Title of Presentation: Characterizing Emissions and Developing Emission Factors at Gas Gathering Compressor Stations, Gas Gathering Pipelines and Gas Storage Fields

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Brief Abstract: More than 51,000 reciprocating compressors are operating in the United States today, with a potential to contribute over 72.4 Bcf per year of methane emissions to the atmosphere (USEPA, 2016a). Additionally, the Pipeline and Hazardous Materials Safety Administration (PHMSA) estimates that there are over 240,000 miles of gas gathering lines in the U.S.. Currently, there is minimal data available on leak rates from gathering lines. However, studies conducted on gas distribution pipelines have found that cast iron and unprotected steel piping have a potential for high leak rates (USEPA, 2016b). Additionally, knowledge of methane seepage from gas storage wells is currently limited and not fully represented in the Green House Gas Inventory (GHGI) (Petron et al., 2012; Tollefson, 2013). Soil gas measurements conducted by USGS and BLM show evidence of significantly elevated methane seepage from the ground surface near gas storage wells (Lyman et al. 2016; Stolp et al., 2006). These results underscore the need for a robust approach to detect and accurately quantify such emissions over the full range of expected field conditions, including seasonal variability in climate as well as operations, in order to better understand the true impacts of natural gas gathering, boosting and storage operations.

Two research projects have been funded by the U.S. Department of Energy – National Energy Technology Laboratory (DOE-NETL) to conduct fugitive leak screening and component-based emission rate and frequency measurements at natural gas gathering and boosting compressors, gathering lines, and storage wells. Multiple field programs will be conducted using: 1) an optical imaging camera for fugitive screening; 2) a high volume sampler for component-level emission rate and frequency measurements; 3) an open path FTIR spectrometer and tracer gas for ambient and background measurements; 4) a dynamic flux chamber to quantify methane seepage at the soil surface and; 5) subsurface temperature and moisture sensors to perform long-term, high-resolution monitoring of subsurface methane seepage rates (storage wells only).

A critical component of these research projects will be participation and interest from industry, regulatory agency, academia, government and non-governmental organization stakeholders concerned with air emissions from natural gas gathering and boosting compressors, gathering lines, and storage wells. Technical Advisory Steering Committee (TASC) participants will provide recommendations and feedback on project activities to ensure that project results can be broadly applied across industry operations.

References:

USEPA, 2016a. Reducing Emissions from Compressor Rod Packing Systems. USEPA Natural Gas Star Program.

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Tollefson, J., 2013. Methane leaks erode green credentials of natural gas, Nature, 493,doi:10.1038/493012a.

Lyman et al. 2016. Measurement of Methane and Nonmethane Hydrocarbon Soil Flux Near Oil and Gas Wells in Utah, Performance Report summited to Utah Bureau of Land Management, Cooperative Agreement No. L13AC00292.

Stolp, B.J., A.L. Burr, and K.K. Johnson, 2006. Methane gas concentration in soils and ground water, Carbon and Emery Counties, Utah, 1995-2003, U.S. Geological Survey, Salt Lake City, Utah, Scientific Investigations Report 2006-5227.