



Use Inert Gases and Pigs to Perform Pipeline Purges



Technology/Practice Overview

Description

When pipeline segments are taken out of service for operational or maintenance purposes, it is common practice to depressurize the pipeline and vent the natural gas to the atmosphere. To prevent these emissions, Partners reported using pigs and inert gas to purge pipelines.

In implementing this practice, a pig is inserted into the isolated section of pipeline. Inert gas is then pumped in behind the pig, which pushes natural gas through to the product line. At the appropriate shutoff point, the pig is caught in a pig trap and the pipeline blocked off. Once the pipeline is “gas-free” the inert gas is vented to the atmosphere.

Operating Requirements

Requires existing pig-launch and pig trap facilities and a mobile nitrogen supply.

Applicability

This practice applies to all pipeline segments that are being taken out of service for operational or maintenance purposes.

Methane Emissions

The amount of avoided methane emissions is a function of the pipeline diameter, length, and pressure. Based on the *Pipeline Rules of Thumb Handbook*, Fourth Edition, (p. 270), the amount of gas saved by the unit of application is 90 Mcf per year per two miles of 10-inch diameter pipeline. One Partner reported avoiding 538 Mcf of methane for 6 purges by using pigs and inert gas.

- Compressors/Engines
- Dehydrators
- Directed Inspection & Maintenance
- Pipelines
- Pneumatics/Controls
- Tanks
- Valves
- Wells
- Other

Applicable Sector(s)

- Production
- Processing
- Transmission
- Distribution

Other Related Documents:

Inject Blowdown Gas into Low Pressure Mains or Fuel Gas System, PRO No. 401

Economic and Environmental Benefits

Methane Savings

Estimated annual methane emission reductions *90 Mcf per two miles of 10-inch diameter pipeline*

Economic Evaluation

Estimated Gas Price	Annual Methane Savings	Value of Annual Gas Savings*	Estimated Implementation Cost	Incremental Operating Cost	Payback (months)
\$7.00/Mcf	90 Mcf	\$670	\$0	\$500	9 Months
\$5.00/Mcf	90 Mcf	\$480	\$0	\$500	13 Months
\$3.00/Mcf	90 Mcf	\$290	\$0	\$500	21 Months

* Whole gas savings are calculated using a conversion factor of 94% methane in pipeline quality natural gas.

Additional Benefits

- Safety of pipeline system and operators

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Economic Analysis

Basis for Costs and Emissions Savings

Methane emissions reductions of 90 Mcf per year apply to purging 2 miles of 10-inch diameter pipeline with nitrogen at 280-psi pressure, once per year.

The economics of this PRO are based on nitrogen at \$5 per Mcf up to 50 miles from the source to the pipeline location and 2 operators working 8 hours each (labor rate of \$25 per hour). There is no capital equipment required.

Discussion

This practice employs inert gases in combination with a pig to prevent venting of a valuable product when taking a pipeline segment off-line for operational or maintenance purposes. Though it can be cost-effective, safety, not methane savings, is the primary reason for using pigs and inert gas to purge pipelines.

Methane Content of Natural Gas

The average methane content of natural gas varies by natural gas industry sector. The Natural Gas STAR Program assumes the following methane content of natural gas when estimating methane savings for Partner Reported Opportunities.

Production	79 %
Processing	87 %
Transmission and Distribution	94 %

EPA provides the suggested methane emissions estimating methods contained in this document as a tool to develop basic methane emissions estimates only. As regulatory reporting demands a higher-level of accuracy, the methane emission estimating methods and terminology contained in this document may not conform to the Greenhouse Gas Reporting Rule, 40 CFR Part 98, Subpart W methods or those in other EPA regulations.