

TOWN AND COUNTRY PLANNING (APPEALS) (SCOTLAND) REGULATIONS 2013
APPEAL UNDER SECTION 47(2) OF THE TOWN AND COUNTRY PLANNING (SCOTLAND) ACT
1997 BY DART ENERGY (FORTH VALLEY) LTD CONCERNING COAL BED METHANE
PRODUCTION, INCLUDING DRILLING, WELL SITE ESTABLISHMENT AT 14 LOCATIONS AND
ASSOCIATED INFRASTRUCTURE AT LETHAM MOSS, FALKIRK, AND POWDRAKE ROAD, NEAR
AIRTH, PLEAN

(REFERENCES PPA-240-2032 AND PPA-390-2029)

PRECOGNITION BY PROFESSOR ANDREW WATTERSON

ON BEHALF OF

CONCERNED COMMUNITIES OF FALKIRK
(AND SUPPORTERS)

1. Introduction

Name, qualifications, professional memberships

Andrew Watterson. Professor of Health
BA PhD Chartered Fellow of the Institution of Occupational Safety and Health
Fellow of the Collegium Ramazzini

Relevant academic publications

a. Books.

Watterson A. editor (2003) Public Health in Practice. Palgrave Macmillan, Basingstoke
Watterson A and Wright L. The Role of the Health and Safety Manager. 2nd ed. Financial Times
Management, London. 1998

b. Reports

Watterson A and O'Neill R (2012) Regulating Scotland: What works and what does not in
environmental and occupational health and what the future may hold. University of
Stirling, Stirling.

c. Chapters in Books

1. Watterson A (2013 and 2009, 2006, 2003 and 2001 editions) Agricultural, Horticultural,
Fisheries and Forestry Health and Safety in Munkman's Employers Liability ed Bennett D. 16th
ed. Elsevier, London pp788-799

2. Watterson A (2013) Competing interests at play? The struggle for occupational cancer
prevention in the UK in Safety or Profit? Ed Theo Nichols and David Walters. Baywood Press,
Boston, USA

3. Watterson A. Toxicology in the working environment' in Rose J. (ed)(1998) Environmental Toxicology: Current Developments. Gordon & Breach Science, Amsterdam, pp225-252

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1. Brophy J, Keith M, Watterson A, Park R, Gilbertson M, Maticka-Tyndale E, Beck M, Abu-Zahra H et al (2012) . Breast cancer risk in relation to occupations with exposure to carcinogens and endocrine disruptors: a Canadian case--control study. *Environmental Health* 11:87

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9. Watterson A (1994) Hazard Information for Employees and International Good Practice: A Neglected Ethical Issue in British Occupational Medicine. *New Solutions: Journal of Environmental and Occupational Health Policy*. 1994:4:49-56

10. Watterson A (1994) Whither lay epidemiology in occupational and environmental health? *Journal of Public Health Medicine*. 16:270-274

11. Watterson A (1993) Chemical Hazards and Public Confidence. Lancet 342:131-132.

e. Other

Watterson AE (2012) Work and Wider Environmental Cancer Prevention: UK perspectives. 3(1):6. *Scottish Cancer Prevention Newsletter*, Dundee University, Scotland

Relevant practical experience

2000 – 2014 . Director of the Centre for Public Health and Population Health Research
Head of the Occupational and Environmental Health Research Group at Stirling University.

2006-7. Visiting Professor, University of British Columbia Department of Health Care and
Epidemiology researching rural health and pollution from chemicals

2011 – 2012. Visiting Professor, IRRU, researching regulation of health and safety, University of
New South Wales, Sydney, Australia

Previously

Professor of Occupational and Environmental Health, De Montfort University, Leicester
Head of the Centre for Occupational Safety and Health, Department of Mechanical Engineering,
Nottingham Trent University

Journal Editorial Board member:-

Environmental Health (BMC))

International Journal of Occupational and Environmental Health (Baywood)

Policy and Practice in Health and Safety (IOSH)

Researcher on occupational and environmental; health at Southampton University (1980-1992)
including lecturing MEng civil engineering students on occupational health and safety.

Researching issues surrounding exposures and potential exposures rural and urban populations
within workplaces. Focus on chemical hazards from a multi-disciplinary perspective. I sat on HSE
committees exploring chemicals in agriculture where the exposure boundaries between
workers and the surrounding communities are blurred. As a chartered health and safety
practitioner, I was a member of IOSH's Environmental Interest Group.

1992- 2014. Research on the inter-relationship between epidemiology, toxicology and risk
assessment, risk management and risk regulation including a case study on coke oven workers
and bladder cancer exploring how toxicologists identified risks at an early date, employees
expressed concerns about cancer incidence, some epidemiologists confirmed the risks but
industry and regulatory action on fumes exposure did not occur: a story repeated in several
other industries. Published on coke oven workers, chemical regulation and exposure controls,
toxics use reduction and hazard information and transparency of data for employees and
communities.

As Head of the Centre for Occupational Health and Safety, Department of Mechanical
Engineering, Nottingham Trent University I was course leader for the first UK BSc in
Occupational Health and Safety Management. The course included modules on environmental
management, toxicology, epidemiology, risk assessment and risk management.

During this time I published a paper in Lancet on chemical hazards and public confidence related to the impact of industry on chemical control standards and investigated the relationship between industry, employees and communities faced with established and new chemical hazards and how such hazards were or were not effectively controlled by industry and regulated by government especially with regard to toxics use reduction strategies.

As chair of occupational and environmental health at De Montfort University and later at Stirling University my work covered wider public health subjects resulting in the text book 'Public in Practice'. My methodological interests have been in epidemiology and its limits, toxicology and its data gaps and health impact assessments. Using HIA techniques on 'novel' industries such as aquaculture and again on the energy industry threw up common problems relating to how industry addresses public health challenges of their activities and the evidence base used to support new developments. I have conducted and published research following up earlier work on cancers and other adverse health effects and environmental exposures linked to water, soil and air pollution. This includes consideration of exposures to endocrine disruptors sometimes with particular reference to the Forth Valley.

Relevant personal history

I provide this statement as an independent researcher who has received no payments from nor has any monetary interest in bodies either submitting the coal-bed methane proposal or opposing it. I do, however, live within the Forth Valley area.

When and how you became involved with the case

I have been following the international developments of unconventional gas resources for some time and the assessments available on their likely public health impacts. I also have a particular interest in chemical and biological carcinogens in the context of work we have done on occupational and environmental carcinogens and a recent international conference we held at Stirling University on occupational and environmental cancer prevention with speakers from WHO, EASHW, and the European Environment Agency. This led to the CCoF group approaching me and asking if I would provide a witness statement at the public inquiry. I was happy to do so. I would have provided exactly the same statement if Dart Energy had approached me.

Evidence

General Outline

1. My current inter-disciplinary research interests lie in the field of public health with particular reference to health impact assessments, risk assessment and risk management of chemical and other hazards, and the regulation and governance of both occupational and environmental health and safety. They also include research on carcinogens and endocrine disruptors that may be used in CBM extraction (Brophy et al 2012; Watterson et al 2008 a, b; Watterson and O'Neill 2012). My concerns about the Dart submission relate to all these elements. Other submissions to the enquiry have

provided details on specific chemical toxicity and epidemiological studies indicating both hazards and risks associated with CBM and I will not duplicate that detail in this precognition.

2. As the United Nations Environment Programme observed: “given the uncertainty in terms of GHG emissions, public health, environmental issues and depletion of water resources, the continued development of UG reserves is an option which brings with it great responsibility” (UNEP 2012: 10) .

Specific points

3. I have examined various documents provided by the company in the planning process and by other bodies such as government departments and researchers. The Dart Energy Environment Statement in August 2012 for example made no mention of ‘public health’ or ‘human health’ or ‘adverse health effects’ and ‘precaution’ was mentioned only twice - once on vehicle break down and once on lighting. On the basis of these documents, I do not consider that the risk assessments so far attempted, and hence the related risk management strategies proposed on specific materials involved in CBM extraction and their combinations, are sufficient to ensure public health is protected. Risk assessment should identify and accurately assess the risks presented by the hazards of a process and its related materials.
4. Complete risk assessments are needed before proper health impact assessments can be conducted on particular projects but these do not seem to exist either for CBM or fracking (UNEP 2012). Generally there are problems with chemical toxicity assessments and in 2006, in the USA, it was estimated that even with chemicals used in high volumes, only around 10% had partial hazard assessments available and none had complete hazard assessments. The position with regard to UG chemicals has historically been worse as APHA in 2012 and others (Maule et al 2012) pointed out because of a lack of disclosure of chemicals used in UG extraction.
5. The RPS Waste Management Plan 11th February 2014 does not provide a proper risk assessment of this part of the CBM process and in places perfectly illustrates the failure to adopt a transparent approach that enables public health risks to be assessed just from the waste management process. Sections 4, 5 and 6 do not properly describe how human health may be affected by the deposit of waste. This is because there does not appear to have been any external and independent validation of the process: none is provided in the document. No material safety data sheets , nor related published research studies to check the accuracy of those data sheets, are provided or referenced that would enable a proper assessment to be made of the statements made in this document. For example (3.3) all wastes are defined as non-hazardous but no detail of

the content of the drilling fluids and sludges are provided. No detail is provided on the drilling fluids used beyond an assertion that they non-toxic and harmless (3.22).

6. The RPS WMP risk assessment of this part of the process is also astonishingly short and inadequate and relies on trust in mitigation measures (4.5) that cannot be guaranteed to be successful and will not be. For examples again, the Operational Risk Assessment does not supply any more detail on the drilling fluid chemicals and tells us what the compounds do not contain but not exactly what they do contain (Appendix 2A page 1). In contrast with the list of 'harmless' extractive wastes, it does list some hazards: namely caustic soda, dust from vehicles but not the WHO/IARC carcinogen diesel fumes that will certainly be produced by vehicles.
7. Evidence of sound public health impact assessments should be reflected in environmental statements. These would consider the short, medium and long term impacts of CBM, the effects on climate (micro and macro), the possible impact on the development of sustainable energy in Scotland which of course impacts directly and indirectly on public health, a proper estimate of jobs created and jobs lost by CBM extraction again over its complete lifetime, a community wellness and mental health impact assessment of the proposals and so on (Watterson et al 2008a; APHA 2012:4). I cannot currently identify any complete risk assessments provided by the CBM industry nor can I find any for the Dart submissions.
8. Several major international and national public health bodies (for example APHA 2012; Doctors for the Environment 2013) have also been unable to find complete risk and health impact assessments for the UG industry. APHA concluded that UG will do little to slow global warming this century but posed potential risks to public health through water, air climate change and worker and other exposures (APHA 212:2). Many data gaps exist as well as some evidence of the adverse effects of materials at extremely low doses (Maule et al 2013). Very recent research also indicates increasing and not diminishing causes for concern relating to the substances that may be used in CBM extraction (Hill 2012, Colborn et al 2012; Brophy et al 2012). Risk assessment should lead to the prevention of potentially major public health adverse effects but the risk-cost-benefit analysis of CBM at local and national level reveals the existence of far greater potential public health risks than benefits.
9. The 'health impact assessments' so far conducted within the environmental statements by or for the company are not proper integrated public health impact assessments and are inadequate (Watterson et al 2008) . The assessments of public health impacts of unconventional gas (UG) production made by bodies such as the Royal Society (Royal Society 2012) and the UK Government's Centre for Public Health are either very limited in the case of the former and excludes whole rafts of both risks and data in the case of the latter (Public Health England [PHE] 2012). The PHE draft review is not a systematic

review of UG chemicals and provides minimal information about its method, rigour and results. Public health practitioners look for high-quality systematic reviews before accepting any conclusion about a lack of public health risk. The review itself also notes many data gaps and specifically excludes consideration of occupational health and safety and climate change. Bodies such as the American Public Health Association have indicated why we should ensure proper public health impact assessments are needed.

10. An additional approach might be to draw on complete lifecycle analyses of CBM in settings such as the proposed Dart site but again these do not appear to be publicly available. “ In the framework of a Life Cycle Analysis (LCA), a thorough cost/benefit analysis could be a tool to assess the overall benefits for society and its citizens. A harmonized approach to be applied throughout EU27 should be developed, based on which responsible authorities can perform their LCA assessments and discuss them with the public” (EU 2011: 79).
11. There may be transparency in the future in the UK on UG chemicals to be used but this does not address the fact that many ‘negative’ or inconclusive studies of UG hazards in the past were based on a lack of information about specific chemicals or mixtures used.
12. Some of those ‘no effect’ UG studies from institutes in Texan universities and universities in Pennsylvania have since been discredited and their institutes closed because of conflicts of interests by their authors and Universities who gained funds from or had investments in the UG industry. Other non-industry studies have, however, recorded adverse health effects near CBM sites and are noted elsewhere in precognitions. Some of these focus on the very young, the old and the ill (Hill 2012). These are exactly the groups that the WHO and bodies such as the APHA have highlighted as vulnerable to even low level chemical insults and so meriting special attention in health impact assessments (APHA 2012).
13. Linked to claims of safety for materials and processes, the UG industry has made similar statements about ‘safe practices’ indicating that equipment and processes will not fail and there will therefore be no pollution or ‘accidents’ and incidents. Such claims are fanciful because failures always occur, as they have done in conventional energy extraction industries, and the question is to what extent such failures will affect public health. Similar claims in Scotland have been made about effective remediation of open cast coal mines and other industrial processes when companies cease operating and again there are examples of major failures by industry to clean up such ‘old’ industries.
14. As UNEP accurately observed in 2012, whilst drawing on the EU’s report on the impacts of shale gas and shale oil extraction “ Hydrologic fracking may result in unavoidable environmental impacts even if UG is extracted properly, and more so if done inadequately (EU, 2011). Even if risk can be reduced theoretically (IEA, 2011), in practice

many accidents from leaky or malfunctioning equipment as well as from bad practices are regularly occurring. This may be due to high pressure to lower the costs or to improper staff training, or to undetected leaks leading to contamination of the ground water (EU, 2011)” (UNEP 2012:11)

15. The European Environment Agency has produced detailed reports on why we should adopt the precautionary principle when dealing with carcinogens and endocrine disruptors because of ‘late lessons from early warnings’. Many of these chemicals may be present in CBM extraction. (EEA Late Lessons from Early Warnings Volumes 1 and 2 - see Watterson 2008b). The APHA also recommended the application of the precautionary principle when dealing with proposed UG developments and explicitly noted that where the effects of chemicals are unknown especially where the potential for long term effects (such as cancers) and endocrine disruption exist , their use should be discouraged (APHA 2012: 6). The failure to apply the precautionary principle with regard to Scottish shale oil plants has a long history with the first occupational cancers reported in 1875 and still many cases were being reported occurring in 1922.
16. In this context, it is necessary to scrutinize government and industry statements carefully with regard to the approval, regulation, inspection and monitoring of management in CBM to ensure suitable precaution. The regulation of UG according to a number of reputable international and EU organisations remains flawed (UNEP 2012; EU 2011; Watterson 2013). As the European Parliament report of 2011 noted “A publicly available, comprehensive and detailed analysis of the European regulatory framework concerning shale gas and tight oil extraction is not available and should be developed” (EU 2011:79). It may well be very premature to approve CBM applications without such a framework.
17. Within a UK context the powers, staffing and resources of the various regulatory bodies dealing with worker and community health and safety and environmental protection both north and south of the border have been significantly diminished (Watterson and O’Neill 2012). HSE has suffered major budgetary and staffing cuts. Where they have not been cut, they appear very narrow and currently incapable of effectively monitoring either applications or operations of UG extraction including CBM projects. Little readily publicly available information seems to be available on how they will tackle the environmental challenges presented by CBM (SEPA 2013).
18. HSE is responsible for oversight of worker and related health and safety issues that are mentioned in the Dart Energy Hearing Statement 2 (Paragraphs 2.23-2.26) and UG extraction is covered by general and specific provisions including the Borehole Site and Operations Regulations 1995, the Offshore Installations and Wells (Design and Construction etc) Regulations 1996 that has some relevance to onshore shale gas wells HSE Mines Specialist Inspectors and Offshore Inspectors may therefore cover UG. It is

questionable if HSE now has adequate staff and resources to effectively regulate new developments when its core budget has been so eroded and pro-active inspections have declined so significantly over more than a decade. It is noteworthy that no breaches have ever been recorded by HSE in recent years with regard to the 1995 Borehole Regulations in industrial sectors known to be highly hazardous even before UG extraction appeared on the health and safety scene. The extent to which drilling will be scrutinised closely, if a large number of approvals are granted as the industry hopes, by specialist wells inspectors from the Health and Safety Executive (HSE) therefore remains a contentious point especially in the light of continued national and international health, safety and environmental failures in the regulation of the offshore oil industry.

19. The Dart Energy Hearing Statement 2 rightly indicates that SEPA need to be satisfied that the operation will not give rise to a significant risk to the environment or human health (2.39). As with the HSE, this raises the question of SEPA's staffing and resources within the field of human health. SEPA's staff have very high levels of both scientific competence and experience but historically have had few if any staff dedicated to looking specifically at human health. In the late 2000s there was just one with such a title. SEPA should be able to demonstrate in-house competence rather than multi-agency expertise to fulfil the assessment of the human health risks posed by the Dart submission.
20. In 2006, SEPA issued a position statement relating to the Water Environment (Controlled Activities) (Scotland) Regulations 2005 and noted:- "The protection of human health is not a primary duty of SEPA. This rests with a number of other agencies, principally Local Authorities and the Food Standards Agency. However, SEPA plays a key role in the protection and prevention of pollution derived health risks. This is reflected in a number of EU environment Directives designed to ensure this. Over and above these requirements SEPA is developing a Human Health Policy and Action Plan to assist in the wider assessment of human health impacts associated with the activities it regulates". The document goes on to state that "the statutory guidance further directs SEPA to apply the Precautionary Principle in its regulatory activities, endorsing the statement that a lack of full scientific certainty is not a reason necessarily for inaction, and actions should be proportionate to the risk. This is particularly relevant when considering the health effects of environmental exposures because of the considerable uncertainties that still exist". Finally it noted:- "SEPA will develop and maintain links between this policy and other policies, e.g. SEPA's chemicals policy. This will be managed through the Human Health Working Group, which will aim to review the policy every two years or more often if required. The Human Health Working Group will manage the actions required to implement this policy, and will report progress to the Human Health Steering Group at least once a yearly". To what extent these principles have been revised, if they have been revised at all since 2006, is not clear but based on

the information available about the human health threats and data gaps on CBM chemicals, they would indicate that with application of the precautionary principle, the Dart submission as it stands will present potentially significant risk to human health.

21. The regulatory guidance provided by SEPA when the Dart planning submissions were first made appeared to be based on aspirations to control the industry rather than an evidence base (SEPA 2012:3). The document also proves highly selective when citing European evidence that there is a high degree of protection provided by the EU regulatory framework on UG. Several other reports submitted to the EU on the same subject draw very different conclusions and indicate problems with regulation.
22. Health Protection Scotland may play a major role in advising local authorities, SEPA and the Scottish Government about the hazards and risk of UG extraction but currently this body has just one web site entry on the subject and that is to an English public health report (PHE 2012). There is an urgent need for impartial advice on UG extraction to be made available to local authorities by informed and independent public health professionals but currently this is not available in Scotland or often elsewhere (APHA 2012; Doctors for the Environment. 2013) .
23. Opinions expressed about the effectiveness of the regulation and management of the UG industry including CBM are simply not borne out by the facts and this should be carefully considered in assessing any CBM environmental statements (Watterson and O'Neill 2012; Watterson 2013)..
24. The environmental and health and safety management record of some of those UK and international companies engaged in the extraction of oil and gas has been consistently poor, in several instances lethal to its workers, and the cause of huge pollution problems.

Conclusions

25. Forth Valley already contains a variety of existing industries and many companies that produce pollutants including potential carcinogens and endocrine disruptors that are monitored by SEPA. The load from such substances is significant and clearly any new CBM activity will add to that load.
26. Assertions about the good environmental and occupational health and safety of processes and materials used in CBM and effective regulation, management and good governance need to be tested against the evidence. Currently they do not stand up to scrutiny.

Sources

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