

## **Converting Fugitive Methane Gas Emissions into a Viable Resource, Fruitland Formation Outcrop, San Juan Basin Colorado**

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Fugitive methane-gas emissions from near surface and surface coal-bed outcrops in the San Juan Basin have resulted in explosion hazards, methane in water wells, distressed vegetation, and greenhouse gas emissions. The Colorado Oil & Gas Conservation Commission (COGCC) funded a demonstration project to evaluate the viability of combining mitigation of the methane gas seepage with use of the potentially valuable resource. A pilot project was implemented to capture the fugitive methane emissions and use the recovered gas to generate electricity. Gas surveys along the 23 mile long Fruitland Formation outcrop located on the northern rim of the San Juan Basin have identified areas of methane gas seepage. One of the seeps is in a rural ranch/residential area of the South Fork Texas Creek (SFTC) drainage where methane has historically been observed bubbling into a creek flowing through an area of distressed vegetation in a pasture.

A mitigation system consisting of gas gathering, gas compression, and electricity generation was installed at SFTC. The gathering system includes horizontal slotted subsurface collection piping and a vapor barrier installed beneath topsoil/ native grass seed. The compression unit consists of a natural gas compressor, fluid separation, and controls. The methane powers a 25 kilowatt (KW) microturbine generator with the ability to sync the generated 3-phase power to the 1-phase electrical grid. Excess power is returned to the electric grid as renewable energy per a net-metering agreement with the local power authority.

The first six months of mitigation-system operation indicate that the system is achieving the demonstration project goals with an average recovered gas concentration of 80% methane.

Observed vegetation growth indicates that the goal of mitigating agricultural damage has been accomplished. The annual greenhouse-gas reduction achieved by combustion of the methane at the current operating rate is estimated at 360 tons of carbon dioxide equivalent based on a 20 to 1 reduction in greenhouse gas resulting from methane combustion. Optimum operation with the existing gathering system results in sustained generation of 12 KW, with sufficient energy (KW-hours) to service five typical households connected to the grid.

The methane gas recovery rate varies and operational optimization efforts will continue. The next phase of the demonstration project may include expanding the existing gathering system, or collecting methane from down-dip monitoring wells. The goal of these efforts will be to maximize the power output of the generator to twice the current operational setting. A long term goal of the demonstration project is to encourage recovery and use of the fugitive emissions at other seep locations.