

Technical workshop on public health impacts and risks resulting from oil and gas extraction

- 8th November 2016, Brussels-
Report

All presentations made at this workshop are available on this webpage:

http://ec.europa.eu/environment/integration/energy/unconventional_en.htm

Session 1: Introduction by the European Commission

The Commission explained that the main objective of this technical workshop is to gather experts from North America and the European Union, knowledgeable about public health impacts and risks resulting from both conventional and unconventional oil and gas extraction, and to identify possible information needs and research gaps.

Session 2: Knowns and unknowns on public health impacts and risks resulting from unconventional oil and gas extraction in the USA

Speakers from Pittsburgh University Graduate School of Public Health, Weill Cornell Medical College and Johns Hopkins Bloomberg School of Public Health stated the following elements:

- There is a limited number of robust studies in the US on health impacts and risks from unconventional oil and gas extraction. Further work is upcoming notably on air quality and psychological hazards.
- Potential sources of public health impacts are:
 - Local (air and water pollution, noise and light, lorry traffic, safety issues)
 - Regional (air pollution, flowback and other waste disposal sites, lorry traffic, water availability, boomtown issues)
 - Global (methane emissions, climate change)
- Health impacts from unconventional oil and gas may derive not only from toxicological effects but may also be linked to effects from stressors (such as denied information, suspected corruption, ignored complaints, financial damages, noise) and the so-called "boom-bust" cycle (the influx of an often young male workforce may lead for instance to alcohol-related accidents or sexually transmitted diseases).
- When looking at health impacts and risks, there is a need to consider not only the local extraction sites but also related activities/facilities in the region such as compressor stations and waste operations.
- Emissions vary from one site to another and depend not only on the characteristics of the site but also on the operator's safety culture.
- More research needs to be done to fully understand the short-term and long-term consequences of exposure (direct and indirect) to hydraulic fracturing activities. In particular, further research is needed on the possible effects of unconventional oil and gas on organ systems, implications on cancer rates and endocrine disrupting chemicals.
- There is a need for continuous monitoring in order to identify trends; it would be useful to replicate existing studies in other shale gas basins in the US.
- There is a need to improve exposure metrics (environmental measurements; appropriate biomarkers).

During the discussion, the need to involve public health agencies and citizens early on before permitting oil and gas extraction projects was stressed, in particular to identify baseline needs.

Session 3: The experience of Lower Saxony, Germany

- Speakers from the NGO GENUK and from the institute of public health of Lower Saxony reported a significant increase in the incidence of lymphoma, myeloma and leukemia in certain age and gender groups. These cancer clusters were identified in several municipalities in Lower Saxony, Germany, that are located close to hydrocarbon extraction sites. Based on available data, no causal link between these cancer cases and hydrocarbon extraction has been demonstrated so far; however public health authorities are still investigating possible causes.
- Investigations using routine cancer registry data alone are insufficient to draw causality links with individual risk factors. A 2009-2016 literature review is being prepared, examining multiple factors for myeloma. Interviews by local public health authorities of the population of one municipality will be evaluated soon and a prospective epidemiological study is also planned. There is a need to quantify exposure (or use a proxy) and better define agents of exposure. The lack of environmental monitoring data was stressed.
- Main sources of public concerns are the possible use of hazardous substances by the oil and gas industry; residues from gas flaring; emissions from venting and from the wells; a lack of data on benzene emissions and hazards resulting from undeclared drilling mud disposal sites. Civil groups have set up a registry of incidents, incl. alleged leakages of waste water, leaks from underground gas tubes and unsafe deposition of drilling tubes (Ra-226), which would have been insufficiently monitored. The NGO GENUK called for more effective controls by enforcement authorities and prevention practices by public health authorities. It recommended the development of databases for emissions/immissions and to widen the scope of existing health registers to additional diseases beyond cancer.

In the discussion, exposure to benzene was identified as a possible cause for the cancer cluster.

Session 4: Health Impact Assessments (HIAs): practices in Member States

- According to Public Health England (PHE), there is on-going baseline monitoring to identify background levels of pollutants in England. It is compulsory to disclose chemicals used for hydraulic fracturing and there is an approval process (chemicals used must be non-hazardous to water). The composition of wastewater must also be disclosed. There is no set method for HIAs but guidance is available. Based on evidence collected until 2014, PHE concluded that hydraulic fracturing is safe provided it is properly regulated; the literature review did not encompass recent scientific articles published in the US between 2014-2016. Few comprehensive HIA have been undertaken on shale activities. There is a need to consider appropriate epidemiological studies to extend and strengthen the evidence base prior to significant development of shale gas extraction.
- The public health charity Medact referred to several recent US studies on health impacts, social and economic effects but raised issues of data gaps, a lack of robust studies and a lack of capacity in public health agencies to adequately monitor these activities in the UK. It considers that PHE's analysis has insufficiently taken into account public health risks related to shale gas development. Broader considerations were also made on how public health impacts of various energy resources compare (incl. indirect impacts due to climate change) and what this should imply for the choice of energy mix.
- Compared to the previous guidance document, the latest guidance developed by the oil and gas industry (IOGP-IPIECA) places more emphasis on strategic HIAs and integrated assessments, encompassing environmental, social aspects as well as the public health dimension. The guidance covers both strategic HIAs and HIAs carried out at the level of the individual project. At project level, a screening is typically done by the companies, the scope is then discussed with competent authorities. The importance of identifying the pre-existing situation before operations start (baseline) was highlighted, as well as the importance of taking appropriate measures to manage impacts and risks.

In the discussion, the following elements were mentioned:

- Exposure to pollutants resulting from conventional hydrocarbons development has not been systematically assessed. As a result, it is unknown what the key pollutants are during the various project phases that could have an impact on public health. It is not known either whether conventional and unconventional hydrocarbons production result in similar or different exposure patterns/health impacts.
- When assessing the health impacts of hydraulic fracturing, the chemicals used for fracturing have to be taken into account but also the characteristics of the fluids returning to the surface following the fracturing operation.
- Cause-effect relationships are difficult to show.
- Each HIA must explain the information on which it relies and its limitations.

Session 5: Relevant initiatives at EU level:

- The European Human Biomonitoring Initiative (HBM4EU) is due to start in January 2017. This 5 years European Joint Programme aims at coordinating and advancing human biomonitoring in the EU. A set of priority chemicals to be focused on has been identified for the first 2 years, after which new prioritisation will take place. Chemicals mixtures are featured in the programme.
- The EU platform for chemical monitoring data (IPChem) was then presented. It aims notably at compiling existing data on chemicals monitoring, improving comparability of data across the EU and promoting interoperability with other information systems. It includes human biomonitoring and environmental modules.
- A recent proposal to improve the situation of workers faced with carcinogens and mutagens at work was put forward by the Commission¹ (COM(2016) 248 final). In this document, a binding Occupational Exposure Limit (OEL) for respirable crystalline silica was proposed (0.1 mg/m³). There is already a *binding* OEL for benzene². A 4th list of substances on which *indicative* OELs will be identified is expected to be developed by the end of 2016.

Session 6: Epidemiological studies and biomonitoring

- US academic experts pointed to the need to measure exposure of individuals and involve local communities (e.g. "citizen science"). Exposure agents and their health effects need to be identified. An expert suggested assessing health effects using animals because effects may show earlier than on human beings.
- The Commission (RTD) informed that there are 3 "exposome" research projects³ which are currently on-going at EU level with a financial EC contribution.
- Public Health England is currently designing an epidemiological study. The target population is likely to be small. There is a need for more discussion with communities. The importance of carrying out baseline measurements was stressed, against which changes can be assessed. Some signature compounds could be identified. Exposures must be validated.
- The NGOs Food and Water Europe (FWE) and Friends of the Earth Europe (FoEE) called for more transparency from the industry and pointed out that the energy sector needs to be decarbonised in order to meet the agreed climate targets. FWE suggested focusing the research on regions with oil and gas activities. The NGO Genuk proposed to focus on benzene as well as on other known or suspected carcinogens identified in recent research. With

¹ <https://ec.europa.eu/transparency/regdoc/rep/1/2016/EN/1-2016-248-EN-F1-1.PDF>

² Directive 2004/37/EC (<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2004:229:0023:0034:EN:PDF>)

³ Exposomics; Heals; Helix, two of which will be finalised next year;

<http://ec.europa.eu/research/health/index.cfm?pg=policy&policynome=environment>

regard to participatory research, FoEE raised the concern that prospective studies would use communities as "guinea pigs". FWE expressed concerns about compliance with the Strategic Environmental Assessment Directive in Lower Saxony and considers that competent authorities would need to restore and/or enhance public trust. Medact mentioned the importance of explaining to the local communities the objectives of such participatory research. GENUK suggested to work with health insurance companies and cancer registries to gather relevant data and pointed out that the results of epidemiological studies must have an impact on policy-making. Overall, the NGOs consider that it would be better to stop fossil fuels extraction in the first place.

- The Lower Saxony health authority pointed out that the most important is to identify the exposure agents. The local population in Lower Saxony has strong expectations about epidemiological studies.
- The oil and gas industry suggested to start with baseline surveys and identify specific markers.
- The Commission (JRC) mentioned that there may be a need to summarise available studies, their scope, target population and limitations; identify chemical agents and non-chemical agents; carry out exposure assessments; and possible research on biomarkers.

Session 7: Concluding remarks by the European Commission

The Commission (ENV) thanked all participants for their involvement in the workshop. Follow-up reflections by the Commission will address the following points:

- Citizen science⁴: The need for transparency and the involvement of citizens are featured among the core principles of the Recommendation⁵ adopted by the Commission in 2014. The workshop suggests that this should be applied to all hydrocarbon production activities including conventional production. Any particular follow-up action from the Commission would need to take into account the subsidiarity principle and Member States' freedom to choose their energy resources.
- Availability of exposure data: The workshop identified gaps in the availability of such data. In view of more than 150 years of conventional oil and gas production in Europe, this appears surprising. Knowledge of exposure to relevant agents across the lifecycle of a hydrocarbons project is essential to draw conclusions on causality links. It is also of high relevance for HIAs. The Commission is currently considering further research activities to improve exposure and health risk assessment within the framework of the exposome concept.
- Epidemiological studies: a series of epidemiological studies with coinciding results are needed to reach a scientific consensus on cause-effect relationships of exposure and associated health impacts. Therefore, epidemiological studies carried out in the EU in the oil and gas producing areas provide an added value. In view of the current hydrocarbons activities in Europe, such studies would focus on areas with long experience of conventional oil and gas production⁶. This would complement epidemiological studies carried out in the US that address unconventional hydrocarbon production. It remains to be seen whether such studies should be carried out at national level or whether an EU-wide study would be more appropriate. Furthermore, studies comparing the health impacts of all energy carriers including fossil fuels, nuclear energy and renewable energy sources would be desirable.

⁴ involvement of the public in scientific research

⁵ <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32014H0070>

⁶ including tight gas production