

Unconventional Gas (UG) in Scotland Public Health Impact Assessment (PHIA)

Report of a PHIA scoping workshop with community groups and other stakeholders, held on Monday 23 November 2015.

Introduction

This is the report of a scoping workshop held for community group representatives and other stakeholders as part of the PHIA process being coordinated by Health Protection Scotland, on behalf of the Scottish Government.

Three workshops were held in November 2015 to identify key issues to be considered in the Public Health Impact Assessment (PHIA) of Unconventional Gas (defined as including unconventional oil and coal bed methane) in Scotland. Separate events were held for representatives from:

- (1) community groups and other stakeholders (defined as non-industry and non-public sector organisations);
- (2) UG industry representatives and
- (3) public sector agency professionals who would be required to respond to applications for UG developments and/ or give advice to local communities regarding such developments.

The purpose of the workshops was to identify the issues of particular concern to each group of stakeholders and not to identify, assess or evaluate specific evidence associated with these issues. The issues highlighted in each event were to be used by the HPS UG PHIA Working Group (WG), as part of the PHIA process, to help set the scope for the review of evidence.

The workshops were all held under Chatham House rules. Information and views shared in the workshops cannot therefore be attributed to any individual or organisation.

This is the report of the event held for the community groups and other stakeholders. Attendees at the community event included representatives from:

- Community Groups across Scotland affiliated to the Broad Alliance
- Friends of the Earth Scotland
- Environmental Protection Scotland
- The Occupational and Environmental Health Research Group, Centre for Public Health and Population Health Research, School of Health Sciences, University of Stirling

Each workshop included presentations giving an overview of the scope and process of the PHIA, and an outline of the present state of knowledge on UG in Scotland including a description of the regulatory context. Participants were then invited to identify the relevant populations to consider in the PHIA, and then used a pre-populated health impact checklist, to identify potential types of impact to consider. Participants then discussed these potential impacts in two smaller groups and were also invited to note any additional points (on post-it notes). Findings from the two sub-groups are combined in this report. Some further written input from one participant has also been added to this report.

A draft report of the event was circulated to participants to allow them to clarify and correct any inaccuracies. This final report includes comments received on the initial draft and details the potential impacts and pathways identified by the Community Groups workshop.

General comments about the PHIA process and the workshop

Feedback from the participants at the event highlighted a number of concerns about the information provided in advance of the scoping events.

(A letter had been sent to the named coordinator for each group inviting them to the event and setting out the purpose of the workshop. However, this was considered inadequate).

Some parties had previously requested information in advance of the event on whom else had been invited and who had declined to attend. (HPS had declined to provide this information on the grounds that this breached a requirement to preserve the confidentiality of other prospective participants who had not been asked for permission to share such details).

Comments were also made on the selection of groups invited. Some participants expressed concerns about the presence of other parties that they did not consider suitable. (The numbers of participants were limited by the need to conform to normal HIA scoping event practice, which is designed to ensure that the ratio of facilitators to participants is adequate to enable all participants to have an equal opportunity to voice their concerns. This is also to prevent any one individual or group from dominating the event unduly).

The group identified themselves as being well informed about UG, and those present on behalf of the Broad Alliance reported that the local community groups they represented have broad membership including people with scientific, academic and health backgrounds. They commented that they felt patronised by assumptions that they lacked technical understanding. They described feeling “fobbed off” by Scottish Government and frustrated that they had not been involved in the PHIA to date beyond an initial meeting with the chair of the Working Group. The PHIA process was described as “inadequate” and they expressed concern that they had been “excluded.” They expressed deep mistrust of industry, Scottish Government, planners and regulators and gave examples. Several members of the group expressed feeling “angry and frustrated... [We] are being treated like we are back in playschool”.

The PHIA scoping event process was described as “demeaning.” One participant expressed anger at the suggestion that participants could write any comments that they did not have an opportunity to share with the group on a post-it note – this was described as “insulting”.

The group suggested that there was a need for more time and capacity (for HPS) to complete the PHIA. The timescale was contrasted with the time and resource used in the New York State review of Unconventional Gas.

Overall, it was suggested that the PHIA should take account of the potential scale of UG development in Scotland and model realistic scenarios to do this, as any evaluation based on the impacts of a single UG well would be meaningless. The group stated that the assessment must consider worst case scenarios (e.g. large

methane leaks) and the risk of cumulative impacts and multiple UG developments – they stated that some communities are subject to proposals for shale gas, coal bed methane and also underground coal gasification.

The group stated that the PHIA should not be based on any assumption that UG development will be permitted in Scotland. The group was also critical that the scope of the PHIA excludes Underground Coal Gasification (UCG). (However it was clearly explained at the event, that the remit for the work had been stipulated in the specification for the PHIA provided to HPS by the Scottish Government (SG) and which was publicly available. It was also explained at the event that the decision to exclude UCG was made by SG not by HPS and that UCG was the subject of a separate Scottish Government commissioned assessment).

Outputs from the group discussions at the event.

POPULATIONS

The group identified the following population groups that may be affected by UG development in Scotland and/or could be particularly susceptible to health impacts.

- People with pre-existing health problems
- Children and pregnant women (especially childhood cancer)
- Elderly
- Communities in close proximity to sites, especially within 1-2 miles (studies demonstrate an impact within a 10 mile radius)
- Communities living 'downwind' from site
- Communities where waste water is likely to go or sediments accumulate – 'downstream'
- Socioeconomically disadvantaged groups, the vulnerable and underprivileged
- People who live in close proximity to other sites that have potential health impacts where the health impacts from UG developments may act cumulatively or synergistically
- Communities along major transport routes
- People with private water supplies
- Workers

POTENTIAL AREAS OF IMPACT

IMPACTS ON HEALTH AND WELL-BEING

Members of the group stated that they would wish direct physical health impacts to be prioritised in the assessment. A slide listing impacts that the PHIA Working Group (WG) had previously identified, was shown; those present agreed that all of the impacts listed could be important. It was suggested that the PHIA should also consider evidence of public health impacts that was led by participants in the Falkirk Public Inquiry.

They particularly highlighted the following potential risks:

Cancers

From exposure to carcinogenic chemicals and radioactive materials introduced or released during drilling, fracturing, diesel exhaust fumes from equipment and interactions.

Childhood cancers

The groups raised specific risks of childhood cancers – parallels were drawn with nuclear energy: “they said that was safe and we all know how safe that is.” There were concerns specifically over exposures in childhood requiring a smaller dose and adverse health outcomes emerging in a much a shorter period of time than it might take for adverse outcomes to develop given the same level of exposure in adults. Furthermore, survivors of childhood cancer often experience iatrogenic effects from treatment which can persist in the long term and include secondary malignancy. Life expectancy among survivors of childhood cancer is lower than the general population; participants said that suicide rates are high among childhood cancer survivors. There are also significant impacts on families.

Respiratory health

Caused or exacerbated by air pollutants including benzene, toluene as well as particulate and nitrogen dioxide pollution and ground-level ozone.

Low birth weight and congenital disorders

Effects of endocrine disrupting chemicals

Including impacts on reproductive health, immuno and neuro toxicity.

Mental health

The group also noted that potential stress and poor mental health could arise due to noise, poor air quality, loss of greenspace, house prices, being “stuck where you don’t want to be,” and perceived lack of control over their lives. This was noted as particularly relevant given the current community empowerment agenda.

Skin conditions

Food quality

The group identified that the potential impact on agriculture, for example from loss of productive land, toxicity of food crops and livestock, could impact on food quality.

Pre-existing conditions

The group noted that people living around old coalfields have existing health issues, which UG impacts could add to.

Effects of ‘boom town’ situation

The group noted that an influx of workers could lead to a ‘boom town’ situation with adverse impacts relating to stress, sexual health and substance use among the workforce. These issues could then also affect the local community. They reported that ‘boom and bust’ patterns within very short time spans have been reported in US and Australia with the result that communities are left to manage consequences after developers have left.

Occupational health

The group noted that UG may provide employment for some, but was unclear about the quality of the employment. They raised concerns about occupational health risks in the short and longer terms. They wondered, “Do the workers know the risks they are exposed to?”

IMPACTS ON PEOPLE

Disempowerment and exclusion of communities

Participants reported that local people in areas where planning applications for UG extraction have been submitted are not being consulted and as a result communities are disempowered. They expressed frustration that communities are excluded from the assessment process although they are directly affected by the outcome. People who have been through the Public Inquiry process and subsequent appeals appreciate just how draining this is emotionally, physically, and financially for individuals and communities; people engage with the process in good faith and at considerable expense in all aspects of their life -- they are worn down at the end of the process. Participants expressed concern about bias in the planning system that seems weighted towards developers, has no third party right of appeal and allows applications to be called in by Ministers. The Falkirk Public Inquiry was given as an example. The group expressed concern that plans to develop UG were kept secret and it was difficult for communities to engage with them. They felt it was important for communities to know how it will all work, but reported their experience that information about what was likely to happen in practice was not forthcoming from the companies.

The group also noted that communities have avenues to seek engagement with Local Authority Planning Authorities but not with SEPA or via the Petroleum Exploration and Development Licence (PEDL) process.

Group participants suggested that there is a low level of knowledge about UG among the general population. "The general population don't know what the issues are." "Where can people get unbiased information? An alternative view? The developers have significant resource and are "love bombing" local communities with "misinformation". There is a lack of balance to the debate and a lack of information from a trusted neutral source." They reported this was exacerbated by limited digital connectivity in large areas of Scotland, as many of the populations that would be directly affected by UG developments have limited access to the internet and so could not engage with the SG's online consultations.

Participants also said that there is a power/wealth dynamic: "This is not Our Scotland, that's a throwaway line." A few people said that there is "feudalism" – land owners in some rural areas have power, influence and political clout with strong links to local councils and local authority planners. It was asserted that some landowners had not renewed tenancies on some farms in south west Scotland to ensure land is available for drilling activity if necessary.

Demographic changes to communities

It was suggested that the impact of a UG development would be that people with financial means would move from affected areas. This could create communities full of disadvantaged and disempowered individuals. This was described as "social engineering" and "colonisation." This might also affect the sustainability of local businesses.

Rural areas

The specific impact of UG developments in rural areas and the effect that this could have on the tourist industry was highlighted. People choose to retire to rural areas because of the natural beauty – would they choose to retire there if there are UG developments? What will happen to the local community without this net in-migration [it was perceived that community sustainability is dependent on people retiring to the area]? How will those who stay feel about their home? Rural communities will be industrialised and this was identified as a threat to the tourist industry. Would UG

lead young people to come back to the area to get jobs? (This suggestion was rejected by other participants.) Or would it deter young people, and others, from moving to the area if it was no longer attractive to live in?

Central belt

In the central belt the higher population density and previous exposure to other industries and other health threats were identified as a “ticking time bomb.” The communities that are likely to be affected in the central belt have already been affected by industrialisation and there is a cumulative effect, which raised issues of environmental justice.

Relationship to place and home

The group raised a wider issue about the impact of place and our relationships to places, in particular our homes, which have a direct impact on our health. “For local people this is not a theoretical exercise [reference to both UG developments and the PHIA process], this is very real.”

Role of community groups

There was some discussion about the representativeness of community groups protesting about UG activity. One participant suggested that local community groups are not representative of the disadvantaged within the population, who are less likely to engage with this type of consultation process. This was strongly contested and rejected by representatives of community groups present: “Community groups are about equality and inclusion, we are not all middle class NIMBYs sitting worrying about the price of our property.” An example was given from a community where almost all residents had petitioned the council with their concerns.

IMPACTS ON SERVICES

Emergency services

It was suggested that there will be a need for emergency preparedness operations – this may detract resources from elsewhere. Potential emergency events identified included risks arising from gas pipelines, explosions and any risk from terrorism. Do we have the capacity to deliver this?

Health and Social Care

The group stated that there would be an impact on demand for local health and social care services both in terms of dealing directly with the negative impacts on health and wellbeing of the local population and also the needs of migrant workers.

It was stated that the USA has specialists working solely in the late effects of childhood cancer treatment – one member of the group argued that this would be required in Scotland if UG were to be developed.

The group noted that the NHS does not have experience of assessing the impacts of UG developments and could not therefore reassure communities about the risks. They also noted that GPs should be made aware of potential risks so they can look out for them.

Education

The group expressed concern about noise and, in particular, the impact of noise on school children if there is noise distraction near schools or children’s homes.

Water

The group identified potential impacts on water supply.

IMPACTS FROM TRANSPORT

HGV movements

The group reported that there would be 2,000-4,000 HGV movements over the lifetime of a well, with potential health impacts. The group noted that these impacts will add to existing impacts of traffic and HGVs so would depend on the pre-existing situation. The impacts of this included air pollution, noise, damage to roads, and congestion.

IMPACTS ON EMPLOYMENT AND ECONOMY

Direct employment

It was noted that there would be direct employment from UG. There was discussion about the key workers, which roles would be needed and where they would be. Group members noted that each well would need 15-20 workers who would rotate to the next site, so the total jobs created would be limited. There would also be short term construction jobs.

The group reported that a cost benefit analysis had found UG would bring few local jobs, as skilled workers would need to come from outside, and higher paid engineering jobs to produce equipment would be elsewhere. [Reference to Greenpark Energy Report]. The group noted that the most highly paid jobs would be in head offices elsewhere.

The group identified that there may be specific occupational health risks in the industry.

Effects on agriculture and food industry

The groups suggested that UG may have impacts on agriculture and farming. They reported that tenanted farms have been cleared in Dumfries and Galloway and that changing land use is affecting the local economy and the environment. Farmers objected to PEDL133 but were ignored. The group also identified that the presence of UG may affect customers' perceptions of Scottish produce and make it less marketable. They noted that some food production needs high quality water and there was potential for a direct impact if water was contaminated. Sea trout fishing could be affected by this.

Effects on tourism

There was concern about the impact on tourism and, in particular, a potential adverse impact if the area was perceived to be tainted by wells.

Wider economic effects

The group reported that small companies may be bought up by multi-nationals, and so profit would go outside Scotland.

The participants suggested a need for cost benefit analysis as even if there is some benefit to an area from a development (local shops, hotels) this may be offset by other businesses being disadvantaged (tourist industry).

Participants noted that UG investment may also represent diverted investment from renewable energy.

The group noted that economic benefits may not be experienced by those who experience the adverse effects of UG (especially given horizontal drilling).

IMPACTS ON HOUSING

House prices

The group thought house prices could increase if there was demand due to incoming workers. On the other hand, house prices could fall if people don't want to live near to sites. [DEFRA report referenced] The group noted that if there is a 'boom' and then a 'bust' there could be a short term requirement for housing that would benefit some, but thought this would be outweighed by longer term negative impacts on the attractiveness of the area.

Loss of investment

In the context of communities that currently have a lot of retired people, there was concern that this could result in individuals losing the value of their investment in their home.

Out-migration

There were concerns that those who can, will move out of development areas. This could have impacts on those who remain – they could become isolated, suffer reduction in community amenities and services, loss of autonomy, changing relationship with their home.

Subsidence

There was concern about potential subsidence, particularly in areas with existing, poorly mapped, mine-workings. Horizontal drilling could result in houses that are distant to the well pads being affected by this. The group wondered who will pay if subsidence occurs and what impact this would have on insurance. The group reported that there is a lack of technical agreement among experts about whether drilling in existing coal seams and geological faults will create potential pathways particularly for gas migration. [Reference: Falkirk Public Enquiry]

IMPACTS ON ENVIRONMENT

Issues previously identified by the working group were shown on a slide and the group agreed that all of these were issues of concern.

Vulnerable populations

It was suggested that some populations may be particularly vulnerable to environmental pollutants, notably children, pregnant women and those with pre-existing medical conditions.

Cumulative impacts

It will be important to consider that the impact of pollutants may be cumulative and synergistic – proposed developments may be on land that is already contaminated and contamination may not be just soil or just water or just air but a combination; studies tend to focus on assessing the risk associated with a single exposure. A further significant concern is the effect of multiple chemical triggers together, e.g. heavy metals or carcinogens in combination with materials such as surfactants that might enhance their toxicity e.g. by transporting materials across cell membranes; endocrine disruptors acting in combination; or respiratory sensitisers in combination with irritants. There may also be short, medium and long term impacts from exposure to these that should all be considered.

Participants referenced a recent article in *The Herald* newspaper that identified from upwards of 300 high level pollutants identified. There would be emissions arising from flaring of gas, resulting in SO_x and/or NO_x. Pollutants may arise from HGV movements on and off site, chemicals in the drilling process, Naturally Occurring Radioactive Material (NORM), benzenes and other waste products.

It was suggested that some activities, for example HGV movements and flaring, may be within 20 metres of houses and schools – but impacts may be wider and only those living within 20m have to be notified under Planning Regulations.

The group identified a need to consider risks from products and by-products.

Exposure standards

The group wondered which exposure standards to use – for workers or for communities. There may be lessons about impacts on communities from research on workers. They strongly asserted that it was important to consider chronic exposures and multiple stressors rather than just considering risks of individual chemicals.

Specific health effects

The group identified a range of specific health impacts that could be associated with chemical exposure. These included Low Birth Weight, Neural Tube Defects, cancers, endocrine disruption, mental health problems, respiratory disease.

Traffic

The group noted that increased traffic and the development of transport infrastructure would impact on air quality, noise and odours.

Noise

Noise impacts on health and wellbeing in particular leading to sleep deprivation.

Light

Light pollution can also cause considerable stress.

Odour

There was potential for odour which would lead to stress.

Air pollution

Particular exposures of concern were particulate matter and diesel exhaust from onsite equipment, and the interaction with fugitive emissions of methane and other substances from well-heads etc. Effects are far ranging and may be experienced by people living and working several kilometres downwind of development sites. The group reported that there are documented effects which include for example low birth weight babies however there is “limited information on the long-term health impacts of long-term exposure to cancerous chemicals.” [Referenced PSE Health Energy, NY a compendium of risks associated with UG.] Where there is an evidence gap, would it be possible to have some modelling to look at specific impacts and likely outcomes associated with specific exposures? Impaired air quality would be particularly problematic in Air Quality Management Areas (AQMAs).

Water

Water could be contaminated by drilling chemicals, hydraulic fracturing fluids, and naturally occurring chemicals mobilised by these processes (e.g. heavy metals, BTEX, VOCs, PAHs and NORM etc) through faulty well construction; damage or deterioration of wells during and after their productive life; naturally occurring and/or created faults, fractures and cleats; accidents and spills; wastewater treatment and

disposal. The group identified that this could impact on human health via fish ingestion or through direct exposure to contaminated water. It was noted that rural areas may have private water supplies that would be more vulnerable to contamination. One person noted that there could be a benefit to people with private water supplies if UG brought sufficient additional people into an area to justify providing mains water, but others disagreed that this would be beneficial.

Land

The group noted a potential impact on farmers if UG had a negative impact on livestock or crops. The group identified potential land contamination relating to waste disposal. The group noted that context is important.

Regulatory capacity

The group expressed doubt about the capacity of regulators to adequately monitor sites over 30-50 years. This included capacity for monitoring of the work environment. They reported that SEPA had not appropriately monitored UG boreholes.

Climate change

The group identified potential impact on climate change from use of fossil fuels including UG.

IMPACTS ON GREENSPACE

Loss of greenspace

The value of access to green space for physical and mental health was acknowledged. The group identified potential loss of greenspace, with adverse impacts on residents' wellbeing.

Urban greenspace

Some noted that loss of greenspace may be particularly important in areas with poor access to quality greenspace currently. The group suggested that any plans to confine development to already industrialised areas would mean that planners and developers were creating a "sacrifice zone."

Rural greenspace

Others noted that rural areas may rely on greenspace to attract visitors.

Visual impact

The visual impact included wellhead apparatus ('Christmas trees'), visual impact of flares, drilling rigs, tracks, pipelines and associated infrastructure. There was concern about the scale of potential development and industrialisation of the landscape.

Soil disruption and bio-accumulation

The group identified potential impact on peat and soil disruption. They identified a need to understand the capacity of soil to attenuate, potential bioaccumulation, and the risk of accumulation in Sustainable Urban Drainage Systems (SUDS) ponds.

Decommissioning and extensions

The groups said that lessons should be learned from decommissioning of open cast mining, where promises to restore the physical environment were broken and communities have lost trust. There was concern about incremental extensions to sites. It was reported that coal bed methane extraction may then lead to hydraulic fracturing of rock strata ("fracking"), and has done so elsewhere – it was reported that 40% of coal bed methane (CBM) sites are subsequently "fracked".