



EUROPEAN COMMISSION

Directorate-General for Environment

Circular Economy & Green growth

Waste Management & Secondary materials

SCIENTIFIC COMMITTEE ON HEALTH, ENVIRONMENTAL AND EMERGING RISKS (SCHEER)

Request for an opinion on public health impacts and risks resulting from onshore hydrocarbon exploration and production in the European Union

Commission Department requesting the Opinion: Directorate-General for Environment

1. Background

Hydrocarbons have been produced for more than 150 years in many areas of the world and the EU is featured among the producers of crude oil and natural gas. This activity results in planned and unplanned releases of crude oil and gas components as well as other substances to air, groundwater, surface water and soil. The population living in oil and gas production areas is exposed to these agents. Releases of the following substances are considered to be among the most problematic during crude oil and natural gas production: benzene, SO₂, NO_x, formaldehyde, PAHs and hydrofluoric acid.

In the EU, there seems to be limited information available on possible public health impacts and risks resulting from decades of oil and gas production, including in populated areas. A significant increase in the incidence of lymphoma, myeloma and leukaemia in certain age and gender groups has been identified in several municipalities in Lower Saxony, Germany, that are located close to hydrocarbon extraction sites. The possible causes are being investigated.

In North America, a number of scientific papers and studies have been recently published, drawing attention to possible public health impacts and risks resulting from the fast development of onshore unconventional oil and gas production (e.g shale gas), requiring the use of well stimulation¹ techniques, such as high-volume hydraulic fracturing. This is a process by which fracturing fluids, a mixture consisting typically of water, a proppant (such as sand) and chemicals are injected under high pressure in the underground so as to break the rock and access hydrocarbons. Some US papers reported preterm birth, high-risk pregnancy, possibly low birth weight, asthma exacerbation, nasal and sinus problems, migraine headache,

¹ Well stimulation is a general term describing a variety of operations performed on an oil and gas well to improve productivity. It is generally divided into matrix treatments and hydraulic fracturing. (Amec 2016) High-volume hydraulic fracturing was defined in the Commission Recommendation 2014/70/EU as "1 000 m³ or more of water per fracturing stage or 10 000 m³ or more of water during the entire fracturing process into a well".

and severe fatigue symptoms near unconventional gas developments^{1 2}. These studies do not distinguish to what extent the possible health impacts and risks identified are specific to activities involving the use of high-volume hydraulic fracturing (e.g. shale gas) or could be caused by exposure to agents that occur in oil and gas extraction in general.

While some papers argue that exposure to pollutants is expected to remain below the thresholds set by the World Health Organisation or that public health effects resulting from such activities are not significant provided that adequate measures are in place, other reports tend to stress the lack of biomonitoring and epidemiological research, making it difficult to have clear evidence of public health impacts and risks. Recommendations for increased transparency have been made, in particular as regards the use of chemicals and air emissions³. General EU legislation on environmental protection and workers' health applies to hydrocarbon exploration and production. In addition, the non-binding Commission Recommendation 2014/70/EU on minimum principles for the exploration and production of hydrocarbons using high-volume hydraulic fracturing (such as shale gas) aims inter alia at ensuring that public health is safeguarded.

As part of our mission to protect human health, we would like to have a better understanding of exposure to agents resulting from onshore oil and gas extraction and of the overall risks to and impacts on public health associated with this activity in the EU.

2. Terms of reference

SCHEER is asked to provide an answer to the following questions:

1. Can you assess public health risks resulting from onshore oil and gas exploration and extraction practices at commercial scale in the EU?
2. What are the main knowledge gaps identified and what should be done to address such gaps?

In this work SCHEER should build upon scientific literature available focusing on information relevant to practices in oil and gas exploration and extraction at commercial scale in the EU (from construction until the post decommissioning). In the absence of relevant data in the EU, experience from outside the EU can be examined, provided that it is deemed comparable to EU practices, in view of standards applied by the industry. Please note that this opinion is not expected to duplicate recent literature reviews carried out (see non exhaustive list of studies/papers below).

Deadline: September 2017

² Presentation from Johns Hopkins School of Public Health made at the European Commission workshop on public health impacts and risks from hydrocarbons exploration and production, 8 November 2016: http://ec.europa.eu/environment/integration/energy/unconventional_en.htm

³ Minutes of a European Commission workshop on public health impacts and risks from hydrocarbons exploration and production, 8 November 2016: http://ec.europa.eu/environment/integration/energy/pdf/health_impacts_and_risks-from-oil_and_gas_extraction.pdf

Non-exhaustive list of recent studies/papers:

North America:

o Toward an Understanding of the Environmental and Public Health Impacts of Unconventional Natural Gas Development: A Categorical Assessment of the Peer-Reviewed Scientific Literature, 2009-2015, 2016: <http://dx.doi.org/10.1371/journal.pone.0154164>;

o Environmental health impacts of unconventional natural gas development: A review of the current strength of evidence, 2015: <http://dx.doi.org/10.1016/j.scitotenv.2014.10.084>

o Environmental and health impacts of 'fracking': why epidemiological studies are necessary, 2016: <http://jech.bmj.com/content/70/3/221>

o Potential Public Health Hazards, Exposures and Health Effects from Unconventional Natural Gas Development, 2014: <http://pubs.acs.org/doi/abs/10.1021/es404621d> o Human health risk assessment of air emissions from development of unconventional natural gas resources, 2012: <http://dx.doi.org/10.1016/j.scitotenv.2012.02.018>

EU:

o Health impact assessment of Unconventional oil and gas in Scotland, 2016: <http://www.hps.scot.nhs.uk/resourcedocument.aspx?resourceid=3102>

o Unconventional Gas Exploration and Extraction (UGEE) Joint Research Programme, Ireland, 2016:

[http://www.epa.ie/pubs/reports/research/ugeepublicconsultation/EPA-Fracking-8pp-DL-Jan15-v7\(web\).pdf](http://www.epa.ie/pubs/reports/research/ugeepublicconsultation/EPA-Fracking-8pp-DL-Jan15-v7(web).pdf)

o Bekannte oder vermutete Risikofaktoren für das Multiple Myelom, Institute of public health of Lower Saxony, 2009

o Review of the Potential Public Health Impacts of Exposures to Chemical and Radioactive Pollutants as a Result of the Shale Gas Extraction Process, Public Health England, 2014 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/332837/PHE-CRCE-009_3-7-14.pdf

o AMEC study on the assessment and management of environmental impacts and risks resulting from the exploration and production of hydrocarbons, 2016: http://ec.europa.eu/environment/integration/energy/pdf/Study_on_the_management_of_environmental_impacts_and_risks_of_conventional_oil_and_gas%20.pdf

o AMEC technical support for the risk management of unconventional hydrocarbon extraction, 2016:

http://ec.europa.eu/environment/integration/energy/pdf/study_management_ei.pdf

o AMEC technical support for assessing the need for a risk management framework for unconventional gas extraction, 2014:

http://ec.europa.eu/environment/integration/energy/pdf/risk_mgmt_fw.pdf

Other:

o Green Energy Choices: the Benefits, Risks and Trade-Offs of Low-Carbon Technologies for Electricity Production (2015):

https://www.unclearn.org/sites/default/files/inventory/-green_energy_choices_the_benefits_risks_and_trade-offs_of_low-carbon_technologies_for_electricity_production-2016unep_gec_web.pdf_1.pdf

The SCHEER adopted this mandate by written procedure on 6 March 2017.