Shale Gas Extraction: Public Health & Public Engagement

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5+1
11th May 2017
Introduction

- About Public Health England
- Public Health England’s role in onshore oil & gas
- Who Public Health England works with
- Public health impacts of shale gas extraction (chemicals and radiation)
- Approaches to engagement, pros & cons
- Recent engagement activities
- Summary
Public Health England

- Executive Agency of the Department of Health
- Established in April 2013, 5500 staff
- We protect and improve the nation's health and wellbeing, and reduce health inequalities.
- 9 local centres across 4 regions, supported by several expert centres
- Works closely with Directors of Public Health
- PHE is NOT a regulator but an advisor
## Outcome-focused priorities

1. **Helping people to live longer and more healthy lives by reducing preventable deaths and the burden of ill health associated with smoking, high blood pressure, obesity, poor diet, poor mental health, insufficient exercise, and alcohol**

2. **Reducing the burden of disease and disability in life by focusing on preventing and recovering from the conditions with the greatest impact, including dementia, anxiety, depression and drug dependency**

3. **Protecting the country from infectious diseases and environmental hazards, including the growing problem of infections that resist treatment with antibiotics**

4. **Supporting families to give children and young people the best start in life, through working with health visiting and school nursing, family nurse partnerships and the Troubled Families programme**

5. **Improving health in the workplace by encouraging employers to support their staff, and those moving into and out of the workforce, to lead healthier lives**
Review of potential public health impacts of chemical and radiological emissions

- Shale gas extraction is at an early exploratory stage in UK
- Issue has resulted in public concern
- Reports suggest potential exists for adverse effects on the environment and human health
- Initial review based on published or peer-reviewed scientific literature
- The currently available evidence suggests that the potential risks to public health from exposure to emissions associated with the shale gas extraction process are low if operations are properly run and regulated.
Shale - Public Health England’s Role

• PHE works with the regulators to ensure that potential health impacts of operations are properly assessed as part of the planning and permitting process. PHE’s remit is to protect and improve the nation's health and wellbeing and reduce health inequalities.

• PHE provides specialist scientific support to local authorities when considering the evidence provided by applicants, this is done working closely with local Directors of Public Health.

• Environmental monitoring data will allow Public Health England to assess whether there is any potential for exposure to chemicals introduced to the environment as a result of shale gas extraction.

• PHE has reviewed the literature on the potential public health impacts of exposures to chemical and radioactive pollutants as a result of shale gas extraction. We conclude that the currently available evidence indicates that the potential risks to public health in the vicinity of shale gas extraction sites will be low if shale gas extraction is properly run and regulated.
Environmental risks of shale gas extraction

- Water + sand + chemicals
- Possible Aquifer
- Confining Layers
- Production Zone

- Gas emissions to atmosphere
- Production Platform
- Storage tanks
- To river or STW

- Fugitive emissions
- Inadequate transport or processing of produced gas
- Inadequate treatment/disposal of drill cuttings

- Inadequate transport or treatment of waste waters
- Contamination of soil, surface or groundwater due to spills of chemicals or return fluids
- Contamination of groundwater due to poor well design or failure
- Contamination of groundwater due to mobilization of solutes or methane

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Potential Emissions and Pathways

Many emissions in common with conventional onshore oil and gas extraction:

- Engines for operations; compressors used to capture & transport gas; venting of condensate & oil tanks; gas capture & flaring; leaks from pumps, flanges, valves, connectors. **Pollutants include: PM$_{10}$, NO$_x$, SO$_2$, CO, CO$_2$, VOCs, methane**

- Levels of naturally occurring radioactive contamination. **Including:** $^{40}$K, $^{212}$Pb, $^{214}$Pb, $^{214}$Bi, $^{228}$Ac, $^{226}$Ra, $^{222}$Rn

Potential pollutants and exposure pathways:

- Fracking chemicals
- Disposal of large volumes of waste water/fracking fluids
- Well construction and integrity essential to reduce the risks of ground water contamination.
- Potential for large numbers of wells: cumulative impacts
- Variability between underlying geologies
Baseline monitoring

Environmental baseline monitoring in the Vale of Pickering

BGS, along with the universities of Birmingham, Bristol, Liverpool, Manchester and York and partners from Public Health England (PHE), is conducting an independent environmental baseline monitoring programme in the Vale of Pickering, North Yorkshire. This is the area where North Yorkshire County Council has granted planning permission to Third Energy to hydraulically fracture one of their wells.

Monitoring

The monitoring is allowing us to characterise the environmental baseline before any hydraulic fracturing and gas exploration or production takes place in the event that planning permission is granted. The investigations are independent of any monitoring carried out by the industry or the regulators, and information collected from the programme will be made freely available to the public. This information will also support peer-reviewed science.

The monitoring in and around the Vale of Pickering includes:

- water quality (groundwater and surface water)
- seismicity
- ground motion
- air quality
- radon
- coal gas

View real-time data and data summaries

Current status of monitoring

The monitoring programme was initiated for all activities in September 2015. These activities and preliminary results are described in more detail in the links above. The activities over the project period (September 2015 to March 2017) include:

- Set-up of a monitoring network for groundwater and surface water across the Vale with monthly water sampling
- Drilling of new boreholes into the local aquifers for investigation of water quality and seismicity
- Installation of 10 seismometers for measurement of seismicity 6 at surface and 4 within the new boreholes
- Onshore installation of equipment for real-time monitoring of water quality
- Installation of equipment for real-time monitoring of greenhouse gases and indicators of air quality at the proposed hydrocarbon exploration site (XOG)
- Installation of analogous air-quality equipment at the sites of proposed hydrocarbon exploration in Lancashire
- Streaming of real-time data on seismicity, water quality and air quality to BGS for representation on the BGS website; some data are available now, others will follow
- Two self-gas surveys at selected sites close to the proposed hydrocarbon exploration site
- Installation of indoor and outdoor monitors for time-integrated measurement of radon in air

http://www.bgs.ac.uk/research/groundwater/shaleGas/monitoring/yorkshire.html
Health Studies – PHE Conclusions

- A number of studies suggest potential health impacts from emissions, but limitations, include:
  - Limited exposure data
  - Limited information on possible confounding factors
  - Limited clinical data
  - Currently reported health concerns have multiple causes

- Further work is needed to profile emissions during the stages of gas well development.

- Other pollutant sources need further assessment. The existing background levels of pollution need further assessment as it is not clear how much extra pollution could be caused by the shale gas extraction and related activities.

- Epidemiological data must be combined with exposure data, proximity analysis, biomonitoring and biomarkers of exposure and effect.
Key Recommendations

• PHE needs to continue to work with regulators to ensure all aspects of shale gas extraction and related activities are properly risk assessed as part of the planning and permitting process.

• Baseline environmental monitoring is needed to facilitate the assessment of the impact of shale gas extraction on the environment and public health.

• Effective environmental monitoring in the vicinity of shale gas extraction sites is needed throughout the lifecycle of developments.

• Chemicals used in fracking fluid should be publically disclosed and risk assessed prior to use.

• The UK has the opportunity to consider appropriate environmental and epidemiological studies to extend and strengthen the evidence base in advance of significant development of shale gas extraction activities.
Key Recommendations

• It is important to ensure that broader public health and socioeconomic impacts such as increased traffic, impacts on local infrastructure and worker migration are considered.

• The type and composition of the gas extracted is likely to vary depending on the underlying geology and this necessitates each site to be assessed on a case by case basis.

• Characterisation of potentially mobilised natural contaminants is needed including naturally occurring radioactive materials (NORM) and dissolved minerals.

• Evidence from the USA suggests that the maintenance of well integrity, including post operations, and appropriate storage and management of fracking fluids and wastes are important factors in controlling risks and appropriate regulatory control is needed.
Wider public health issues

Social Determinants of Health

- Community – identity, quality of life, wellness, social relations, active transport,
- Recreational spaces, habitat and wildlife
- Employment, boom or bust, demand for housing, physical infrastructure, social services
- Distribution of costs/benefits

Public perception/Community engagement

- Environmental justice

Healthcare system and Infrastructure

- Sexually transmissible infections

Climate change
Challenges

• Further work is needed to profile emissions during the stages of gas well development.

• Non-methane pollutant emissions appear to vary substantially by field type, number of well heads, completion process, and controls in place. Consideration is also needed of the impact of local meteorology and topography.

• Other pollutant sources need further assessment; the existing background level of pollution needs further assessment as it is not clear how much extra pollution is caused by the shale gas extraction and related activities.

• Currently reported health concerns have multiple causes

• Epidemiological data needs to combined with exposure data, proximity analysis, biomonitoring and biomarkers of exposure and effect
Summary

• The currently available evidence suggests that the potential risks to public health from exposure to emissions associated with the shale gas extraction process are low if operations are properly run and regulated.

• Good on-site management and appropriate regulation of all aspects of exploratory drilling, gas capture as well as the use and storage of fracking fluid is essential to minimise the risks to the environment and public health.

• Where potential risks have been identified in other countries, the reported problems are typically due to accidents or operational failure.

• Most evidence from other countries suggests that any contamination of groundwater, if it occurs, is likely to be caused by leakage through the vertical borehole. Therefore good well construction and maintenance is essential to reduce the risks of groundwater contamination.

• Contamination of groundwater from the underground fracturing of shale (fracking) process itself is unlikely because of the depth at which it occurs.
Health Impact Assessment

• HIA aims to predict the health implications of a development or project which aids decision makers.
• Aim is to enhance positive aspects and avoid or mitigate negative aspects
• HIA can be desktop, rapid or comprehensive usually dependent on scale of project, time and availability of resources
• HIA is usually a holistic approach using a mixture of qualitative and quantitative methods
• Ideally HIA should consider views of all stakeholders and especially the affected communities
HIA and related guidance

No formally prescribed methodology for carrying out an HIA although numerous guidance documents are available


UKOOG has produced guidance for the industry to show where health concerns can be covered within EIA [http://www.ukoog.org.uk/images/ukoog/pdfs/Guidelines_for_Addressing_Public_Health_in_Environmental_Impact_Assessments_for_Onshore_Oil_and_Gas.pdf](http://www.ukoog.org.uk/images/ukoog/pdfs/Guidelines_for_Addressing_Public_Health_in_Environmental_Impact_Assessments_for_Onshore_Oil_and_Gas.pdf)
Health in Environmental Impact Assessment

- EIA is a statutory assessment which accompanies certain planning applications.
- An EIA is conducted on development projects which are expected to have significant effects on the environment.
- Currently EIAs need to consider the significant effects of a proposed project on human beings, as well as on a range of other topics.
- EIA Directive effective from Spring 2017 – definition of health changed to ‘population and human health’.
Health Engagement – planning and permitting

- Environmental Permitting Regulations (England & Wales) 2016, originally came into force on 6 April 2010

- Consultation and public participation required - enables members of the public and other organisations (such as public health bodies) to provide comments to the regulator on aspects relating to potential environmental and human health impacts.

- PHE provides an expert and independent opinion to the regulator (EA) on the potential public health impacts of emissions arising from existing or proposed regulated facilities at the permit application stage.

- PHE and the Environment Agency (England) have a ‘Working Together Agreement’ setting out what each can expect of each with respect to permitting.

Public Engagement Events
Approaches to engagement events

- Round 14 petroleum exploration and development licence (PEDL) blocks - 159 new licences
- High level of public and media interest
- Feedback during formal consultations has shown need to engage with the public at a much earlier stage
  - Public drop-in sessions
  - MP-led events (town hall)
  - Scrutiny Committees
Aims of the events

- Engage with residents at early stage, ahead of any planning or permitting applications
- Discuss key issues before sites have been identified for development
- Explain how regulators regulate the oil and gas industry and protect people’s health and the environment
- Explain our role as an advisor
- Informal information sessions
- Public drop ins – more constructive than public meetings
- Cohesive approach from agencies – demonstrate how we are working together to protect people and the environment
- All regulators in attendance – benefit for local people seeking answers on public health, safety, climate change and any local impacts and environmental risk.
Agencies in attendance

- Environment Agency – Environmental regulator, permitting
- Oil & Gas Authority – Oil & Gas regulator, licencing
- Health and Safety Executive – Health & Safety Regulator – well safety
- Mineral Planning Authority – Planning permissions
- PHE - NOT a regulator but an advisor
Promotion of events

- Local media
- Social media including Twitter
- Local MPs (newsletter and websites)
- Anti-fracking websites
- Green party
Attendees

- General public
  - Varies between well read and those seeking reassurance/info
  - Multiple attendances in some areas
- Protest groups
  - Frack Free
  - Friends of the Earth
- MPs and local councillors
- Parish councils
- Local Vicar – circulated his thoughts across the country
Typical Questions - PHE role

- What is our role? Do we have the resources to do our job?
- Fracking is it safe?
- Why are we (PHE) not a statutory consultee from the planning perspective?
- If PHE role is to protect health how can we say… in the report, if there is such a gap in the evidence?
- Why do PHE not follow precautionary principle based on current evidence?
- Disinformation and how to access the truth? Issues with respect to variations of information available.
- Climate change and energy policy
- Our personal opinion of shale
- Wider public health issues, health and well being, mental health
- What is our role from the planning and permitting perspective?
Typical Questions - Health studies

- Are we looking at health impacts of Fracking?
- What are the health parameters that you are going to look at / monitor?
- Our view on studies published since the PHE review (ie post 2015).
  - Pennsylvania Met study of AQ and impacts on health – those located in areas of high well density more likely to be admitted to hospital?
  - Asthma study
  - Medact report
  - faculty of public health asking government to overrule the decision on shale gas activities.
Positives

• Very good feedback received!
• Greater engagement with the public
• Public feel they have access to the experts and are listened to
• Profile of PHE – staff available to be challenged on the evidence
• Continued development of working relationships with other agencies
Engagement - USA

- Spatial planning
- Set-backs
- State vs County/Municipalities (House Bill 13)
- Impact Fee
- Memorandums of Understanding (Colorado)
- Transparency eg FracFocus
Production Pad - Texas
Production Pad - Pennsylvania
What next?

• UK Development in 2017
  • Cuadrilla, Lancashire
  • Third Energy, North Yorkshire
  • New planning applications 2017 – numbers?

• Further engagement events; drop-in, proposal-specific

• PHE Reports?

• Health Impact Assessment toolkit

• Results of baseline monitoring programmes
Summary

• Shale gas extraction is at an early exploratory stage in UK
• Issue has resulted in public concern, reports suggest potential exists for adverse effects on the environment and human health
• The currently available evidence suggests that the potential risks to public health from exposure to emissions associated with the shale gas extraction process are low if operations are properly run and regulated
• Public engagement provides access to regulators and advisors and allows for detailed questioning
• Engagement provides a two-way dialogue and provides reassurance to communities
• Continue to review the evidence-base and develop tools for supporting local public health teams
Thank you – Questions?