Reduce Frequency of Replacing Modules in Turbine Meters

Technology/Practice Overview

Description

Turbine meters are used to accurately measure the volume of gas received to, or delivered from pipelines. To assure an accurate measurement, the module (internal rotating element that does the actual flow measurement) has to be periodically removed for servicing. To remove and replace the module, the meter-run is blocked-in and the high-pressure natural gas in the piping section is vented to the atmosphere, resulting in methane emissions.

One partner reported modifying his practice of changing the internal modules from a 2-year frequency to every 3 years. By doing so, the company reduces the methane emissions by one-sixth (one-third of the meters every year, rather than one-half) on hundreds of meters and saves labor costs.

Operating Requirements

May require revision of agreements with customers or public utility commissions on metering standards.

Applicability

This applies to all custody-transfer turbine meters requiring very accurate gas flow measurement.

Methane Emissions

Methane savings are based on a transmission pipeline with 500 turbine meters. A partner has reported savings of 38 Mcf per year on 519 meters, ranging in size from 4-inch to 12-inch.

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

Applicable Sector(s)

- ☐ Production
- ☐ Processing
- ■ Transmission
- ■ Distribution

Other Related Documents:

Replacing Bi-Directional Orifice with Ultrasonic Meters, PRO No. 907

Economic and Environmental Benefits

Methane Savings

Estimated annual methane emission reductions	*27 Mcf per year*

Economic Evaluation

Estimated Gas Price	Annual Methane Savings	Value of Annual Gas Savings*	Estimated Implementation Cost	Incremental Operating Cost	Payback (months)
$7.00/Mcf	27 Mcf	$200	$0	-$4,000	Immediate
$5.00/Mcf	27 Mcf	$140	$0	-$4,000	Immediate
$3.00/Mcf	27 Mcf	$85	$0	-$4,000	Immediate

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

Additional Benefits

- Save labor costs
- Reducing methane emissions was an associated benefit of the project

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(Cont'd)

Economic Analysis

Basis for Costs and Emissions Savings

Methane savings of 27 Mcf per year are based on 500, 8-inch turbine meters in a 900-psig system, replaced every 3 years, rather than 2 years. The volume of gas in the turbine meter run assumes the block valves are spaced 11 pipe-diameters up and downstream of the meters.

There is no implementation cost for this project since no equipment is being purchased and labor is being avoided. Operating costs savings are estimated to be $4,000 based on the value of avoided labor for replacement of turbine meters. Although these savings will vary significantly depending on labor rates and the number of turbine meter replacements avoided, the economics would remain favorable since there is no implementation cost.

Discussion

The primary benefit of this practice is to save labor costs. With no capital requirements and reduced labor, the payout is immediate while also reducing methane emissions.

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 %