irrigation water from the Manning River system. This matter was not identified specifically in the Director-General's EARs and was not addressed in the AGL Environmental assessment, again illustrating the inadequate standard of assessment that is general throughout the industry.

The matter has caused considerable comment and even a degree of alarm. The *Manning River Times*, 15 March, reported that concern as per the following extract;

> *MAYOR of Greater Taree City, Cr Paul Hogan said coal seam gas mining could have "'a terrible effect'" on the environment, and should not be permitted in any area where water supplies might be affected.*

> *As a delegate to MidCoast Water, he was horrified to learn that MidCoast had not been included in the consultation or preliminary design stage which led to the State government's approval of the initial 110 gas wells earlier this month.*
>
> *Gloucester Shire Council, Great Lakes Council and the NSW Office of Water were invited to a planning focus meeting at which the development was discussed, but potential impacts on drinking water in downstream catchments were not raised, he said.*
>
> *He described MidCoast Water's omission from the discussions as "like shutting the gate after the horse has bolted".*

Robert Oakeshott, independent Federal Member for Lyne, similarly commented *'for this decision to have been made by the NSW Government without even asking MidCoast Water to the table simply beggars belief'.* (Media release 17 March)

We consider that the matter cannot be rectified by discussions and monitoring after the event, it was a critical component of the assessment process and the environmental process is deeply flawed by its omission.

The use of chemicals and hydraulic fracturing
General
The Alliance remains deeply concerned not only by the inadequate and, at times, dishonest information being provided by coal seam gas companies generally but by the use of the fracking process, the huge amount of water that is withdrawn by the process and the use of any chemicals being injected into the water supply.

We note the following issues as being relevant to the fracking process:

- The gas will flow into undetected old bore holes with gas migration having the potential for poisoning and even explosion.
- The water now flowing through the coal seam will pick up carcinogens, heavy metals and other contaminants from the coal seam and flow into aquifers that supply domestic drinking water and agricultural water.
- Fracking and drilling chemicals will be added, most of which have not been evaluated by NICNAS, and enter domestic and agricultural water, again poisoning 'man and beast'.

We are particularly concerned that the fracking process is seen as a 'one size fits all' approach. The fracking process always imposes a high level of environmental risk but this can be extreme in areas of complex geology, such as the Gloucester Basin. However, the gas extraction companies are concerned only with the economics of the fracking process from a recovery consideration and appear incapable of understanding the geological problems of different areas.

The fracking process in the Stroud-Gloucester Valley
AGL advised (SMH August 2011) that the estimates of reserves in the Gloucester Basin may have to be downgraded because of the incidence of fracking that will be involved. It is clear that AGL will be relying on or agitating for substantial use of the fracking process. This is a particularly disturbing situation given the Gloucester Basin's extremely vulnerable geology.

The Gloucester area has already experienced incidents of methane gas migration during exploration as noted in the report *Coal Bed Methane Hazards in New South Wales*, by CM Atkinson, 2005.

Effect on greenhouse gas and other emissions

General

The rationale for coal seam gas has been that its combustion produces less carbon dioxide than coal and that it is therefore the ideal intermediate fuel to take us to the next stage of reducing greenhouse emissions. This is a misrepresentation based only on the gas produced during the power generation-burning process. However, this is an incomplete assessment at best and a completely misleading and dishonest assessment if viewed totally. There are a number of claims that the amount of greenhouse emissions have been significantly understated, but even leaving that aside, there are other serious concerns. Professor Robert Howarth from Cornell University (research on the life-cycle carbon cost of CSG1) estimates that over a twenty-year period, CSG produces at least as much carbon as coal and potentially much more.

Such is the level of concern from scientists in the USA that the Council of Scientific Society Presidents wrote to President Obama in 2010 warning that some potential energy bridges such as shale gas have received insufficient analysis and may aggravate rather than mitigate global warming.

Methane is a far more potent greenhouse gas than carbon dioxide and it is the 'fugitive emissions' that cause concern. These escape into the atmosphere during the production process (flaring, drilling, fracking) and due to losses from the transmission pipelines. The ABS estimates transmission losses for natural gas over 2001-022 at 1.5% of all piped natural gas. Howarth estimates that between 3.6% and 7.9% of the methane from shale gas production escapes to the atmosphere over the lifetime of a well.

We also note that the gas emissions produced in the extraction and processing (principally but not confined to the high use of diesel motors) has not been taken into consideration.

The Stroud-Gloucester Valley

The Alliance is concerned with two further aspects that apply to the Gloucester Basin; the cumulative effect when combined with the increasing level of coal mining that the valley is experiencing and the unusual air inversion characteristics that affect the valley.

The Stroud-Gloucester Valley already has two relatively major coalmines operation within its boundaries, with further expansions and new mines being planned. It is critical that the cumulative impact of all of these developments be considered, not just the (usually understated) impacts of individual projects, prepared as if they all operate in complete isolation.

The second aspect, that of Gloucester's local meteorological conditions has been well acknowledged but is not being given consideration in relation to coal and gas development. This characteristic has long been noted by way of the incidence of heavy fogs that frequently blanket the valley and the severe winter temperatures that occur along the valley floor caused by cold air flowing into the valley from the Gloucester-Barrington Tops area.

A further characteristic is now being revealed. The fogs that often gravitate to the northern end of the valley and persist there for some time are beginning to show a grey pollution stain. This, combined with other air measuring and empirical evidence, is showing that the Gloucester Valley may already be subject to excessive levels of health damaging air pollution.

Air quality - health impacts

Assessment of air pollution issues and cumulative impact were undertaken by Alliance member Dr Steve Robinson, retired medical practitioner and psychiatrist. Dr Robinson expressed concern regarding the project's cumulative impact with increased mining at the Roseville West and Bowens Road north pits, the increased production at the Coal Handling and Processing Plant and increased train movements. Of critical concern is that emissions from the AGL project will react with the coal dust pollution presently occurring from existing coal mining with potentially toxic effects.

The Alliance is particularly concerned at the health-damaging fine particle pollution that is produced. Dr Robinson commented in regard to flaring;

> *My comment to the particulates is that burning them can't make them disappear. They tend to become ultra fine particulates which are less than PM 0.1. These are a size that enter inside cells and cause genetic changes such as inducing malignant processes. They are very much more numerous because the same mass is split into many more particles. It is true that these also often combine with other particles in the atmosphere becoming fine or coarse sized particles again. Any suggestion that flaring breaks organic compounds into their basic elements is wrong, you have to have extraordinarily high temperatures for that to occur 10,000DegC and those temps are not nearly reached. So flaring, to my understanding, is a health endangering process, not a benign one.*

Dr Robinson expressed alarm at the placement of the gas central processing unit so close to the coal processing unit, which in turn are both only two km from Stratford school as well as the proximity of wells to private residencies:

> *The 200 meters proximity of wells to houses means that noise and perhaps air pollution will have adverse health consequences on a significant number of households when projects occur in relatively densely populated areas such as Gloucester Valley, Camden, St Peters etc.*

Noise pollution (Dr Robinson continued**)**

> *Infrasound and low frequency noise generated by pumps and generators at well heads have not been evaluated, such as the resonance occurring within bedrooms and even skull and chest cavities interfering with the normal functioning of the Autonomic Nervous System of the many close residents. They will disturb cardiovascular system, sleep, concentration and learning and interfere with emotional wellbeing with 24-hour operations being the norm. The greenhouse gas effect on global warming has already had an effect on global health problems with more parasitic diseases and infant diarrhoea. This causes resentments in affected foreign nations.*

Psychological stress

Dr Robinson also made the following comment in a larger assessment of psychological stress impact of the development:

> *Obviously it is not just what you can see from your house that has an impact on you. For many the necessity to change life plans was a stressor. For others it was the decrease in real estate value amounting in some cases to the impossibility of being able to sell their property to escape. The powerlessness of being a victim in a larger game in which they had no influence promoted feelings of depression. Increased stress tends to lead to a reactivation of past psychological disorders currently in remission but may also result in new cases. Psychological stress also causes physical health problems such as raised blood pressure.*

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2. THE ECONOMIC AND SOCIAL IMPLICATIONS OF CSG ACTIVITIES

Legal rights of property owners and property values

The legal rights of owners, or rather the lack there of, is a most serious matter that urgently needs to be addressed. The lack of property rights is inconsistent with the Australian economic-social-legal structure and is inconsistent with modern democratic administration and legal processes generally.

Property owners are not notified of exploration licences granted over their properties. Most rural property owners do not have the knowledge, finances or experience to deal with the CSG companies. This situation is worsened by the preferred approach of the CSG companies, which is to divide and conquer. They seek to deal only with individuals; they give misleading information and generally seek to avoid proper community consultation.

There is no protection available to property owners regarding overall economic impact and no satisfactory legislation to address the impact of CSG mining on property values. Information so far available in Australia indicates a dramatic impact on property values, a result consistent with overseas observations. There is evidence that some properties may be virtually unsaleable, a situation that is compounded by the dual impacts of both coal and gas mining, revealing yet another instance where cumulative impact must be considered if proper environmental-social-economic impact assessment is the be achieved.

A further matter of economic impact has not even been considered in any assessment to date - the effect of reduced property values on both local investment funding and retirement funding. Property values form a major component of local investment funds and a reduction in these values and the ability to sell real estate if required reduces local investment ability. Eventually, reduced values have an effect on the owners' retirement funds and security. This has a significant effect with both local and wider impacts.

Food security and agricultural activity
Protection must be given to all agricultural land; we should not use narrow, selective definitions such as 'prime' agricultural land.

Much (most?) productive land would not make that category. To illustrate, most of the Sydney surrounds that supplied Sydney with fruit, vegetables and dairy produce for a century and a half (Hills District, Mangrove Mountain–Peats Ridge, Kurrajong, Camden-Campbelltown) would not be classed as prime agricultural land. Any land that produces even specialised low volume niche industries should be considered as 'prime' land.

We need to be very careful that the CSG industry does not respond with a bargaining process whereby they do not seek to mine on 'prime' agricultural land providing greater access is given to other agricultural land.

Regional development, investment and employment, and State competitiveness
This is a broad area of consideration and comment has been made above regarding reduced property values and the effect of that on investment and retirement security.

The effect on agricultural production is an obvious negative impact that is being downplayed by the CSG companies with claims that the two can co-exist. Empirical evidence shows otherwise; the amount of land lost from production is far greater than claimed and the damage to water supplies and the health risks to livestock have not been properly addressed.

We address an issue of major concern that has been neglected by the CSG companies – visual impact and tourism impact. This is relevant to all CSG mining areas but the comments here are directed more to the New South Wales North Coast and the Stroud-Gloucester Valley. Tourism is an important and highly productive industry throughout this region.

The following comments are made in regard to the Stroud-Gloucester Valley. An understanding of the valley's heritage significance, including its scenic qualities, is of the highest importance to the valley's social/economic base. Tourism is now the valley's biggest industry from a local economic perspective. The danger that arises from the present level of inadequate assessment is that the essential scenic-heritage qualities will continue to be eroded by successive stages of development that are being assessed to a minimal standard and as though each development will operate alone and in isolation. The result of this will be that the valley's special significance will be permanently lost.

The *Vale of Gloucester* was recognised by the National Trust of Australia (NSW) as a cultural heritage landscape in 1975 and is among the earliest cultural landscapes so identified in New South Wales. That assessment was updated in 1981 and again in 2011. The listing for the Vale of Gloucester sits in the National Trust Register along with other highly significant conservation areas such as the Kosciusko Alpine areas, Lord Howe Island, Parramatta Park and the Cumberland Plain Remnant Communities.

The Vale of Gloucester was entered onto the Register of the National Estate but the entry was not finalised before the register was abolished on 1 January 2004, with the result that additions or changes were not allowed after that date. The Barrington-Gloucester-Stroud Preservation Alliance commissioned a more extensive professional assessment in 2009, copies of which have been sent to all relevant bodies, including the Department of Planning. The heritage assessment, *The Stroud-Gloucester Valley & the Vale of Gloucester: A heritage landscape under threat*, considers that the Gloucester Valley has heritage significance at local, State and National levels for historical, aesthetic, social and technical/research reasons.

This assessment will be used as a basis to gain formal State and National recognition and a nomination is currently before the Department of Sustainability, Environment, Water, Population and Communities to have the Stroud-Gloucester Valley assessed for national heritage significance in the 2011-2012 program.

The Stroud-Gloucester Valley also is adjacent to the Gloucester Tops-Barrington Tops world heritage Gondwana Rainforests of Australia (formerly CERRA), a feature of great environmental significance and tourist potential. It would be an absolute tragedy to have such a highly significant cultural heritage landscape of potentially National significance situated adjacent to a World Heritage natural landscape degraded to the extent that will occur.

Royalties payable to the State

This is a significant underlying issue to the whole CSG environmental-social-economic problem. We have been advised that for the first five years of production no royalties are payable. In year 6 they commence at 6%, then rise by 1% per annum until year 10, from which time they continue at 10%. This has the effect of creating a frenzied 'gas rush' that acknowledges no one and has no regard to the social, environmental and economic damage done to local communities.

The CSG companies should be made to cost in the full cost of the operations, including the proper royalty cost and the environmental-social cost. This will provide a basic beginning in a proper cost evaluation that will hopefully lead to a more efficient and less intrusive industry. The issue that CSG mining may not then proceed in some areas because the total cost makes it uneconomical will provide a more equitable industry.

The requirement is to provide a more responsible industry. In this regard, the making of greater payments to any one body, whether that is the State government, the local government or individual landholders, in order to gain support to push development through contrary to the interests of others will be contrary to the purpose.

It is apparent that under current procedure the gas companies and the State government may be winners but the local area will not be once the initial economic input has passed.

Local Government including provision of local/regional infrastructure and local planning control mechanisms

The present position whereby local government is excluded from the CSG planning process by way of the *Environmental Planning and Assessment Act 1979* Part 3A provisions is most unsatisfactory. However, it is acknowledged that many local government councils would not have the planning expertise to properly assess development of this type but we also note that this position has been partly caused or at least worsened by the Part 3A provisions.

A totally new planning procedure is required, one that incorporates local government into the planning process while ensuring that the necessary level of technical expertise is available and that the State government-CSG company biased and inadequate environmental assessments do not continue.

The Planning Assessment Commission has shown that it is incapable of consistently producing skilled, impartial assessments, yet the creation of a genuinely impartial and informed body offers great potential. However, a more clearly defined legislative and administrative structure is necessary if this is to be achieved.

One further problematic area under present planning procedure is that CSG development unreasonably impacts on local government councils to plan for the orderly development of their areas. Gloucester's CSG project is situated on the townships doorstep and almost surrounds the township. Gloucester Shire Council, its residents and its industries are tied in regard to the orderly planning for the area's growth.

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3. THE ROLE OF CSG IN MEETING THE FUTURE ENERGY NEEDS OF NSW INCLUDING THE THE NATURE AND EXTENT OF CSG DEMAND AND SUPPLY
(This is a most complex issue that requires research, further development and clarification of already existing contradictory data.)

The nature and extent of CSG demand and supply cannot be fully assessed while critical issues remain disputed. Whatever level of demand is currently being claimed could be substantially reduced when details of the overall environmental impact, including greenhouse effect, are fully accepted.

However, leaving that to one side for the time being, there is much uncertainty as to how much of the CSG will be for local consumption and how much will be for export. Information provided by the Australian Industry Group (accessed online) is that most of the gas is for export. This produces a sad result for the people of New South Wales – we suffer the environmental health and social damage of the mining process while the benefits go to the CSG companies and overseas users.

The critical issue that arises is that CSG is NOT the ideal alternative energy source to be used as a transitional fuel until other renewable, environmentally safe sources are developed. The use of CSG will delay the proper development of alternative sources. The appropriate action is to immediately fund technological-economic development of renewable energy sources and restrict CSG development to the absolute minimum consistent with that goal.

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4. THE INTERACTION OF THE ACT WITH OTHER LEGISLATION AND REGULATIONS
This is a substantial section that requires full and lengthy consideration. It is unclear from the Inquiry terms of reference as to what is envisaged under this heading. Is the enquiry to be far reaching and include, among others, the *Petroleum (Onshore) Act 1991*, the *Environmental Planning and Assessment Act 1979* and the *Land Acquisition (Just Terms Compensation) Act 1991*? Is the interaction of these statutes with other legislation such as the *Water Management Act 2000*, the *National Parks and Wildlife Act 1974* and the *Heritage Act 1977* to be considered?

As such, the Alliance considers that this should be a separate submission with its own terms of reference and extended submission time. The Alliance notes that problems exist in all of the above areas and in particular note:

- the inequities in regard to property entry and exploration practices (among other matters) under the *Petroleum (Onshore Act) Act 1991;*
- the lack of adequate environmental control over the exploration process;
- the excessive project development powers given to the Minister for Planning in the Part 3A provisions of the *Environmental Planning and Assessment Act 1979* ;
- the deficient and at times misleading environmental assessments that have become the normal procedure under Part 3A of the *Environmental Planning and Assessment Act 1979* because of the lack of assessment provisions provided by that statue;

- the manner in which the Part 3A provisions of the *Environmental Planning and Assessment Act 1979* restrict or turn off eleven important environmental statutes, including *Water Management Act 2000*, the *National Parks and Wildlife Act 1974* and the *Heritage Act 1977*.

- the lack of merits appeals in regard to approval given by the Planning Assessment Commission because they are supposedly an independent body;

- the lack of expertise displayed by the Planning Assessment Commission generally and its lack of independence from the Minister;

- the inadequate compensation provisions of the *Land Acquisition (Just Terms Compensation) Act 1991* that fail to take into consideration the full impact and injustice of mining projects on land holders.

The entire legislative process relating to mine exploration and development is among the most inadequate and unjust found anywhere in Australia, perhaps even in the western world. Such an issue cannot be addressed by a mere, ill defined and inadequate subsection in a document of this size and scope. A complete and thorough review of all aspects of this legislation is essential.

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5. THE IMPACT SIMILAR INDUSTRIES HAVE HAD IN OTHER JURISDICTIONS

The coal seam gas and shale gas industries are causing much concern around the world. France, the UK, South Africa, the USA and Canada have all imposed partial or complete bans in certain regions and in relation to hydraulic fracturing. The US Environmental Protection Agency is funding a large study on the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources.

We have been made aware of the lack of transparency, even deceit and dishonesty being perpetrated by gas mining companies and have been made aware of the damage being experienced in the US by the film *Gaslands*.

We offer brief extraction from a document prepared by United Myall Residents Against Gas Extraction as expressing concerns consistent with our own.

> *The behaviour of large multi-national mining and petroleum companies has not engendered trust in their actions. They are seldom up-front with their knowledge, information and financial dealings and there is a long history of environmental damage in areas where supposedly, there were sufficient protections in the rules of operation to prevent such damage. The Exxon Valdez, the Gulf of Mexico oil catastrophe and the Montara Wellhead in Western Australia are all examples of disasters where theoretically there was a set of rules to prevent such occurrences.*
>
> *Dr. Sylvia Earle, one of the world's foremost marine experts and an authority on marine life in the Gulf of Mexico, stated in her testimony to the US House of Representatives Inquiry into the impacts of the Gulf of Mexico oil spill that "while yielding to the pressure to extract golden eggs from the golden Gulf, we have failed to take care of the Gulf itself".*

The Alliance expresses its deepest concern regarding the gas extraction process, the behaviour of the companies involved and the damage that has occurred in Australia and overseas both in the gas extraction industry and in other similar industries. There is ample evidence that serious and irreversible damage is occurring and will continue to occur. There is mounting evidence that disasters of the scale of the Gulf of Mexico oil disaster will beset the industry. We cannot allow the coal seam gas industry to continue along its present path.

……

The health factor:

Ignored by industry, overlooked by government

Failure to prevent pollution and protect human health is creating a costly legacy for Australia.

Doctors for the Environment Australia argues that proper health impact assessments and national oversight are crucial and long overdue.

DEA Doctors for the Environment Australia
www.dea.org.au

Acknowledgements

This report from Doctors for the Environment Australia was prepared with the expert assistance of many members of the organisation and with the help of others such as environmental lawyers. We would like to acknowledge the input of Professor Tony McMichael AO, Emeritus Professor of Population Health, Australian National University. and the assistance of staff from the World Health Organisation Collaborating Centre for Environmental Health Impact Assessment in the School of Public Health at Curtin University.

For further information on Health Impact Assessment and input into developments, policies or plans, contact Curtin University.
W: http://ehia.curtin.edu.au
Director, Professor Jeff Spickett
Email: J.Spickett@curtin.edu.au
Dianne Katscherian, Adjunct Senior Research Fellow
Email: Dianne.Katscherian@curtin.edu.au

Doctors for the Environment Australia is an independent, self-funded, non-government organisation of medical doctors in all Australian States and Territories. Our members work to prevent and address the diseases – local, national and global – caused by damage to our natural environment. We are a public health voice in the sphere of environmental health with a primary focus on climate change and the health harms from pollution.

Doctors for the Environment Australia

67 Payneham Road COLLEGE PARK SA 5069

M:0422 974857 E: admin@dea.org.au W:www.dea.org.au

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Summary & recommendations

Australians are suffering ill health and Australia is incurring economic loss because of grossly inadequate assessment and management of the health harms caused by resource and other major developments.

The rapid expansion of the coal and unconventional gas industries has not only created widespread community concern over health and environmental issues but it has exposed the inadequate processes whereby governments impose developments which in their view are in the interest of economic development.

Each project is subject to an environmental impact assessment (EIA) by the States. As part of this process, there is an expectation that the health effects on workers and communities will be effectively assessed. The process is called Health Impact Assessment (HIA) and if conducted properly according to guidelines it has the confidence of the medical profession.

"Australians are suffering ill health ... because of grossly inadequate assessment and management"

However, the application of health impact processes under the jurisdictions of many states is confusing, inefficient, uneconomic and often rudimentary – and the health of communities has not been adequately protected.

Current moves to cut 'green tape' at the instigation of developers will render present health assessments even more inadequate and must be resisted unless health assessments are protected and improved.

The Federal Government has tacitly accepted that state assessments are inadequate by establishing the Independent Expert Scientific Committee (IESC) to improve the collective scientific understanding of the water-related impacts of coal seam gas and large coal mining developments through a transparent process.

In the interests of human health, Australia must take a national approach to assessing the health impacts of resource and other heavy industries.

There are two alternatives for reform:

1. The establishment of a national EPA along the lines of the USEPA
2. The establishment of a body charged with oversight of States' environmental and health impact assessments for resource and other industry projects.

Both solutions are likely to be resisted by States, Federal Government and vested interests but we maintain that human health and well being must have prime consideration.

Introduction

This document describes damning situations where State and Federal Governments have overlooked or ignored dangerous practices. It highlights the deficiencies of large-scale mining and resource development with emphasis on activities of most concern to communities; coal and unconventional gas.

Large projects require an environmental impact assessment (EIA) before they are given State Government approval. The EIA should review all possible effects on the environment locally and regionally. Historically this assessment is the role of the proponent and the state.

Projects that have an environmental impact also pose a human health risk because the two are inextricably linked. In Australia, the HIA has become part of the EIA process (Appendix 3) though it can be independent elsewhere. Different states have different laws and processes to manage the EIA. For example, each state treats the assessment of coal and coal seam gas mining projects differently yet some of the most major potential risks are common to all and the health impacts from exposure to polluting industries are well documented in scientific literature. What the States have in common is inadequate consideration of environmental and health issues and a lack of transparency.

The community and nation as a whole incur increased costs for healthcare, yet the health costs are not included in the cost of the products, namely coal and gas. Indeed the coal industry has little value if health costs are taken into account. See *How Coal Burns Australia*, DEA.[1]

Doctors for the Environment Australia (DEA) argues for health to be considered properly and uniformly as part of approval processes and examines practical areas for reform.

The impacts of a development must be seen in the context of national and international health. These important links are explained in Appendix 1: The need to protect public health.

DEA maintains that the prevention of harm is the basis of public health. Prevention is based on careful scientific assessment of possible hazards, their risks and methods of prevention. Clean air, clean water and nutritious, uncontaminated food are all crucial contributors to public health. Healthy ecosystems are the life support systems for humanity. Both land and marine ecosystems are being progressively compromised by global environmental changes and human activity, which pose major and increasing threats to sustainability, population health and ultimately survival.

Development can have many benefits for society but it may also have unmeasured adverse effects. An EIA is intended to be a comprehensive review of all possible effects on the environment. The assessment of risk to human health by a development is intimately linked to the EIA. It identifies problems of air, water and noise pollution, risks of injury to workers and communities and the effects on the physical and social aspects of community life.

The process of HIA is complex and is conducted by the states under optional guidelines issued by the Commonwealth. The decision about whether a HIA is required for a project is usually made by the same department that is dealing with the EIA.

1 www.dea.org.au/images/general/How_coal_burns_Aust._-_True_cost_of_burning_coal_04-13.pdf

The opinions of health officials or health experts are not necessarily sought before making this decision. Thereafter there is great variability on which health issues are assessed and how, and in the degree of public consultation and reporting. The HIA process for projects is described in Appendix 2: Tool for assessing health impacts.

By failing to consider the long–term health of the environment and communities, governments are allowing irresponsible industrial development.

"Projects that have an environmental impact also pose a human health risk because the two are inextricably linked."

Loy Yang coal mine covers 800 hectares in Victoria's Latrobe Valley. Copyright Rim Zrtkevicius/Environment Victoria

Failing human health

For most industrial developments, responsibility for approvals lies with the States. Standards differ from one State to another, however all States have certain failings in common. Failure to resource and empower environmental protection agencies is an easy way for state governments to permit projects to bypass strict regulations.

Many health assessments by the states are inadequate and some are dilatory. The public, many health professionals, governments and even Premiers do not properly understand approval processes. In 2012 statements made by the Queensland Premier clearly indicated that he did not understand his State's assessment process and its application to the Alpha Coal Mine.[1] The lack of understanding in this case shows how readily State Governments fail in their responsibilities to protect their communities' interests.

Many communities in Australia are suffering ill health as a result of pollution and in some cases lives are at risk.

Unconventional freedoms

In Australia, coal seam gas (CSG) and other unconventional gas projects are a relatively new and untested form of resource extraction. It is convenient for authorities to ignore potential health impacts of unconventional gas projects because they are long term. Health impacts might arise over decades due to exposure to carcinogenic or teratogenic substances in water, air, soil or food. The potential impacts are spread over wide geographical areas of rural lands and settlements.

There are potential health problems common to unconventional gas mining sites regardless of State borders. These risks were detailed by DEA in a submission[2] to the Senate in July 2011 and a submission[3] to the NSW parliament. These risks are;

- the contamination of aquifers used for human and stock consumption with harmful chemicals used in fracking or released from coal seams
- air pollution at the well heads with release of volatile organic compounds
- anxiety in affected communities and the disruption of local societies
- secondary health effects from the release of fugitive emissions into the atmosphere.

Despite the potential health impacts, each state is considering these potential impacts separately, and disparate methods of regulating are arising across the country. The relevant Acts, the power of each Environmental Protection Agency (EPA), the form and function of the EIA, its degree of independence, mechanisms to provide health advice, transparency, and government willingness to accept outcomes are all inconsistent between States. The strength of State standards for health impacts ranges from some degree of consideration to apparent total disregard.

In addition, EIA processes for all resource projects are bedevilled by conflicting responsibilities between different levels of government. See

1 www.theconversation.edu.au/federal-green-tape-myth-for-alpha-mine-7499

2 www.dea.org.au/images/uploads/submissions/MDB_CSG_Senate_submission_June_2011.pdf

3 www.parliament.nsw.gov.au/prod/parlment/committee.nsf/0/f96d076732225603ca25791b00102098/$FILE/Submission%200412.pdf

The scrambled Egg of Government, The Conversation.[4]

The single-mindedness with which states seek to retain independent systems represents more than the usual Commonwealth/States brawl over responsibilities.

State governments avoid their responsibilities by;

- poorly resourcing state EPA
- transferring or absorbing environmental protection into other, often less appropriate departments
- selecting weak terms of reference for EIA
- removing decisions from the aegis of the EPA
- allowing the proponent, who is generally required to prepare the EIS, to use consultants who do not necessarily prepare a report independent of the requirements of the proponent
- withholding health advice from public scrutiny and using 'gag orders' for interaction with outside experts. See *Censoring Public Health in Queensland,* The Conversation[5]
- altering the decision making process to favour the development
- Creating legislation to reverse outcomes that don't please the State Government. For example, recent changes to favour development in Queensland and New South Wales with the Planning Assessment Commission. See *Premier Newman's coal-ition government,* The Conversation.[6]

Regulation & research lag

Industry has invested billions of dollars into development of unconventional gas resources without adequate research — and state governments have given approvals without adequate regulation.

A review[7] of these inadequacies indicates lessons were not learned from the long-standing US industry failings where baseline studies on aquifer water and air quality have not been done before CSG mining development. The National Industrial Chemicals Notification and Assessment Scheme simply failed to assess fracking chemicals. Industry has refused on many occasions to disclose what chemicals are actually used in fracking and has circulated information inaccurately suggesting the procedure uses only benign substances.

Unconventional gas mining is already operating in Queensland and in NSW and the lack of regulatory control is apparent.

Known harms of coal

Compared to unconventional gas, coal developments pose even more immediate health problems. Even with a well-established body of knowledge about the health effects of coal, such as cardio-respiratory illnesses and reduction in life expectancy,[8]

4 www.theconversation.edu.au/australias-scrambled-egg-of-government-who-has-the-environmental-power-9582

5 www.theconversation.edu.au/censoring-public-health-in-queensland-a-dangerous-precedent-9733?utm_medium=email&utm_campaign=Latest+from+The+Conversation+for+26+September+2012&utm_content=Latest+from+The+Conversation+for+26+September+2012+CID_b45f3a63a39ff7f81ac12a2c1c23f83c&utm_source=campaign_monitor&utm_term=says%20Mike%20Daube

6 www.climatespectator.com.au/commentary/premier-newmans-coal-ition-government?utm_source=Climate+Spectator+daily&utm_medium=email&utm_campaign=Climate+Spectator+daily&utmsource=Climate+Spectator&utm_campaign=cc68119be3-CSPEC_DAILY&utm_medium=email

7 www.theconversation.edu.au/dealing-with-the-health-risks-of-unconventional-gas-10987

8 www.dea.org.au/images/general/Briefing_

we have failed to heed the lessons. Governments cut corners to get new coal mines and fail to monitor existing mines.

Coal particles from a patch of roof washed approx half a kilometre from coal train line. Queensland

QLD: Fast tracking approvals

In Queensland, a Right to Information investigation in February 2012 revealed that assessments of gas projects with investments of billions of dollars had been truncated on government demand. One public servant was given three days to draft hundreds of conditions. Public servants had not been given information on the location of gas wells. Without such basic information, assessment of the risks to health and environments are impossible. See Courier Mail articles; *Public servants tasked with approving massive CSG projects were blindsided by demands to approve two in two weeks*[9] and Coal seam gas company threatened to walk away from $16 billion project if approval not granted quickly.[10]

In response to widespread community concern the Queensland Government declared "Urban Restricted Areas", or buffer zones of two kilometres around 163 of Queensland's cities and towns within which mining and petroleum activities will be restricted.[11] This is policy on the run.

> "In the gas fields of Tara, the inhabitants have suffered ... headaches,rashes, nausea and vomiting, nose bleeds and eye and throat irritation"

In the gas fields of Tara, the inhabitants have suffered illness similar to that being investigated by the USEPA. These are headaches, rashes, nausea and vomiting, nose bleeds and eye and throat irritation. See *Air pollution from coal seam gas may put public health at risk,* The Conversation.[12]

The Queensland government health report concluded, "This investigation

paper_on_coal_2011.pdf

9 www.couriermail.com.au/news/public-servants-tasked-with-approving-to-massive-csg-projects-were-blindsided-by-demands-to-approve-two-in-two-weeks/story-e6freon6-1226574952587

10 www.couriermail.com.au/news/queensland/coal-seam-gas-company-threatened-to-walk-away-from-16-billion-project-if-approval-not-granted-quickly/story-e6freoof-1226576528166

11 http://mines.industry.qld.gov.au/mining/709.htm

12 www.theconversation.edu.au/air-pollution-from-coal-seam-gas-may-put-public-health-at-risk-10819

Farmer Tanya Plant and her daughters, one of whom suffers coughing fits that her doctor says may have "environmental" causes. The family's home is two km from New Hope's coal mine, Queensland. 2012 Picture: Jack Tran. Source: The Australian

by itself is unable to determine whether any of the health effects reported by the community are linked to exposure to Coal Seam Gas activities ... To better assess whether these reported symptoms could be related to exposure to CSG activities, comprehensive information on air, water and soil contaminants, as well as an evaluation of the level of noise currently experienced needs to be obtained."[13]

A major flaw in the investigation was the lack of comprehensive and appropriate independent environmental monitoring. Only now has there been a government recommendation: "That a strategic ambient air-monitoring program be established … to monitor overall CSG emissions and the exposure of local communities to those emissions." [14]

The short term economic benefits of unconventional gas development have been promoted to the community in government statements and information brochures by the Queensland government without consideration or disclosure of the potential long term costs of ill health caused by polluted aquifers and fugitive emissions.

DEA condemns the outrageous promotion of short-term benefits while concealing the possible longer-term costs.

NSW: Ignoring advice

The NSW Government has ignored the recommendations of its own Standing Committee; NSW Parliament Inquiry into Coal Seam Gas.[15] The committee recommended a moratorium on fracking but this was rejected.

13 www.health.qld.gov.au/publications/csg/

14 www.theconversation.com/we-need-to-do-our-homework-on-the-health-risks-of-coal-seam-gas-13173

15 www.parliament.nsw.gov.au/Prod/parlment/committee.nsf/0/318A94F2301A0B2FCA2579F1001419E5

In a courageous statement, NSW Health publicly called for health assessment of drilling that it had not been asked to consider; "A comprehensive assessment would be required to establish the full range of potential health risks, which may include risks associated with air pollution, ground and surface water contamination and noise. The information available does not allow a comprehensive assessment of potential risks to human health." Full CSG health check 'essential', SMH[16]

In response to this, the NSW government issued a ban on all CSG mining within two kilometres of residential areas across the state. The Premier said, "I'd like to be able to wind the clock back, I'd like to be able to stop the former government granting exploration licences and approving CSG activities in many parts of the state, but I can't do that." The Australian.[17]

Nonetheless, his government has also issued permissions. The Premier indicated the government would empower the EPAgency to regulate long-standing mining tenements and enforce licence conditions and as part of its remit, it will institute a review by the NSW Chief Scientist of all CSG related activities. See NSW Environment & Heritage.[18]

Meanwhile, monitoring of company compliance has been shown to be inadequate. A breach of environment protection to properly monitor emissions from a gas plant occurred over four years. Thereafter the NSW EPA is inappropriately considering a proposal to allow the company to avoid possible court proceedings and hefty fines. Read more in the Sydney Morning Herald article; AGL failed in its duty to properly monitor gas emissions.[19]

Cosy bedfellows

The situations in Queensland and New South Wales could be described as an unhealthy alliances of industry and government. Powerful lobby groups and experts such as hydro-geologists move between industry and government. Both parliaments have remained unconcerned about health impacts of this potentially highly-lucrative industry.

The close alignment between industry and state government is often at odds with the needs and desires of communities. The governments of these states prioritised their need for immediate revenue ahead of protecting the interests of people.

In March 2012, the regulatory systems unravelled to such a degree that public pressure forced the federal government to introduce an Amendment to the Environmental Protection Biodiversity Convservation (EPBC) Act; a proposed water trigger for large coal mining and coal seam gas projects. At the time of writing, the amendment is awaiting Senate approval. The amendment would bring better protection of water resources. See House of Representatives passes EPBC Bill, McCullough.[20]

16 www.smh.com.au/environment/full-csg-health-check-essential-20130117-2cwav.html

17 www.theaustralian.com.au/national-affairs/nsw-moves-to-limit-coal-seam-gas-plans/story-fn59niix-1226580786864

18 www.environment.nsw.gov.au/licensing/coalseamgas.htm

19 www.smh.com.au/environment/agl-failed-in-its-duty-to-properly-monitor-gas-emissions-20130331-2h1dy.html#ixzz2SwHeeHxl

20 www.mccullough.com.au/icms_docs/152599_House_of_Representatives_passes_EPBC_Bill_proposed_water_trigger_for_large_coal_mining_and_coal_seam_gas_projects.pdf

Failure at every stage

Approvals go through stages, (described in Appendix 2). Typically in Australia, projects fail to protect human health at *every* stage.

1. The decision whether or not to conduct HIA

This decision (called 'screening') is usually made by the same department that is responsible for the EIA. The opinions of health officials or experts are not necessarily sought before making this decision. This means the reliability of advice and level of expertise is variable and arbitrary. DEA argues that the health impacts of some developments have been ignored or dismissed at the screening stage despite recognition of health impacts for similar proposals in other state and national jurisdictions.

2. What health issues should be included in the assessment?

Scoping decisions requiring consultation with health departments and communities are often inadequately managed by the proponent with inadequate health sector input and lack of transparency. Furthermore, even if consultation occurs and raises issues that need further consideration, there is little potential for their consideration during the EIA process.

3. Assessment of risk to the community

At the assessment stage, appropriate input from the health sector is often omitted. A robust assessment of risk to a community should be required. Failure to even assess the risks means important questions about health go unanswered: Questions such as; Can risk be avoided or minimised? Are better alternatives available? How can benefits and risks be evaluated and compared? How can the cost and benefit, nature and magnitude be weighed up? Will predictions of future health consequences be robust enough to withstand legal and public scrutiny?

4. Reporting the findings

Reporting of outcomes of many HIAs and other assessments related to communities are often not made available to the public, so communities are seldom properly informed about how their interests are — or are not — being protected.

Because the EIS is seen as environmental, the health implications are not made clear to the public and they are rarely consulted about these in the early stages of the project. Without involvement of health expertise, the public is unlikely to have the implications explained to them or have access to specialised resources.

5. Monitoring for safety and health effects

The monitoring of the health impacts of operations is badly flawed. It is usually the responsibility of the proponent to fund pollution monitoring. This makes the monitoring less independent, and decreases public transparency. Also, proponents are not required to demonstrate compliance over the life of the proposal so deteriorating performance can go unchecked.

For example, in the case of approved CSG projects there is often the absence of any ongoing environmental assessment under either state or federal regulation. Once a CSG project is approved, the approval is enduring and the proponent is not required to undergo further environmental evaluation. Even if new scientific data emerges, the assessment cannot be

suspended on the basis of inadequate environmental data.[21]

6. Review

Government review of compliance is usually inadequate. Frequently it is carried out by non-health personnel and is often not explicitly judged against health exposure standards.

Furthermore, data from monitoring may be averaged over an extended period even though it is short-term fluctuations that can cause the greatest risks to health. Such fluctuations are typically not reported.

Existing developments escape scrutiny

As flawed as the EIA process is for new projects, oversight of existing projects is even worse. Existing industry is often excluded from EIA requirements, or considered on an ad hoc basis by State Governments. These governments generally do nothing because of short-term economic considerations, likely opposition and reluctance to incur the cost of inquiry.

When an EPA is involved it is constrained not only by agreements (for example, an agreement to allow pollution), but by a requirement to balance economic viability against public interest outcomes such as public health. This means environmental and health considerations are fundamentally compromised by economic argument

> "environmental and health considerations are fundamentally compromised"

and concerns the company towns might close. So the very body that is charged with protecting the environment is also inappropriately charged with protecting economic interests that may be at odds with the former.

21 www.theconversation.com/environmental-assessment-of-coal-seam-gas-lacks-scientific-back-up-13314

Flood water in tailing dams was discharged from Collinsville open pit coal mine resulting in thousands of tonnes of sediments and toxic sludge reaching the Great Barrier Reef 2011 © Dean Sewell. Greenpeace

Licensed to pollute: case studies

In this section we examine some examples of inadequate management and indicate how health is affected. These examples relate mainly to coal mining but examples from other industries will be used to illustrate selected points.

To provide a comprehensive review of failures would require an expansive report. This small selection of case studies reveals alarming cases of regulation assessment and failure. That these cases represent only a sample should alert Australia to the wide scale diminution of environmental protection.

"This small selection of case studies reveals alarming cases of regulation assessment and failure"

NSW Hunter valley: *Shutting down dissenting voices*

Debate about the long-standing pollution in the Hunter and the Newcastle regions was reignited by the EIA for an expanded coal export facility, the T4 project. This project would increase pollution in both regions by allowing expansion of coal mining and its transport through Newcastle and loading from the new terminal.

Analysis by DEA shows that the EIA has bias in favour of development in the poor selection of references and inappropriate use of data. DEA's health concerns are consistent with concerns expressed from within NSW Government Health. See submission by Hunter New England Local Health District.[1] This submission suggests the department's opinion had not been taken into account.

The NSW government restricted input from stakeholders and placed the decision in the hands of one arbiter within the Planning Commission to ensure approval. At time of this report, the T4 project is deferred.

Hunter Valley Protection Alliance 2013. Source: ABC

1 www.majorprojects.affinitylive.com/public/0f0afe81bc7476016c93022beafa5686/NSW%20Health%20(Hunter-New%20England%20Local%20Health%20Service).pdf

QLD Acland coal mine: *Expanding pollution*

The Acland open cut coal mine, stages one and two are in operation in Queensland. Since stage two became operative in 2006, local inhabitants have complained of severe dust pollution and have suffered a range of health problems. See Living in the dusty shadow of coal mining, The Australian.[1]

An EIA for stage three was completed in 2009. Analysis of the data prepared for stage three is inadequate and incomplete, but the data that *is* available shows air pollution above accepted standards. Despite this, mine expansion proposals continue.

The experience of DEA is detailed in an article[2] and a submission[3] by DEA on stage three where DEA contends that government and proponent have failed to protect community health, failed to properly consult with the community and failed to inadequately monitor air quality.

Despite air pollution above accepted standards, mine expansion proposals continue.

Blast clouds visible from house across the road from Acland mine, 2009

1 www.theaustralian.com.au/news/features/living-in-the-dusty-shadow-of-coal-mining/story-e6frg6z6-1226255705308

2 www.dea.org.au/news/article/dea_acland_correspondence

3 www.dea.org.au/images/uploads/submissions/New_Acland_Stage_3_Submission_02-13.pdf

QLD Galilee Basin: *Cumulative consequences*

Galilee coal mines will range from 20-60 million tonnes per annum (mtpa) and will be among the biggest in the world with initially a total of 198 mtpa of coal exports. (The largest open cut coal mine in the world is Black Thunder at 80 mtpa in Wyoming.)

The development of the Galilee Basin has health and environmental implications for the Basin, for the rail corridors that take coal to the coast, for the coastal waters, for the Great Barrier Reef and for the world climate. There is a cumulative impact from the mines on the health of community and workers.

In the Galilee Basin, like many regions of Australia, multiple coal and/or unconventional gas projects proceed successively, each undergoing an individual assessment process on the impact on water resources, air quality, social and health. However the cumulative impact of all these developments may have greater consequence than the sum of individual impacts. This cumulative impact may also have distant impacts. For example, extensive mining development in the Galilee Basin catchment, which drains to the east coast, may have impacts on coastal waters and the Great Barrier Reef.

Under the Queensland Government's system of assessment, cumulative impacts are excluded. This became apparent when DEA reviewed the Kevin's Corner assessment in 2011. DEA concluded, "Given that the EIS does not consider these cumulative impacts, it is incumbent on the Queensland and Federal Government to do so. A failure to do this will have significant long-term impacts on the health of many Queenslanders and on Queensland's treasured icon. These impacts will last well beyond the impact of the revenue from the mine". See DEA submission on Kevin's Corner.[1]

In December 2012, the terms of reference for the China Stone coal project (which will mine 60 mtpa) did

1 http://dea.org.au/resources/submissions/submission_on_the_environmental_impact_statement_kevins_corner_project

Aerial view of Hay Point coal terminal - One of several that export coal through the Great Barrier Reef. 2012
© Tom Jefferson, Greenpeace

not include assessment of cumulative impacts on health despite the fact that the Federal Minister and UNESCO raised the issue in the intervening period. See DEA submission on China Stone.[2]

The Galilee mines also have international health impacts through the increase in world greenhouse gas emissions they will cause. These Scope 3 emissions are not recorded. Commonwealth regulation needs to include Scope 3 emissions because climate change is now affecting Australia through extreme weather events. See DEA submission on Extreme Weather Events.[3]

2 www.dea.org.au/images/uploads/submissions/China_Stone_Submission_12-12.pdf

3 www.dea.org.au/images/uploads/submissions/Extreme_Weather_Events_Submission_01-13.pdf

VIC Anglesea: *Coal and children don't mix*

At Anglesea in Victoria, residents are facing the expansion of the open cut coal mine and ongoing pollution from an old coal-fired power plant on the outskirts of their town. The power station is only approximately a kilometre from the primary school, which was completed in 2011, and children are one of the groups most susceptible to the effects of air pollution. The open cut coal mine is approximately half a kilometre from residents' homes.

Children are one of the groups most susceptible to the effects of air pollution and this proximity to pollution is almost certain to affect children's health. The mine is approximately half a kilometre from residents' homes.

A 2008 Air Emission Study and Human Health Risk Assessment of the power station prepared for Alcoa Anglesea Australia was released to the public for the first time on 28 November 2012. See Alcoa Anglesea draft report.[1] It shows Anglesea residents are exposed to levels of sulphur dioxide at levels that could result in illness including asthma, bronchitis and other diseases. No information is available on other pollutants and the EPA does not operate any independent air quality monitoring there.

It is ironic that Victoria has legislation to prevent wind power development — which does not cause any air pollution — within two kilometres of people's homes, but the same perimeter does not apply to highly polluting fossil fuel sources.

The Anglesea community is asking that Alcoa invest in currently available technology to clean up their current operation and transition toward clean energy. It is also seeking a government-funded independent study into air quality to establish levels of pollutants in Anglesea. Such measures should not require lobbying by the community. They should done as a matter of course.

"this proximity to pollution is almost certain to affect children's health"

1 www.vicmps.greens.org.au/sites/greens.org.au/files/Air%20Emmission%20Study%20and%20Human%20Health%20Risk%20Assessment%20Alcoa%20Anglesea.pdf

VIC Latrobe Valley: *Failure to measure sulphur dioxide*

The Latrobe valley has five brown-coal-fired power stations and many coal mines. Almost half of all the sulphur dioxide emitted in Victoria is emitted in the Latrobe Valley.

Despite this, there is only one independent EPA air quality monitoring station in the area and it is not located correctly to pick up the impact of industry or power generation. Monitoring by electricity generators is required by the EPA and shows there are exceedances of the current sulphur dioxide standard. This data is not available to the public. Furthermore, this monitoring station does not monitor for particulates as small as $PM_{2.5}$ (ie. 2.5 parts per million), in spite of the high risk of this pollutant to health.

Evidence given by Dr Lynette Dennison, Principal Scientist, Air Quality EPA Victoria in October 2011 during a VCAT hearing discusses the issue of sulphur dioxide arising from coal combustion there.

Dr Dennison noted that studies on the health effects of sulphur dioxide in Australia mirror results of international studies. These effects are well documented and include mortality, respiratory conditions and child health. There is no safe level of exposure, particularly for sensitive groups.

The state standards for sulphur dioxide (AAQ SEPP) relate to the national air quality standards (AAQ NEPM) which were set 14 years ago. In recent years there have been extensive reviews of the health impacts of sulphur dioxide

Loy Yang power, Victoria. Copyright Rim Zrtkevicius/Environment Victoria

which has led to the World Health Organisation (WHO)[1] and the US EPA significantly tightening their standards, so they are now much more stringent than Australian state and federal standards. Furthermore, the emission standards relate to general air quality in urban areas - and not to non-urban areas closer to an emission source.

To our knowledge, despite the significant exposures to air pollution, there has been no recent federal or state commissioned research on the impacts on the health of the population in the Latrobe Valley, so it is highly likely this area has significant exposure to air pollutants at levels known to affect health. Inadequate state standards and monitoring, outdated federal standards and little research on the health impacts all contribute to this failure.

> "it is highly likely this area has significant exposure to air pollutants at levels known to affect health"

1 Air Quality Guidelines, WHO www.euro.who.int/__data/assets/pdf_file/0005/78638/E90038.pdf

SA Port Augusta power station: *Licence to pollute*

The Port Augusta coal-fired power stations are amongst the most polluting in Australia and the smoke stack for the southern station is three kilometres from the edge of the town of 15,000 inhabitants.

Under agreements, the operators were responsible for air monitoring in the town and the results were passed to the EPA for analysis. It was reported to government that the results over several years had not shown any exceedences of pollution standards. A reanalysis of this data by DEA experts contradicts this and reveals high peaks.

The regulatory processes at Port Augusta highlight that operators are granted licences to pollute and these can remain in operation for many years. It is inappropriate to delegate monitoring to the polluter unless the authorities deploy adequate resources to supervise.

Port Augusta became the source of power vital to the state, but in recent years it has continued operating at the expense of human health. The true cost of this power is not properly measured. See article Illness and Pollution at Port Augusta; Doctors Prescribe Solar Thermal Treatment.[1]

Port Augusta Power station

1 www.dea.org.au/news/article/illness_and_pollution_at_port_augusta_dea_speaks_at_the_parliament_of_south

SA Olympic Dam expansion: *Health impacts excluded*

This huge project necessitated an environmental impact statement (EIS) of 4,000 pages, many appendices and additional material. Its preparation required hundreds of participants paid by the consultant who was remunerated by the proponent.

DEA made a submission[1] to the EIS and detailed several health concerns. A review of the entire document within given time (14 weeks) by independent expert assessment is virtually impossible. Indeed, the EIS had many potential health impacts, which were described by DEA and others and which were not adequately assessed. Consideration of these health impacts was then excluded by parliamentary procedures. Furthermore, as with many other EIA throughout Australia, conclusions on health issues were not made public.

Despite approval, initiation of the project was deferred by the proponent on financial grounds. The proponent then came forward with a proposed major change in technology (acid heap leaching) which raises new concerns, yet this was not subjected to further EIA.

It should be pointed out that in South Australia – whatever the findings of EIA and any HIA that accompanied it – there is legislation that ensures certainty of major development under

Section 48e of the Development Act.

> "Consideration of these health impacts was then excluded by parliamentary procedures."

1 www.dea.org.au/images/uploads/submissions/Olympic_Dam_Submission_DEA_11-11.pdf

SA Port Pirie: *lead smelter dispenses with EPA surveillance*

Over the years many of the children of this town have suffered excessive blood lead levels due to pollution from the town's lead smelter. In effect, this one-industry town lives with the trade off between survival of its only industry and illness.

In a recent reappraisal of the process by the operator Nyrstar and by the State Government the surveillance by the EPA has been dispensed with. An initiative from Health SA, the EPA, the Port Pirie Regional Council and Nyrstar set a goal of at least 95 per cent of 0-4 year-old children to have blood lead levels below the WHO standard of 10 micrograms per deciliter by the end of 2010. The goal was not attained. It has been superceded by a "Ten for them" initiative which does not have EPA or Health SA involvement. The Premier announced, "The Government will provide regulatory certainty via legislation that will prevent key terms of Nyrstar's licence with respect to lead emissions being amended without Ministerial consent," thereby guaranteeing an ongoing licence to pollute.

WA Esperance: *Looking the other way on lead pollution*

It took birds falling from the sky with lead poisoning to bring action at Esperance. In concluding the Parliamentary Inquiry, the Education and Health Committee said:

"The Committee has identified major failings in DEC's (Department of Environment and Conservation) industry regulation function and shortcomings in other regulatory agencies ... The Committee believes that these regulatory failures, combined with the irresponsible and possibly unlawful conduct of the Esperance Port Authority, Magellan Metals Pty Ltd, and BIS Industrial Logistics, exposed workers and the community to unacceptable and avoidable health and environmental risks."

See Inquiry into the Cause and Extent of Lead Pollution in the Esperance Area[1]

One of the recommendations of the inquiry was the increased emphasis on HIA and the provision of funding to employ more staff. This funding was short-lived and unsurprisingly, more failures followed.

"It took birds falling from the sky with lead poisoning to bring action at Esperance"

"Time to rethink blood lead goals to reduce risk to children's health" The Conversation, November 2012

1 www.parliament.wa.gov.au/parliament/commit.nsf/(WebInquiries)/28F900665F5C386048257831003E970C?opendocument

The price of systemic failures

As we have described, deficiencies in health assessments result from the poorly designed and executed environmental assessments at the State level. Worse than that, health assessments can be avoided altogether, and health departments are simply excluded, potentially putting health and lives at risk. There are many consequences of such systemic failures. Social impacts, true economic impacts and greenhouse gas emissions are three consequences that need proper consideration in EIA.

Social impacts

In many resource projects the creation of jobs is detailed as an economic positive, but fly-in, fly-out labour for mines is recognised as detrimental to health of workers and communities. See Corporate Risk and Insurance[1] and *Mining, fly-in, fly-out workers and the risk of suicide*, The conversation[2] and may not be a positive when all the short and long term social and economic assessments are made.

Communities can be affected in a range of ways that are seldom explored before a project is approved. Some groups within communities can be more vulnerable than others to the effects of a project development. Community exposure to pollution, proximity to the project, rental prices, access to and cost of services can all be stressors and should be assessed. Site remediation seldom puts things right and communities are often left with the legacy once the natural resources are exhausted.

Yet, the socio-economic risks and benefits are seldom included in formal EIS. Exclusion of the broader impacts of a development can have significant consequences, as recognised by the Australasian Centre for Rural and Remote Mental Health[3]. DEA has provided examples in coal seam gas development. See DEA submission to NSW Parliament[4]

1 www.riskmanagementmagazine.com.au/article/fifo-woes-the-risks-of-flyin-flyout-workforces-128950.aspx

2 www.theconversation.com/mining-fly-in-fly-out-workers-and-the-risk-of-suicide-9998?

3 "*This place is doing my head in*,"http://acrrmh.com.au/assets/Uploads/This-Place-...-Brochure.pdf

4 www.parliament.nsw.gov.au/prod/parlment/committee.nsf/0/f96d076732225603ca25791b00102098/$FILE/Submission%200412.pdf

One of 70 farms abandoned in Acland Queensland since the mine started operating

Consultations with communities are often used as a means to promote a development rather than forming an integral requirement for approval and adapting the project to address community concerns. Communities need to know the true significance of a project not just the revenue and jobs it creates.

Measuring true economic impacts

The case should be made for the economic viability of each project taking into account all health, environmental and social costs. The health and social costs encompass all aspects of community health, including social and mental health aspects and social disruption. The trade off between positive and negative impacts should be assessed through a cost benefit analysis.

In practice, it is common for mining companies to list and overstate the expected revenue for a project together with the number of jobs created and the revenue to local communities - and downplay or ignore economic impacts on the environment, public health, native vegetation and existing industries. See Economic Assessment, NCCNSW.[5]

Indeed, a true and complete economic impact assessment is rare. These studies must be undertaken by independently appointed consultants, because state governments tend to act with bias towards industry.

Greenhouse gas emissions

The emissions from burning coal and gas add to climate change, which WHO regards as one of the biggest health issues of this century. Emissions overseas resulting from fossil fuels produced in Australia (Scope 3 emissions) are not accounted by Australia and are not considered in the EIA process.

They should now be included because the effects of greenhouse gas emissions have measurable economic and health impacts in Australia for example through extreme weather events.

Many in the Australian community are concerned about harm caused to other countries from our fossil fuels. Measuring Scope 3 emissions will show a doubling or trebling of Australia's contribution to global greenhouse gases in the coming decade.

The Asia-Pacific Region was listed as important in the early stages of global discussions on accounting for Scope 3 emissions but this conversation has diminished to a whisper.

"The case should be made for the economic viability of each project taking into account all health, environmental and social costs."

5 www.nccnsw.org.au/sites/default/files/Economic%20assessment%20of%20environmentally%20damaging%20mining%20and%20gas%20developments%20in%20NSW%20-%20EAL%20and%20TAI%20%28April%202013%29-.pdf

The case for urgent reform

Australians are suffering ill health and Australia is incurring economic loss because of grossly inadequate assessment and management of the health harms caused by resource and other major developments.

The division of powers between states and Commonwealth paralyses reform on so many issues of national importance; education, hospital services, Murray Darling river system, environmental and infrastructure issues. However, such difficulties are no excuse to avoid reform, particularly when lives are at stake. And they are!

There is a well-researched and internationally accepted protocol for the assessment of health impact of developments (health impact assessment or HIA). When functioning independently and with adequate resources, a HIA process can provide appropriate consideration of both positive and negative health issues arising from developments and highlights equity, sustainability and community engagement. This balance must be assessed during the planning phase and before projects proceed.

Health professionals have been advocating for appropriate use of HIA for two decades. In 2001, the Federal Government released guidelines to promote the merit of HIA and guide project proponents on an appropriate process. See Appendix 2. On many occasions, the States assiduously avoid implementing it. The guidelines languish with no revision and without being reflected in federal or state legislation. See Appendix 3.

There is an economic cost to not having an effective and robust HIA process. The paper by Epstein et al from Harvard that shows that if the health and environmental costs of coal mining in USA were included in the price of coal, then the cost of electricity would more than double. See Full cost accounting for the life cycle of coal, NY Academy of Sciences.[1]

Most importantly the long term health costs of a development need to be assessed in the HIA so they can be included as part of the economic assessment of the project. Then decision makers won't be granting approvals without knowing the facts.

This principle should be applied particularly to energy costs and coal developments. See Coal's hidden costs make solar a bargain, Climate Spectator.[2]

Persistent refusal of governments to accept full cost accounting in energy choices that have the potential to impact human health must be overcome. DEA drew attention to this in a submission to the Draft Energy White paper in March 2012. See

> "There is a well-researched and internationally accepted protocol for the assessment of health impact of developments"

DEA submission on the Draft Energy White Paper.[3] The Energy White paper issued in November 2012 again fails to address the matter.

1 www.onlinelibrary.wiley.com/doi/10.1111/j.1749-6632.2010.05890.x/full

2 climatespectator.com.au/commentary/coals-hidden-costs-make-solar-bargain?utm_source=Climate%2BSpectator%2Bdaily&utm_medium=email&utm_campaign=Climate%2BSpectator%2Bdaily&utm_source=Climate+Spectator&utm_campaign=7e3008ce07-CSPEC_DAILY&utm_medium=email

3 www.dea.org.au/images/uploads/submissions/Draft_Energy_White_Paper.pdf

Much to be gained

A robust HIA process would have many advantages. First and foremost, it is a form of preventative health. Preventing harm is cost effective and saves suffering. There are additional advantages to business, to regulators and to the wider community.

Advantages for business

A one-stop shop for environmental and health science management relating to industry wherever it is would be an advantage to business. Proponents would be able to work with one authority. The facts will be available for scrutiny and business need not risk its reputation by making unwise and incorrect statements about the safety of processes. A thorough HIA provides reassurance to industry that risks from their activities are fully accounted.

> "A one-stop shop for environmental and health science management relating to industry wherever it is"

In partnership with government and community, there can be a collective endeavour to avoid future calamities — like the legacy of asbestos the country is dealing with now. By adopting a participatory, transparent and consultative approach to proposal development industry can earn its social licence to operate.

Advantages for regulators

A single independent body for EIA and HIA will allow presently interspersed medical experts to be brought together. Their expertise can be applied free from the conflict of interest present in serving the interests of some state governments.

The HIA system operating under such a body would help decision-makers make choices about alternatives and improvements to prevent disease/injury and to actively promote health. See Health Impact Assessments, WHO.[4]

The body would enable the following:

- Explicit and transparent understanding and consideration of the issues
- People most likely to be affected by implementation of the proposal have opportunities to engage with the process and participate in decision-making
- Vulnerable groups are given explicit recognition
- Improved collaboration across sectors and with communities
- Potential to influence outcomes and health can be embedded in current and future decision-making for the proposals.

Advantages for communities

The community must have a process in which they can have confidence. The present conflict of government plus industry versus the community in areas subject to CSG development shows how little confidence the community has in current State processes.

Communities and government would benefit from transparency and predictability of the HIA process if it is conducted independently and run by experts. They can have reassurance that appropriate governance is being used to ensure that new activities will minimise harm and, where possible, will result in better outcomes for their health and well-being.

4 www.who.int/hia/en/

Role of the Commonwealth

Historically the States have had responsibility for environmental matters. Presently, the Commonwealth Government administers the EPBC Act on behalf of Australia and this receives about 400 referrals each year, usually of major projects. See *The scrambled Egg of Government*, The Conversation.[5]

The Commonwealth has used this Act to have input into the health aspects of water management and more recently it responded to widespread public concern over potential water contamination from coal seam gas mining by establishing the Independent Expert Scientific Committee on Coal Seam Gas and Coal which can offer advice which the states are at liberty to follow if they wish.

In general however the Commonwealth has been reluctant to accept any responsibility for the health impacts that accompany environmental protection. Commonwealth/State negotiations over 20 years have seen a gradual withdrawal of Commonwealth interest (See Appendix 3) and a downgrading of input from the Department of Health and Ageing. Recently, the Commonwealth has moved to divest its remaining authority under the COAG proposal to reduce green tape initiative. See *Cutting 'green tape' won't make a more prosperous Australia,* The Conversation.[6]

As part of this move, the Productivity Commission has been asked to examine the regulatory objectives and key features of Australia's major project development assessment processes at all levels of government, including the interactions between levels of government, the role of facilitation, the capacities and resources of the institutions involved and significant variations between jurisdiction.

See PC probe into impact of assessment processes on major projects.[7] where the objectives make no mention of health.

If this rationalisation takes place it will offer even more licence for the states to ignore health impacts on the grounds they may impede progress. This is the background of nihilism and laissez faire on health that must be addressed by reform.

"It is in the interest of governments and community that Health Impact Assessment be conducted promptly by the Commonwealth."

5 www.theconversation.edu.au/australias-scrambled-egg-of-government-who-has-the-environmental-power-9582

6 www.theconversation.com/cutting-green-tape-wont-make-a-more-prosperous-australia-11112

7 www.lgnews.com.au/pc-probe-impact-assessment-processes-major-projects/#.UMp1x2ckr8k

The Australian Constitution

If it so wishes the Commonwealth Government has wide powers to make laws to protect the environment.

The Commonwealth's heads of power cover matters such as taxation, corporations and external affairs.

DEA took advice from a constitutional lawyer on the applicability of the Corporations Act to regulation of the CSG industry. This opinion is included in the DEA submission on Murray-Darling Basin Plan[1] to the Senate Enquiry.

Applicability of the Corporations Act to regulation of the CSG industry:

"It is in the interest of governments and community that Health Impact Assessment be conducted promptly by the Commonwealth. The use of legislation to do this must be considered – we understand that such legislation could regulate the activities of trading, financial or foreign corporations (as well as any other persons engaged in interstate or international trade). This would be a valid approach, given the High Court's 2006 Work Choices decision. The HIA process would be established for one or more industries (which might be specified in the legislation itself, or could be prescribed later by regulation), prohibiting corporations from being involved in development projects in that industry without a positive HIA".

1 www.dea.org.au/images/general/Murray_Darling_Submission_04-12.pdf

Whilst constitutional change is the most certain way of delivering reform, it is almost impossible to achieve. However in the view of constitutional lawyer Professor George Williams in his Parkes Oration 2012 the constitution does allow the Commonwealth to address complex issues such as those pertaining to the Murray Darling Basin and we believe this applies also to ther complex developments.

"On the surface, Australia's 111 year-old Constitution would seem to have little to do with current questions of public policy such as how to fix the Murray Darling Basin, or matters of social justice such the human rights of asylum seekers or how to provide everyone in the community with access to first-rate schools and hospitals.

In fact, the Constitution has everything to do with these things. We must simply look deeper, often beyond the dry words on the page, to understand how fundamentally the Constitution continues to shape the nation and our capacity to realise our collective goals.

Among other things, the Constitution:

- establishes lines of power in our society (such as who can do what to whom);
- establishes relationships and the legitimacy of people and organisations; and
- provides recognition of groups and national aspirations.

In these ways, as Parkes would have anticipated, the Constitution has a profound, ongoing impact on the nation and community well-being. This is rarely noticed."[1]

1 The Henry Parkes Oration 2012 Mission impossible?: Achieving social justice through constitutional change www.parkesfoundation.org.au/HPoration2012.pdf

Inescapable conclusions

DEA has argued that current regimes are failing Australians badly. In their zeal for economic growth and revenue, State Governments approve project development with scant regard for human health. They have a conflict of interest between budget bottom line and the health of their citizens. Health departments are poorly resourced and there is a lack of a consistency in approach and application of HIA across Australia leaving some communities less protected than others. Decision-making is not always transparent, proponents are not required to be accountable for impacts on communities and formalised appeals processes are not available.

Doctors are seeing long term, short term and cumulative health effects resulting from exposure to environments damaged by industry in a climate of indifference by governments. DEA is on the front line of exposing the causes of these health and social problems. Developments that proceed with little regard to the environment or the health impact resulting from damage to the air, water or soil should have no place in Australia.

The dangerous recent trend to bypass 'green tape' should alarm any thinking person. It fails to recognise that the identification of health risks to the community are tied into the environmental assessment that industry complains about. Continuing the current regime has an unacceptable cost to the environment and to human health.

There is an urgent need for governments to reverse this trend and take greater control over projects that have an impact on the environment, air, water or soil. Independent medical input and Commonwealth oversight of industrial developments should be integral. It is important that the Commonwealth retains and uses its environmental powers under the EPBC Act. Health and environmental issues are indivisible. See the DEA submission to EPBC Act[1]

In a nation of 24 million people, it would be logical, economic and efficient to have one national health assessment system with full-time health expertise overseeing this process: One efficient, well-resourced, independent health assessment process. Not eight State systems, which provide eight different, often flawed solutions to the same problem.

The road to achieving an effective and robust assessment process for project approvals will require vision and commitment from policy makers. Having the facts on the table for all stakeholders is a good start.

It is important the public knows how projects may come to their communities at a high price for their health, lives and longevity - and that are ultimately very expensive. To continue allowing the States and industry to sacrifice health in the name

> "The dangerous recent trend to bypass 'green tape' should alarm any thinking person."

1 http://dea.org.au/resources/submissions/the-proposed-amendments-to-the-epbc-act-are-a-health-issue

of short term economic growth is inexcusable.

Failure to reform will result in an increasing health burden, reduced life expectancy, increasing healthcare costs, which will ultimately cost the economy much more than the Government cares to recognise. The current failure to even measure the externalities of projects veils the alarming truth.

Future generations will be dealing with the legacy unfolding now. No one will be able to claim 'we didn't know any better at the time.' The spectre of asbestos should always be before us.

History will not look kindly on the Federal and State Government failures to protect human health. The evidence is in. Failure to act on the evidence is inexcusable failure on a grand scale.

"History will not look kindly on the Federal and State Government failures to protect human health."

Communities around Australia have galvanised in attempts to prevent under-regulated coal and CSG projects from polluting their areas. Photo courtesy of Lock the Gate Alliance.

Solution: A national approach

Australia should take a national approach to assessing the health impacts of resource and other heavy industries. Environmental and human health protection should be an integral part of assessing projects that impact on natural resources, human health, economic growth, energy, transportation, agriculture, industry, and international trade.

Strict air pollution standards, greenhouse gas emission standards, regulating fracking processes and chemicals should all be in the remit of a national body. Social impacts, true and fully costed economic impacts and greenhouse gas emissions are three areas not currently considered properly by States that need to be governed at a national level.

International standards should be adopted; for example WHO standards on air quality.[1] and the Golden Rules for an Age of Gas from the International Energy Agency.[2]

National oversight should include;

- Expert advice from health professionals to determine whether proposals require HIA
- Screening that is independent in the same way that the Office of the Commonwealth Director of Public Prosecutions (CDPP) or State DPPs are independent services
- Expert advice from health professionals to inform the terms of reference for HIA
- HIA of existing projects that plan to expand or have a change of use
- Findings and recommendations of HIA health impacts with specific measures to remove or mitigate negative and enhance positive health impacts
- Total costs of projects including externalities such as healthcare and environmental degradation
- Costing of greenhouse gas emissions that occur overseas from Australian resources (ie. Scope 3 emissions)
- Transparent decision-making
- A formalised appeals process
- Ongoing monitoring funded by the proponent
- Proponents held accountable for impacts on communities.

The most effective way to achieve this national oversight would be to establish a national body with responsibility for projects across the country. If this is unachievable, the Commonwealth should establish a framework under which the States must assess human health impacts.

"establish a national body with responsibility for projects across the country"

1 www.euro.who.int/__data/assets/pdf_file/0005/78638/E90038.pdf

2 www.worldenergyoutlook.org/media/weowebsite/2012/goldenrules/weo2012_goldenrulesreport.pdf

Option 1: A national environmental protection agency

The Commonwealth Government should establish a body charged with oversight of environmental and health impact assessments by resource and other industry projects. This approach could be an extension of current Commonwealth powers under the EPBC Act. USA offers a suitable model for a national EPA.

The USA model

The United States Environmental Protection Authority (USEPA) is a good model. Australia should look to the example of the US where a national EPA imposes minimum standards on states. USEPA's stated purpose is to ensure that all Americans are protected from significant risks to human health and the environment where they live, learn and work; that national efforts to reduce environmental risk are based on the best available scientific information; that federal laws protecting human health and the environment are enforced fairly and effectively; that environmental protection is an integral consideration in U.S. policies concerning natural resources, human health, economic growth, energy, transportation, agriculture, industry, and international trade, and these factors are similarly considered in establishing environmental policy.

Air pollution: In the USA the 2012 Clean Air Act has had a huge impact in reducing nationwide air pollution with huge health benefits.

Greenhouse gas emissions: Recently the USEPA has provided regulations and authority under the Clean Air Act to craft future rules to help combat global warming. This will apply for example to new coal fired plants and to vehicle emissions.

Hydraulic fracturing: In March 2010 the USEPA commenced a comprehensive research study to investigate the potential adverse impact that hydraulic fracturing and associated gas extraction activities may have on water quality and public health.

There are important economic gains in a national approach. The benefits of the implemetnation of national regualtions by the USEPA outweigh costs by more than ten to one for all major EPA regulations adopted in the past decade.[1]

The USA has tensions between Federal and State governments similar to Australia's. Such tensions are not an excuse for Australia to do nothing. There is simply too much at stake.

1 www.whitehouse.gov/sites/default/files/omb/inforeg/2013_cb/draft_2013_cost_benefit_report.pdf

Option 2: Federal oversight of State-run HIA

Introduce national pollution laws that require the states to follow a higher standard for protecting human health and the environment. There must be robust monitoring of the states. This option is less desirable than Option 1 because it requires further expansion of resources at a time when the Productivity Commission is examining ways and means of making processes more efficient.

Abbreviations

COAG	Council of Australian Governments
CSG	coal seam gas (often inclusive of other unconventional gas)
DEA	Doctors for the Environment Australia
DEC	Department of Environment and Conservation
EIA	environmental impact assessment
EPBC Act	Environment Protection & Biodiversity Conservation Act
EPA	Environmental Protection Agency
HIA	health impact assessement
MTPA	million tonnes per annum
PM	parts per million (particulate size)
UNESCO	United Nations Educational, Scientific and Cultural Organization
USEPA	United States Environmental Protection Agency
VCAT	Victorian Civil and Administrative Tribunal
WHO	World Health Organisation

Appendices

Appendix 1:
The need to protect public health

Appendix 2:
Tool for assessing health impacts

Appendix 3:
Progress towards HIA in Australia 1994-2012

Appendix 4:
The US Environmental Protection Authority

Appendix 1

The need to protect public health

'Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being.' World Health Organisation (WHO).

The prevention of harm is the basis of public health. It is based on careful scientific assessment of possible hazards, their risks and methods of prevention. Clean air, clean water and nutritious, uncontaminated food are all crucial contributors to public health. Healthy ecosystems are the life support systems for humanity. Both land and marine ecosystems are being progressively compromised by global environmental changes and human activity, which pose major and increasing threats to sustainability, population health and ultimately survival.

Almost a quarter of the disease burden and deaths in the world can be attributed to environmental factors. The WHO estimate for Australia is 22 per cent.[1] We cannot begin to alleviate this burden of ill-health unless we address the environmental pathways and antecedent causes.

Additionally, the WHO recognises the importance of taking action on the social aspects of health to reduce health inequalities. These are the conditions in which people are born, grow, live, work and age, and are shaped by the distribution of money, power and resources at global, national and local levels.[2]

Increasingly, public health has a global dimension because actions in one country may affect the health of people in other countries. This theme is described in the documents;

- Report of the World Commission on Environment and Development: Our Common Future
- The Millennium Development Goals
- United Nations Environment Programme

Rapid and continued increases in scale and scope of modern development have resulted in commensurate increases in short term, long term and cumulative risks to human health from environmental changes and degradation. Preventive health strategies are essential in protecting and maintaining the health of the individual and the community against the harms.

Public health is largely preventative and so does not usually carry the political weight of an immediate crisis. Understanding by the public and policy-makers about public health is often poor.

While there have been major successes in public health in Australia, such as immunisation and tobacco control, there are many examples of failure of delivery of adequate health protection in the environmental domain where there are fewer counterbalances to the needs of government. Some initiatives are relatively easy to promote to government for their action, but others involve an appreciation of risk and potential long-term harms.

1 Social determinants of health, WHO

2 Preventing disease through healthy environments, WHO

Appendix 2

Tool for assessing health impacts

A Health Impact Assessment (HIA) can be described as a holistic and systematic process that identifies and examines both the positive and negative health impacts of a development during its planning and development stages, and provides decision makers with information about how it may affect the health of people.

HIA involves the scientific processes of hazard identification, quantification, characterisation and risk within a structured health risk assessment process. Risk management/mitigation strategies are developed within the overall HIA and the outcomes and recommendations of the process provided to decision makers such as politicians and regulators.

HIA is similar in concept to EIA. It can be incorporated into overall decision-making or be a stand-alone process. HIA requires good qualitative data and methods to measure effects on social structures, life-style and inequality. The outcomes of HIA should promote health - not just mitigate risk - so that there are better health outcomes for communities.

The horizon for HIA is usually short (for example, five years) but the entire life time of the proposal must be considered and indeed health impacts may continue to arise once the project is terminated

The scope of HIA can be wider and be applied to all policy involving planning and development. For example, how we design urban environments and our travel systems have complex and neglected implications for individual and community health. In all planning and development it is also important to consider the particular needs of vulnerable groups or at-risk populations and address inequity arising from development.

The health of Australians is also tied to global issues such as climate change, increasingly extreme weather events and food security.

It is important that those with expert or local knowledge are given opportunities to provide input. As a holistic process, HIA requires input from all potential stakeholders, or their representatives, and particularly focuses on the needs of those most vulnerable in communities.

HIA has been under development in Australia since 1994. The processes that can protect the community are well defined in principle, but their adoption has been problematic. This failure of preventative health ultimately results in higher costs to our increasingly strained healthcare budgets.

HIA Stages

Many frameworks for HIA exist but in the main they are similar to those for EIA and have the following stages:

1. Screening

Should the project be subject to a health impact assessment?

This must become an independent process in the same way that the Office of the Commonwealth Director of Public Prosecutions (CDPP) or state DPPs are an independent services, The DPP provides for a fair, safe and just society to provide public confidence in the justice system. The same ideals should apply to public health. An independent experienced health office should make the decisions.

2. Scoping

What issues must be addressed in the health impact assessment?

Scoping identifies the key health issues and public concerns to be addressed, and these are then reflected in the terms of reference for an EIA/HIA. It involves discussion with Health departments for their input, consultation with public and stakeholders and decisions on the type of studies and processes.

3. Profiling

What is the current status of the affected population and the local environment?

Profiling considers the characteristics of the environment and community. It describes the community, identifying vulnerable or disadvantaged groups and includes the social determinants of health. Environmental legislation tends to consider only the local community but 'community' must include all those affected even when they are remote; for example they may be impacted by transport generated by the development.

4. Appraisal

Risk Assessment and Risk management: What are the health risks and benefits? Who will be affected? This is a process requiring skills from a range of health disciplines such as environmental health, other public health agencies, disaster management, epidemiology, psychology, occupational health and safety. It requires management of content and process. The risks are then presented ways that decision makers can assess. Often occupational health and safety is dealt with separately from health impact assessment. This should not be so because the worker in the mine is also resident in the community.

5. Implementation and decision-making

Does the assessment provide sufficient, valid and reliable information for decision-making? Is there a conflict to be resolved? How will conditions be enforced? How and by whom will impacts be monitored? How will post-project management be resourced?

6. Monitoring, environmental and health auditing, post-project evaluation

This stage monitors the conditions applied to a development and monitors the health impacts before, during and after the development is completed. Is the project complying with its conditions? How well is the E&HIA process as a whole achieving its aims of protecting the environment and health?

7. Reporting

The conclusions and recommendations in the EIA should include specific measures to remove or mitigate negative and enhance positive health impacts.

Source: Department of Health and Aging, Health impact assessment guidelines p11, 2001.

Appendix 3

Progress towards HIA in Australia 1994-2012

Historically Environmental Impact Assessment (EIA) practice in Australia and elsewhere has given little attention and limited depth to the consideration of health impacts. In recognition of this, the WHO has promoted better consideration of the impact on human health in EIA of development projects since 1987. However in recent years there has been an increased international expectation, beyond legislative frameworks, that more detailed consideration be given to the impacts on health of industry and development projects (Equator Principles, 2006; IFC, 2006).

The experience in Australia has largely followed this trend. In 1994 the National Health and Medical Research Council in Australia published a report on Environmental and Health Impact Assessment (National Health and Medical Research Council, 1994). Now rescinded.

The report emphasised that HIA should not be a parallel process to EIA but be integrated into an overall Environmental and Health Impact Assessment process. Notably the report argued that human health: 'is affected by social, psychological, economic, ecological and physical factors'; is an imperative for sustainable development; and is underpinned by social justice.

The report also included a review of legislation and EIA documentation, finding neither consistently addressed health. In turn this resulted in limited engagement of health agencies in the EIA process. The report therefore argued that integration of health into EIA required establishing and negotiating a number of reinforcing structures and processes: appropriate policy and planning frameworks specifying public health; systemic structures incorporating and linking to health expertise; financially viable community involvement; supports for effective decision-making; and the development of clear guidance. The report then offered a framework for environmental and health impact assessment and outlined methodological issues that required further development.

To emphasise the ecological basis of health the NH and MRC Panel on Health and Ecology prepared a report "On which all life depends Principles for an ecologically sustainable basis for health" This report did not proceed, for it probably had implications that were unpalatable for some. Subsequent to this report the Australian Federal Government established The National Environmental Health Strategy 1999.[1]

Thereafter the enHealth Council was formed with the responsibility for national leadership concerning health in EIA, the implementation of the National Environmental Health Strategy and the development of partnerships with stakeholders. In carrying out these responsibilities the Council published several documents including Guidelines for the implementation of Health Impact Assessment. See Health Impact Assessment Guidelines enHealth Council, 2001.[2]

These guidelines were one of the first internationally to promote integration of health and the wider determinants of health into EIA, while recognising the broader application of HIA to policy and program development. Further, the guidance considered assessing both positive and negative health impacts rather than the earlier tendency in EIA to assess only negative impacts. In the Australian federated system this

1 www.health.gov.au/internet/main/publishing.nsf/Content/59A239BA8D0AAE2BCA2573CB0010E37E/$File/envstrat.pdf

2 www.health.gov.au/internet/main/publishing.nsf/content/health-pubhlth-publicat-document-metadata-env_impact.htm

type of document is available for the various state and local governments who largely have responsibility for HIA. However the document is for reference and is not binding on any level of government.

In 2005 the National Public Health Partnership examined legislative and administrative frameworks at the federal, state and territory levels associated with facilitating HIA on new development proposals (National Public Health Partnership, 2005). The report found that stakeholders consistently felt HIA for new developments should be within EIA rather than a stand-alone process. However, the document referred to the same deficiencies in legislation and practice that became apparent in the early 1990s. The limitations of current legislative provisions and procedures to adequately cover the necessary broad range of health issues, coupled with lack of power of health authorities in development decision-making, were highlighted as critical areas to address.

Subsequent federal activity concerning project proposal focused HIA has ceased. HIA is viewed as a state and territory or local government responsibility that lies outside of the jurisdiction of the Commonwealth Government — although there are triggers for matters of national environmental significance (National Public Health Partnership, 2005). The enHealth Council and National Public Health Partnership have been replaced by the Environmental Health (enHealth) Committee of the Australian Health Protection Committee (Department of Health and Ageing, 2009; Australian Health Ministers' Conference, 2009). The 2001 enHealth guidelines were due for review in 2010-11.

Since 2001 the enHealth Guidelines have not been delivered and environmental health seems to have been greatly downgraded within the department of Health and Ageing and there is every indication that the Commonwealth is divesting responsibility.

Based on *Health impact assessment in Australia: A review and directions for progress*

Harris and Spickett 2010

www.sciencedirect.com/science/article/pii/S0195925510000417

Appendix 4

The United States Environmental Protection Authority

The United States Environmental Protection Agency (USEPA) website states; The mission of the US EPA is to protect human health and the environment.

A number of laws serve as EPA's foundation for protecting the environment and public health. However, most laws do not have enough detail to be put into practice right away. EPA is called a regulatory agency because Congress authorizes us to write regulations that explain the critical details necessary to implement environmental laws.

In addition, a number of Presidential Executive Orders (EOs) play a central role in our activities. These have been crucial in forcing pollution regulation on the coal industry.

Regulations are mandatory requirements that can apply to individuals, businesses, state or local governments, non-profit institutions, or others.

The EPA operates to protect the environment by using a variety of tools and approaches, like partnerships, educational programs, and grants. One of our most significant tools is writing regulations.

Congress passes the laws that govern the United States, but Congress has also authorized EPA and other federal agencies to help put those laws into effect by creating and enforcing regulations.

The laws and EOs which help to protect human health and the environment are listed; Laws and Executive Orders, US EPA

The EPA is charged with administering all or a part of each.

EPA's stated purpose is to ensure that:

- all Americans are protected from significant risks to human health and the environment where they live, learn and work;
- national efforts to reduce environmental risk are based on the best available scientific information;
- federal laws protecting human health and the environment are enforced fairly and effectively;
- environmental protection is an integral consideration in U.S. policies concerning natural resources, human health, economic growth, energy, transportation, agriculture, industry, and international trade, and these factors are similarly considered in establishing environmental policy;
- all parts of society – communities, individuals, businesses, and state, local and tribal governments – have access to accurate information sufficient to effectively participate in managing human health and environmental risks;
- environmental protection contributes to making our communities and ecosystems diverse, sustainable and economically productive; and
- The United States plays a leadership role in working with other nations to protect the global environment.

Source: United States Environmental Protection Agency. http://epa.gov

Doctors for the Environment Australia
67 Payneham Road, College Park SA 5069
M: 0422 974 857 E:admin@dea.org.au W:dea.org.au