



**Friends of
the Earth
Scotland**

Scottish Government
Directorate for Planning and Environmental Appeals
4 The Courtyard
Callendar Business Park
Callendar Road
Falkirk
FK1 1XR

5 July 2013

Dear Sir / Madam

RE: Planning Permission Appeal PPA-240-2032

**COAL BED METHANE PRODUCTION, INCLUDING DRILLING, WELL SITE
ESTABLISHMENT AT 14 LOCATIONS AND ASSOCIATED INFRASTRUCTURE AT
LETHAM MOSS, FALKIRK FK2 8RT Falkirk (P-12-0521-FUL)**

I am writing with additional information in support of Friends of the Earth Scotland's objection to the above application (submitted 8 October 2012).

Introduction

'UG exploitation and production may have unavoidable environmental impacts. Some risks result if the technology is not used adequately, but others will occur despite proper use of technology. UG production has the potential to generate considerable GHG emissions, can strain water resources, result in water contamination, may have negative impacts on public health (through air and soil contaminants; noise pollution), on biodiversity (through land clearance), food supply (through competition for land and water resources), as well as on soil (pollution, crusting).' UNEP Global Environmental Alert System 2012¹

There is a growing body of evidence that environmental and health risks associated with onshore unconventional gas extraction, including coalbed methane, are inherent and impossible to eliminate.

Friends of the Earth Scotland is very concerned that the industry in Scotland is moving from infancy to commercial extraction ahead of a proper review of the full lifecycle environmental and health impacts and adequacy of the regulatory framework to deal with the new techniques used to extract onshore coalbed methane and shale gas in the Scottish context. What is more, it is clear that extracting and burning this gas will seriously jeopardise our ability to meet climate targets under the Climate (Scotland) Act 2009.

¹ UNEP Global Environmental Alert System 2012, Can we safely squeeze the rocks?
http://www.unep.org/pdf/UNEP-GEAS_NOV_2012.pdf



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We consider that the precautionary principle, to which the Scottish Government is bound under international treaties, applies to the unconventional gas industry which to date has failed to demonstrate that it is safe for the environment and human health, in the face of mounting evidence to the contrary.

Therefore we call on the DPEA to refuse Dart Energy's application.

General comments

Dart and RPS fail to substantiate many assertions in the environmental statement and supplementary information. Letham Moss is Dart's most advanced coalbed methane project globally, therefore the company are unable to point to other examples of where they are successfully operating these same techniques at the scale proposed in the current application, nor do they cite examples of where other companies using the techniques proposed are working successfully.

We note that the consultants contracted by Falkirk and Stirling Council's to examine the technical aspects of Dart's application, AMEC, found the environmental statement to be significantly lacking in substantive information in a number of areas, particularly regarding geology and hydrology, including data to support the contention that hydraulic fracturing will not be required to extract a significant proportion of the gas.

Coalbed methane and hydraulic fracturing

There has been a great deal of focus in the media on the impacts of shale gas extraction and hydraulic fracturing – or 'fracking' – and there is a tendency to use these terms interchangeably, as shale gas drilling always involves fracking. Because coal is more porous than shale, coalbed methane (CBM) extraction does not always involve fracking. Often de-pressurising the seams by drilling vertically and horizontally into them and pumping out water is enough to release gas, and this is what Dart Energy propose to do at Airth. But where seams are less permeable, or as gas flow starts to decline, wells can be fracked to increase productivity. In Australia where coalbed methane (known there as coalseam gas) is more developed, the industry estimates that up to 40% of wells will end up being fracked.²

We acknowledge Dart Energy's assertion that they do not currently plan to use hydraulic fracturing at Airth, and that the well design in their current application is not suitable for the use of this technique. However we note that there is nothing detailed in the current application, or SEPA's proposed conditions, that would prevent the applicant from applying for permits to enable them to frack at a later stage for either these or future wells in this license area. Nor did the environmental assessment provide data to support the assertion that fracking would not be required to extract gas at Airth. We also note that fracking was trialled by previous operators of the Airth site, and proposed by the previous operators of the coalbed methane site at Canonbie.

The process of extracting coalbed methane without fracking carries many risks similar to those of fracking for shale gas, but with these important additional factors:

- Coal seams are much shallower than shale deposits (between 100-1000m deep, compared with shale at 3000m) and so closer to groundwater and soil. Thus any

² Australian National Greenhouse Accounts, Coal Seam Gas Estimation and Reporting of Greenhouse Gas Emissions 2012, http://www.climatechange.gov.au/climate-change/emissions/~/_media/climate-change/emissions/factsheets/NGA-FactSheet-7-CoalSeamGas-20120430-PDF.pdf

contaminants have much less distance to travel, resulting in an increased short-term risk of water and soil contamination, air pollution and fugitive methane emissions;

- Coalbed methane has the additional environmental impact of the need to treat and dispose of very large quantities of contaminated wastewater that has been removed from the coal seams during dewatering. This water has been in contact with coal for centuries, is extremely saline and contains naturally occurring radioactive material and BTEX chemicals,³ as well as any drilling chemicals used.

There are significant research gaps in relation to the impacts of these techniques and conflicting results between some existing studies. Some studies do not clearly differentiate between results from shale gas fields and CBM fields, or between CBM fields / wells where fracking has been used or not, for example by examining the health impacts of drilling and fracking chemicals as one.

However, the precautionary principle requires that lack of scientific certainty must not be used as a reason for not preventing potential harm to the environment: *"In order to protect the environment, the precautionary approach shall be widely applied by States ... Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation."* (1992 Rio Declaration on Environment and Development).

We consider that there is a sufficient body of indicative evidence of environmental and health impacts (much of which is referred to below) to support an outright rejection of Dart Energy's application on the basis of the precautionary principle.

Inadequacy of environmental assessments

We note that AMEC, the consultants contracted by Falkirk and Stirling Council to examine the technical aspects of the application, found a number of deficiencies in the Environmental Statement and supplementary information prepared by Dart Energy and their EIA consultants, RPS.⁴

The Environmental Impact Assessment Directive requires that cumulative impacts of developments must be considered. The current application for 22 wells will access 10 - 20% of the resource in the license area which Dart plan to exploit in coming years.⁵ Simple maths indicates that the immediate area could see at least a further 100 wells in the coming years if Dart's plans go ahead. Like any industrial development, coalbed methane operations result in numerous local environmental and community impacts such as noise from drilling, site traffic and landscape impacts. However because each development requires tens or hundreds of wells the cumulative local environmental and landscape impacts for each project can be very significant. It also means that the likelihood of something going wrong – such as a well blow out or chemical spillage – is proportionately greater.

Aspects of the planned expansion of Dart's development are detailed in Field Development Plans required by the Department for Energy and Climate Change (DECC) under the terms of the Petroleum Exploration and Development License (PEDL), however these are considered commercially confidential and not shared with the public, nor to the best of our knowledge, with the local planning authorities and SEPA.

³ Benzene, Toluene, Ethylbenzene and Xylenes. Of these benzene is a known carcinogen in humans and ethylbenzene and the xylenes are suspected human carcinogens.

⁴ Technical Note by AMEC, May 2013, Coal Bed Methane Extraction at Letham Moss, Falkirk, by Dart Energy

⁵ <http://www.naturalgaseurope.com/dart-announces-first-cbm-electricity>

We consider that this is highly unsatisfactory in terms of involving local communities and other interested parties in the decision-making process about the current application, and presents an inherent problem for both the Council and the developer. Without knowledge of an operator's full field development plans from the outset it is not possible for interested parties to make full representations nor for the Council to make an adequate assessment of the cumulative impacts of a development; and the operator faces considerable uncertainty as to whether future applications will be rejected on the basis of cumulative impact and subsequently render their development commercially unviable. This situation is potentially in breach of the Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters, and the EU Public Participation Directive.

We consider that this is of particular concern in light of the fact that the Strategic Environmental Assessment (SEA) carried out by DECC of its plans to tender licenses including PEDL 133 was very likely inadequate in relation to unconventional gas given new information that has come to light since then. We are aware that DECC are revisiting the SEA conducted in 2010 of plans for the 14th round of onshore oil and gas exploration licensing, in light of new evidence regarding unconventional gas exploration and this is what has delayed the tendering process for this licensing round. This casts doubt on the validity of the SEA conducted for the earlier round of licensing in which PEDL 133 – and other current license areas where unconventional gas exploitation is proposed – was assessed.

Climate impacts

A key risk associated with Dart's application to commercially extract coalbed methane at Airth is in relation to our climate targets: unconventional gas extraction is energy intensive, and burning the gas contributes to emissions. Moreover, the impact of 'fugitive emissions' of potent greenhouse gas methane through leaks, as well as flaring and venting has led scientists to argue that the climate impact of unconventional gas is greater than that of coal. As with conventional oil and gas operations, leaks can occur at wellheads, pumps, pipelines and associated gas treatment infrastructure. However indicative research suggests that de-pressurisation of coal seams through de-watering and hydraulic fracturing can change the soil structure and increase the likelihood of methane leaking through the soil.⁶ We note that the applicant refers to CBM as a "clean fuel source" and consider this to be very misleading.

Using a very conservative estimate of emissions, the International Energy Agency's 'Golden Age of Gas' scenario – exploiting unconventional gas to the full - puts global emissions on a trajectory for 3.5°C warming.⁷ This is well above the threshold for triggering catastrophic climate change: the world's nations agreed in the Copenhagen Accord to keep climate change below 2°C in order to prevent dangerous interference with the climate system.⁸ The IEA admits "*we are not saying that it will be a golden age for humanity - we are saying it will be a golden age for gas.*"⁹

Advocates of unconventional gas say it has lower overall emissions than coal or conventional gas, but the academic jury is still out. The key issue for comparing gas with coal is how much methane escapes during gas exploration and production, known as 'fugitive emissions'. Methane is a much more powerful greenhouse gas than carbon dioxide. Experts say that if

⁶ Santos and Maher, Southern Cross University, Fugitive emissions from coal seam gas <http://www.scu.edu.au/coastal-biogeochimistry/index.php/70/> ; Tait, Santos et al, Southern Cross University 2013 Enrichment of Radon and Carbon Dioxide in the Open Atmosphere of an Australian Coal Seam Gas Field <http://pubs.acs.org/doi/full/10.1021/es304538g>

⁷ International Energy Agency, Are We Entering a Golden Age of Gas? 2011 <http://www.worldenergyoutlook.org/goldenageofgas/>

⁸ <http://unfccc.int/resource/docs/2009/cop15/eng/107.pdf>

⁹ BBC, Campaigners' anger over agency's shale gas report 29th May 2012

fugitive emissions are below about 3.2% of total well production then natural gas has a lower climate impact than coal. The US EPA estimates that fugitive emissions are below this, but recent US monitoring suggests that fugitive emissions could be over 4% and up to 9% in some cases,¹⁰ wiping out any climate advantages. One recent Australian study found that methane was leaking at around 3.5 times the level expected,¹¹ and another found that coal seam gas might be nearly as high carbon as coal or electricity generation, with a leakage rate up to 4.38%.¹² A Queensland Government study found almost half the wells in coal seam gas fields in the Tara region to be leaking.¹³

Scotland has tough targets to meet on reducing climate change emissions, requiring a reduction of around 1.5MtCO₂ a year. By comparison full production at the CBM development proposed at Airth would increase emissions by about 3MtCO_{2e} over the 8 years of operation even if it had only a similar carbon content to North Sea gas. Just the fugitive emissions from the site could be equivalent to adding 7,500 extra cars on the roads of Scotland.¹⁴ If all Dart Energy's CBM and shale gas assets in the PEDL133 licence area were burnt they would create at least 22MtCO_{2e} – more than half of Scotland's *total* carbon allowance in 2020.

Furthermore we note that SEPA do not currently have powers to require operators to control and monitor methane emissions from unconventional gas wells. The agency's regulatory role is limited to powers under the Controlled Activities Regulations – 'controlling the impacts on the water environment from the physical exploration and extraction of unconventional gas resources (shale gas and coal bed methane)'; and Pollution Prevention and Control – 'activities, such as those involving refining of gas, gasification or other heat treatments, combustion, or disposal of solid and liquid wastes'.¹⁵

However, in their guidance, SEPA acknowledge the significant uncertainties over fugitive emissions, and note – in a manner that is not consistent with the precautionary principle and duties under the Climate (Scotland) Act 2009 – that it will 'remain neutral' until these are resolved:

*"There is a lack of real field data in this area and more research is required, however it has been reported that fugitive releases of methane during shale gas operations is higher than those of conventional gas but less than from coal. However, others have questioned the validity of the data used to justify this position. Until this dispute is resolved by collection and analysis of actual data we will remain neutral but will require operators to make full use of technologies that capture the gas prior to escape in order to reduce methane emission to air. We are also considering the need for monitoring."*¹⁶

¹⁰ Nature, 2nd January 2013 'Methane leaks erode green credentials of natural gas'

<http://www.nature.com/news/methane-leaks-erode-green-credentials-of-natural-gas-1.12123>, Howarth and Ingraffea, Methane and the greenhouse-gas footprint of natural gas from shale formations, Cornell University <http://www.sustainablefuture.cornell.edu/news/attachments/Howarth-EtAl-2011.pdf>, & Venting and Leaking of Methane from Shale Gas Development: Response to Cathles et al. 2012

http://www.eeb.cornell.edu/howarth/Howarthetal2012_Final.pdf

¹¹ http://www.scu.edu.au/news/media.php?item_id=6041&action=show_item

¹² Hardisty, P. E., Clark, T. S., Hynes, R. G., 2012. 'Life Cycle Greenhouse Gas Emissions from Electricity Generation: A Comparative Analysis of Australian Energy Sources.' *Energies* 5, 872897

¹³ Queensland Government Investigation Report 2010, Leakage testing of coal seam gas wells in the Tara 'rural residential estates' vicinity http://mines.industry.qld.gov.au/assets/petroleum-pdf/tara_leaking_well_investigation_report.pdf

¹⁴ Assuming a mid-range leakage rate of 4.5%

¹⁵ SEPA, Regulatory Guidance: Coalbed methane and Shale Gas, 2012

¹⁶ SEPA, Regulatory Guidance on Coalbed methane and Shale,

http://www.sepa.org.uk/customer_information/energy_industry/unconventional_gas/idoc.ashx?docid=c684b401-ad28-4d30-a4cb-1467f395c100&version=-1

Air pollution and public health

Climate impact is not the only air pollution problem associated with unconventional gas extraction. Activities at gas drilling sites result in fugitive and direct emissions from drilling muds, tanks containing wastewater, diesel engines and site traffic, as well as the future methane pathways described above.

Dart's Environmental Statement and Air Quality Supplemental Report looked at the impacts of:

Site preparation, construction and decommissioning on air quality, including:

- Deposited particulates (nuisance dust);
- Suspended particulate matter (PM₁₀); and
- Nitrogen oxides (NO_x)

Operational effects including:

- Fugitive emissions of dusts and PM₁₀ from site preparation and decommissioning
- Fugitive emissions of odours from odourising the produced gas
- Emissions of combustion pollutant nitrogen dioxide (NO₂) from on-site generators fired by CBM from the project
- Emissions during abnormal / emergency conditions (e.g. from vent and flare)

In the Environmental Statement RPS and Dart consider that:

“During drilling, emissions will comprise dusts, and temporary emissions from the rig and traffic movements....Emissions from the rig will be negligible so have been scoped out of this assessment.”

We are very concerned that Dart has not factored in any monitoring of potential air pollution from chemicals used in drilling fluids and naturally occurring chemicals and radioactive substances during any stage of operation, particularly during the drilling stage. We note that SEPA does not currently have powers to regulate air pollution from unconventional gas sites in this respect other than to investigate a complaint.

We note that while there is a lack of peer reviewed studies into the health impacts of unconventional gas extraction, indicative findings point to potentially very serious public health impacts for communities living in and near gas fields. Again, while studies often fail to distinguish between the impacts of drilling and fracking chemicals on human health, a recent peer reviewed study found that non-methane hydrocarbon emissions from unconventional gas sites were higher during drilling stages than during fracking stages¹⁷, hence public health concerns apply to coalbed methane operations whether or not they are fracked.

The following polycyclic aromatic hydrocarbons (PAHs) – naturally occurring in coal – were detected in air samples taken at a fixed sampling station near a natural gas well pad that used a closed loop system in Colorado.¹⁸ Sixteen directional wells were drilled and fracked during the study period, however samples of PAHs were highest during drilling stages. The health effects of exposure to these chemicals can include impact on: skin, eye and sensory organ; respiratory system; gastrointestinal; brain and nervous system; immune system; kidney function; cardiovascular and blood; cancer, tumorigenesis; genotoxic; endocrine system; liver and metabolic. The same study also detected a large number of volatile organic compounds including high levels of methane and methylene chloride.

¹⁷ Colburn et al, An Exploratory Study of Air Quality near Natural Gas Operations, 2012

¹⁸ Ibid

Table 3. PAHs detected in air samples in western Colorado from October, 2010 to March, 2011.

Chemical name	CAS #	<i>n</i>	%	Mean	Range	Std	<i>n</i>
		Detects	Detects	pptv	pptv	Dev pptv	Spikes
naphthalene	91-20-3	21	100	3.01	0.81-6.08	1.44	4
phenanthrene	85-01-8	16	76	0.36	0.21-0.61	0.14	4
fluorene	86-73-7	11	52	0.20	0.15-0.32	0.06	2
indeno(1,2,3-cd)pyrene	193-39-5	8	38	0.18	0.09-0.49	0.13	1
benzo(g,h,i)perylene	191-24-2	7	33	0.22	0.09-0.45	0.13	1
dibenzo(a,h)anthracene	53-70-3	7	33	0.20	0.11-0.51	0.15	1
benzo(a)pyrene	50-32-8	5	24	0.21	0.13-0.36	0.09	1
benzo(b)fluoranthene	205-99-2	5	24	0.20	0.13-0.26	0.05	1
benzo(k)fluoranthene	207-08-9	5	24	0.18	0.13-0.25	0.05	1
benzo(a)anthracene	56-55-3	2	10	na	0.13-0.16	na	0
chrysene	218-01-9	2	10	na	0.12-0.16	na	0
acenaphthylene	208-96-8	1	5	na	0.20	na	0

na = not applicable. Statistics were not calculated for chemicals in which there were fewer than three detections.

From Colburn et al, *An Exploratory Study of Air Quality near Natural Gas Operations*, 2012

Communities living near gas fields in Australia complain of respiratory problems, rashes and irritated eyes. An investigation by a concerned GP in early 2013 of 38 households in close proximity to coal seam gas wells in Tara, Queensland, found that 58% of residents reported definite adverse health effects related to gas drilling and a further 19% were uncertain.¹⁹ Symptoms include breathing difficulties, rashes, joint and muscle pains, nausea and vomiting, and spontaneous nosebleeds, and are consistent with exposure to naturally occurring and common drilling and fracking chemicals in the unconventional gas industry.²⁰

Further, there is evidence that the long-term human health impacts could be much more serious: research from the USA found that gas operations were leaking highly toxic and carcinogenic benzene into the air.²¹ A working paper from Cornell University suggests that air and water pollution from unconventional gas activities can have a profoundly damaging effect on infant health. The study looked at birth weight outcomes in pregnant mothers living within 2.5 km of a gas well and found that the incidence of low birth weight increased by 25%.²² While the study focussed on a gas well in the Marcellus Shale, the authors point to a number of contributing factors, many of which are also present in CBM drilling, which result in a complex of pollutants that may contribute to the health impacts their study identifies.²³

We also note that the USA Environment Protection Agency has banned flaring from 2015²⁴ as a result of health and environmental concerns.

¹⁹ Symptomatology of a gas field - An independent health survey in the Tara rural residential estates and environs, Gerilyn McCarron, April 2013
http://d3n8a8pro7vhmx.cloudfront.net/lockthegate/pages/49/attachments/original/1367333672/2013-04-symptomatology_of_a_gas_field_Gerilyn_McCarron.pdf?1367333672

²⁰ Colburn et al, 2012

²¹ <http://frackfreescotland.files.wordpress.com/2012/10/nature-vol-482-feb-2012-air-sampling-reveals-high-emissions-from-gas-field.pdf>

²² <http://dyson.cornell.edu/research/researchpdf/wp/2012/Cornell-Dyson-wp1212.pdf>

²³ "NDG [Natural Gas Drilling] requires large quantities of truck traffic, results in loud noise around the clock, requires bright lights for drilling to occur at night, and results in direct and fugitive air emissions of a complex mixture of pollutants from the methane itself as well as diesel engines, drilling muds and tanks that contain produced water and fracturing fluids" <http://dyson.cornell.edu/research/researchpdf/wp/2012/Cornell-Dyson-wp1212.pdf>

²⁴ <http://www.epa.gov/airquality/oilandgas/pdfs/20120417changes.pdf>

Water and soil environment

Drilling and fracking for coalbed methane carries the risk of mobilising naturally occurring chemicals and leaving introduced chemicals behind deep underground from where they can migrate into and contaminate soil and water.

To extract coalbed methane the developers must de-water the seam by drilling vertically and horizontally (for up to 1km) and pumping out large quantities of water that has been in contact with coal for centuries. Waste water from coalbed methane developments is extremely saline, and has been found to contain not only harmful chemicals from the drilling fluids used by operators, but also naturally occurring and highly toxic BTEX (benzene, toluene, ethylbenzene and xylenes) chemicals amongst which are known carcinogens, and naturally occurring radioactive materials. Large quantities of contaminated water must be treated and disposed of. The current application at Airth assumes up to 803m³ per day will be abstracted and disposed of: a not insignificant 293,095 m³ per year. Evidence is emerging from Australia that existing treatments are not capable of removing all the toxins found in CBM wastewater.²⁵

Extracting water from coal seams can also lead to the serious depletion of ground water.²⁶ In the Bowen Basin of Australia the industry is suggesting that groundwater is already 15m lower than before operations began and will be a further 50m lower in 15 years.²⁷

Even if wastewater could be treated adequately, there is still the question of contamination of groundwater and soil from drilling and naturally occurring chemicals, such as BTEX and PAH chemicals, mobilised by the drilling process. As noted above, indicative research suggests that de-pressurisation of coal seams through de-watering and hydraulic fracturing can permanently alter soil structures and increase pollutant pathways for naturally occurring and drilling / fracking chemicals into soil and water systems.²⁸ The authors of another study warn that the gas boom is an uncontrolled health experiment on an enormous scale and make a plea for badly needed research on the likelihood and impact of these chemicals entering the food chain via animal products.²⁹

Scottish Planning Policy

We note that Scottish Government energy policy³⁰ does not support unconventional gas extraction. Further, we note that the new draft Scottish Planning Policy (SPP) has removed any presumption in favour of unconventional gas that could have been read into the previous SPP, introduced more stringent guidelines for how Local Development Plans should deal with the industry, and introduced the need for buffer zones between sites and communities.

²⁵ National Toxics Network submission to New South Wales Inquiry into Coal Seam Gas, September 2011, <http://www.ntn.org.au/wp/wp-content/uploads/2011/11/NTN-submission-to-the-NSW-Inquiry-Into-Coal-Seam-Gas3.pdf>

²⁶ "The drawdown of ground water heads within coal seam gas aquifers is a necessary process and an unavoidable impact associated with the de-pressurisation of the coal" Groundwater (Deep Aquifer Modeling) for Santos GLNG Project – Environmental Impact Statement, 31/3/2009

²⁷ Groundwater (Deep Aquifer Modelling) for Santos GLNG Project – Environmental Impact Statement Feb 2009 [http://www.santosgng.com/media/pdf41108/P2_Groundwater%20\(Deep\)%20FINAL%20PUBLIC.pdf](http://www.santosgng.com/media/pdf41108/P2_Groundwater%20(Deep)%20FINAL%20PUBLIC.pdf)

²⁸ Santos and Maher, Southern Cross University, Fugitive emissions from coal seam gas <http://www.scu.edu.au/coastal-biogeochimistry/index.php/70/>; Tait, Santos et al, Southern Cross University 2013 Enrichment of Radon and Carbon Dioxide in the Open Atmosphere of an Australian Coal Seam Gas Field <http://pubs.acs.org/doi/full/10.1021/es304538g>

²⁹ Bamberger and Oswald, Impacts of Gas Drilling on Human and Animal Health, 2012, *NEW SOLUTIONS: A Journal of Environmental and Occupational Health Policy* <http://baywood.metapress.com/link.asp?id=661442p346j5387t>

³⁰ Scottish Government Electricity Generation Statement 2012 <http://scotland.gov.uk/Resource/0038/00389294.pdf>

This move towards buffer zones is welcomed by FoES and reflects the recent decision of the Government of New South Wales in implementing a 2km buffer zone between communities and sensitive industries and any coal seam gas activities (not just fracking), including horizontal bores, and reflects concerns about public health, water and soil contamination.

We note that approximately half of Dart Energy's current application is located within 2km of residential areas.

Conclusion and recommendations

The concerns highlighted here have led to over 20 bans and moratoria around the world. FoES believes that it is essential to apply the precautionary principle in the face of mounting evidence that the unconventional gas industry is impossible to regulate safely. The application should be refused because the applicant and the industry as a whole has failed to demonstrate that it is safe for human health and the environment.

If the DPEA chooses not to reject the application we suggest that as a minimum, the following conditions should be attached:

- That the CBM wells and their associated infrastructure, including horizontal bores, within 2km of homes, workplaces and sensitive industries are not given planning permission;
- That the applicant publishes in full details of all drilling chemicals to be used in the Airth CBM field, subject to approval by SEPA, as part of the planning application. Any additional chemicals the developer may wish to use in the future must be consulted on and subject to approval by the planning authority and SEPA;
- That the applicant will not use hydraulic fracturing or similar stimulation techniques at any stage in the development of the Airth coalbed methane field;
- A baseline must be established of air, water and soil quality, and independent monitoring undertaken on a regular basis of the full range of chemicals and radioactive substances naturally occurring in the coal seam and surrounding geology and all chemicals to be used in drilling fluids in addition to what the applicant proposes;
- The development of and adherence to an environmental management plan to be agreed with SEPA is held to be a condition of planning consent;
- That robust, realistic restoration bonds are put in place prior to the development going ahead to ensure that the operator is fully liable for ongoing management and any future clean up wells and infrastructure;
- Conditions apply to the present applicant and any future operator of the site.

Yours faithfully,

Mary Church
Campaigns Co-ordinator
Friends of the Earth Scotland