

Evidence

Emissions of methane from abandoned onshore oil and gas wells

Project summary SC140032

This study examines levels of methane at the sites of closed, historic onshore oil and gas wells. Sites of old oil and gas exploration and production wells were surveyed. The study found that methane emissions were generally low compared to other methane-releasing activities. The information will inform the Environment Agency's regulatory approach to proposed new developments of this type by helping us to understand the scale of the risks presented by closed sites. It helps to address suggestions that closed wells could be a source of elevated methane concentrations in the atmosphere.

The project was a collaboration between the Centre for Research into Earth Energy Systems (CeREES) at Durham University, the School of Civil Engineering and Geosciences at Newcastle University, and the Environment Agency. Over 100 onshore wells were investigated in 4 different areas of England where oil and gas have been extracted in the past. This includes areas across much of southern England as well as sites in the east midlands, Lincolnshire, Yorkshire and Teesside.

Methane concentrations in the soil above each well were analysed using a conventional portable leak detector (TDL-500) that uses laser spectroscopy. The results were compared with similar measurements taken at a nearby reference site of similar current land use and soil type. Methane occurs naturally from biological processes, for example, in soils, wetlands and the guts of animals as microorganisms break down other carbon-containing molecules. Ruminant animals are unable to digest cellulose from grass directly but instead rely on their gut microorganisms to degrade the cellulose into compounds that the animal can absorb. In doing so the microorganisms also produce large amounts of methane. There are also other potential sources of methane such as coal mines and landfills. Hence, the reference sites help us to understand the natural or existing background levels of the gas, particularly where the land is now used for grazing animals.

The results showed that 30% of the well sites had methane concentrations at the soil surface significantly greater than their reference site. Conversely, 39% of well sites had significantly lower surface soil methane concentrations than their reference sites. Where methane concentrations were elevated, this may have been caused by leakage from failure of the well lining, but this could not be shown from this type of survey.

The results were used to calculate the potential release of methane from closed wells. Emissions seemed to occur within a decade of well closure, although the releases (based on the wells examined here) were small relative to those from subsequent agricultural use of the land. Appropriate design, construction and decommissioning of wells should minimise methane leakage.

This summary relates to information from project SC140032 reported in detail in the following output(s):

Report: Fugitive emissions of methane from abandoned, oil and gas wells. Published in Science of the Total Environment-18943 2015

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