

Development of a Model to Predict Benzene Emissions from Glycol Dehydrators with Condensation Tanks

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Situation

The oil and gas industry uses glycol dehydrators at many facilities to remove moisture from natural gas streams. The glycols used in these processes also remove other components from the gas stream and some of these components are released to the atmosphere during the glycol regeneration process. Benzene is one of these components and there are regulations in place that limit the allowable benzene emissions from glycol dehydrators. One method of reducing benzene emissions from the glycol regeneration vapour stream is to pass the vapour through a condensation tank or some other form of condensation equipment. These condensation methods are allowed as a method to reduce benzene emissions to regulated levels as long as the final benzene emission levels are measured in the field. This measurement is a costly and dangerous activity. There is a need for a method to allow the upstream oil and gas industry and Regulators to determine the

benzene levels leaving these condensation devices without the need for field measurement.

Project Objective:

Develop a tool that can be used to model the performance of tanks and other equipment used to condense benzene from the glycol regeneration vapour stream so that benzene emission levels can be calculated. The tool should be based on a combination of field measurements and theoretical calculations to ensure that benzene emission levels can be accurately predicted, and accepted by Government Regulators. Some variables which effect benzene condensation, that must be considered in the development of the model include: gas analysis, vapour temperature, ambient temperature, condensation equipment design, impact of other vented gases on condensation efficiency (process gas is vented along with the benzene in varying amounts depending on glycol flow, glycol pump type, and operating pressure). Other variables may also affect the condensation performance, and these must be identified and considered in developing the model.

Policy Issue

Understanding the relationship between source emissions and ambient air concentrations. All levels of Governments and health agencies (local to international) are increasingly using ambient air quality benchmarks (objectives, standards, guidelines, etc) as a means to achieve and maintain air quality in respective jurisdictions. To determine the impact of

such policy measures on the UOG, it is important for industry to understand how air pollutant emissions contribute to and affect the ambient conditions surrounding UOG facilities.

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