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Technical Fact Sheet

Air Pollutant Emissions From Oil and Gas Ponds
(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 production processes. Oil and gas production operations can include waste water holding and evaporation ponds as part of the upstream process. Knowledge of air pollutant emissions from these ponds is somewhat limited and levels of emissions and their variability in time and by process condition are difficult to measure and model. This project, conducted by EPA's Office of Research and Development and EPA Region 3 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 ponds.

Research Description

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

Passive Sampling device

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 comparisons at one or more sampling locations.

Because the passive samplers require no electrical power to operate, they are very easy to deploy and simply need to be hung at the desired location. Since the passive samplers are small and only need to be changed out every two weeks, the measurements can be accomplished with very little interference to operations. Since the passive samplers are low cost, data can be collected over an extended period of time, allowing the variability of emissions and the effects of work practice changes to be assessed.

How Will The Research Be Conducted?

The industry collaborators and EPA ORD will enter into a Cooperative Research and Development Agreement (CRADA)1 to study the use of passive sampling technologies to monitor emissions around one or more oil and gas ponds. A quality assurance project plan outlining the research, use of data, and roles and responsibilities for the parties will be written. A deployment of a number passive samplers in areas around the pond, a canister or other comparison metric, 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 and periodic water samples will be gathered by the group 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, modeling, and data acquired or developed as part of this research effort will be shared with the industry collaborators. The industry collaborators will have the opportunity to comment on all publications and add official comments in the form of an appendix to any generated reports.

Web Source

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

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