

Air Pollutant Emissions From Oil and Gas Extratcion and Production Wellpads

(Investigating Low Cost Passive Samplers)

Background

To help achieve the goal of sustainable, environmentally responsible development of oil and gas resources, it is necessary to understand the potential for air pollutant emissions from various extraction and production (E&P) processes at the upstream, wellpad level. Upstream oil and gas wellpad operations (other than the production wells themselves) typically include product separation equipment, condensate and produced water storage tanks, pollution control devices, etc. as part of the upstream E&P processes. Knowledge of air pollutant emissions from these spatially dispersed operations is limited, given variable levels of emissions over time and by process condition, and are challenging to measure. This project, conducted by EPA's Office of Research and Development and EPA Region 8 in collaboration with the oil and gas industry, aims to develop and test new low cost measurement methods to help improve understanding of air pollutant emissions from oil and gas wellpad operations.

Research Description

This research effort explores use of low cost passive samplers to produce multipoint air pollutant concentration measurements around upstream oil and gas wellpad operations. The project also explores ways that these measurements could be used to estimate emission levels from the extraction and production equipment and how the engineering and work practices of the producers may affect emissions and near source concentrations.

The passive sampler approach is attractive since it is relatively low cost to deploy and provides minimally invasive observations over long periods of time. A passive sampler is a three-inch long, ¼-inch diameter tube filled with a sorbent material. When the tube is exposed to the air, some air pollutants accumulate on the sorbent material through the process of diffusion. After two weeks of exposure, the tube is capped and sent to a laboratory for analysis, providing a time-averaged concentration of select air pollutants. A passive sampler is shown in the photo hanging below the metal rain shelter. The inlet of the tube is positioned alongside the inlet of an air sampling canister used for quality assurance comparisons at one or more sampling locations.



Passive Sampling device

The passive samplers are very easy to deploy because no electrical power is required and they simply need to be hung at the desired location. In addition, the passive samplers are small and only need to be changed out every two weeks, so the measurements can be made with very little interference to site operations. Since the passive samplers are low cost and data can be collected over an extended period of time, the variability of emissions and the effects of technology and work practice changes can be assessed over time.

How Will The Research Be Conducted?

The industry collaborators and EPA ORD will enter into a Cooperative Research and Development Agreement (CRA-DA) to study the use of passive sampling technologies to monitor emissions around a minimum of two separate wellpads, varying in degree of emission control technology (uncontrolled vs. controlled). A quality assurance project plan outlining the research, use of data, and roles and responsibilities of the parties will be written. A number of passive samplers will be deployed in areas surrounding a particular wellpad, in some cases collocated with canisters or other comparison metrics, and a field meteorological station will be set up at one or more facilities. Every two weeks the tubes will be changed by EPA representatives or the collaborators. The passive samplers will be analyzed by one or more quality assured laboratories and the data shared. To support the measurements, data on process operation changes may be gathered by the group from the industry collaborators to provide maximum utility for the project. Quality assurance sampling and comparative analysis will be designed in conjunction with the collaborator to ensure that acquired data is of known uncertainty. All sampling methods and data acquired or developed as part of this research effort will be shared with the industry collaborators.

Web Source

<http://www.epa.gov/osp/ftta.htm>

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