Waste from fracking: Its sources, production and dispersion

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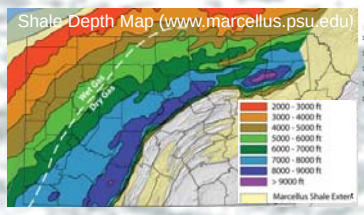
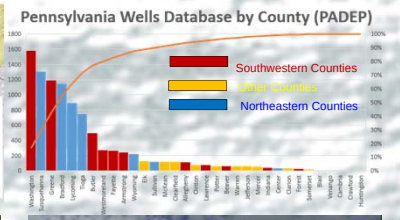
Motivation

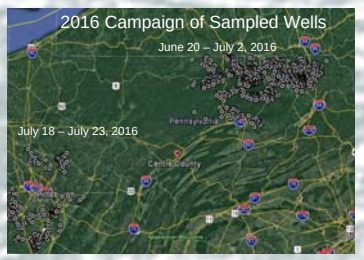
- Identify quantity of solid and fluid waste for sampled counties
- Determine if there is relation between solid/liquid waste and production by examining sampled data
- Compare production and waste between a northeastern region (dry) to a southwestern region (wet)

Background

An NOAA funded campaign over the past two years has sought to quantify the amount of CH_4 leakage in the Marcellus Shale of Pennsylvania, the most productive gas well region in the United State.[1] Over 750 wells are currently being evaluated for fugitive gas emission rates. An inventory of fracking water and solid/liquid flowback seeks to identify trends and any correlations with well data. Waste can be recycled, sent to landfills, and fluid waste can be deep injected or sent to processing facilities. [2] Flowback from drilling/fracking can contain potential hazardous materials such as radionuclides, heavy metals, brines, and other organics which makes proper disposal and treatment an environmental issue. [3]Sampling was constrained to higher density-well regions.

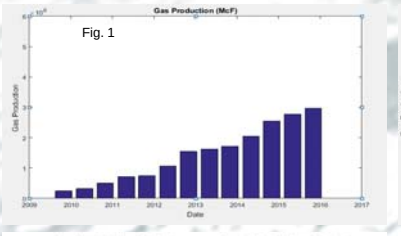


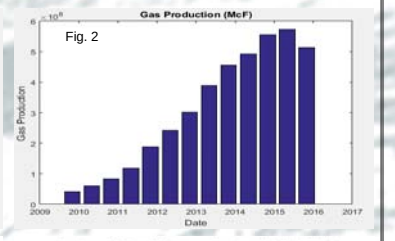


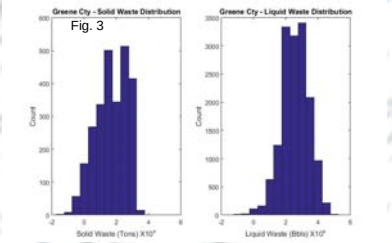


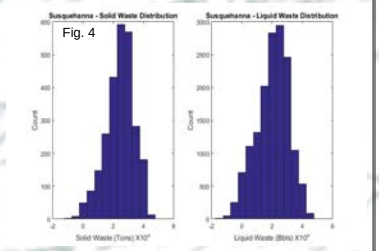
Data

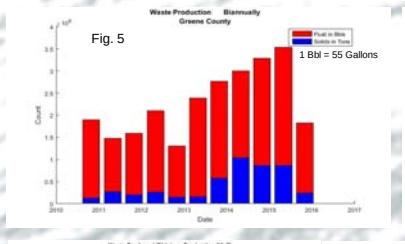
Greene County Wells | Susquehanna County Wells

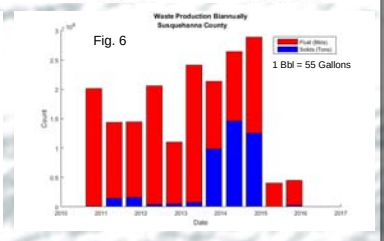


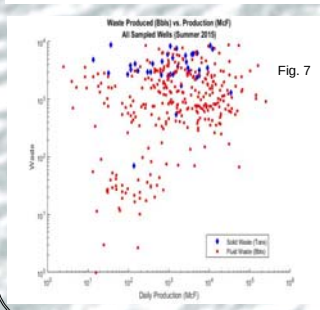


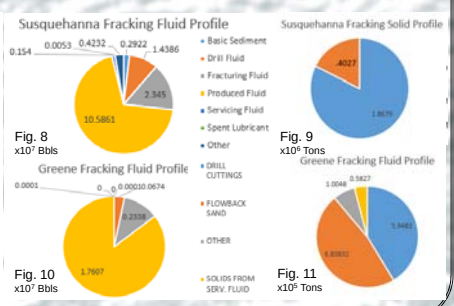












Summary

- Increases in production are a result of well growth (Fig. 1 & 2)
- Susquehanna has a notable drop-off in production (Fig. 2) which may correspond to decreased waste amounts in Fig. 6.
- No notable differences appear in the overall waste profiles. (Fig. 3 and 4)
- Our sampled wells (Fig. 7) appear to show no correlation between production and waste produced over their lifespans.
- Large variations exist in the quantity of flowback solids and liquids from these two different regions.
- Produced fluid is the largest portion of flowback in both cases.
- Flowback sand and drill cuttings constitute the largest component of solid waste from well sites.

References

[1] https://stateimpact.npr.org/pennsylvania/2015/02/17/marcellus-shale-production-numbers-break-another-record/
[2] https://www.epa.gov/hydraulicfracturing#providing
[3]https://www.earthworksaction.org/issues/detail/hydraulic_fracturing_101#.V5pXafkrKCg

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