Inspect Flowlines Annually

Technology/Practice Overview

Description

All gas wells have flowlines that transport natural gas to transmission compressor stations or processing plant booster stations. These flowlines are normally buried and can leak methane as a result of internal corrosion (particularly in wet, sour gas service), external corrosion, and abrasion from thermal cycling. Methane leakage from flowlines is a significant source of emissions in the gas industry.

One partner has instituted a program of annual flowline inspection to reduce gas losses. Underground leaks may be discovered using ultrasound detectors, digital radiography, infrared cameras, aerial surveys utilizing infrared beams, remote methane leak detectors utilizing infrared beams, or through the temporary introduction of an odorant into the gas stream. Regular repair of underground leaks will prevent small leaks from increasing in volume over time.

Operating Requirements

Walking inspections are more effective when using enhanced leak detection devices or odorants. Operators should also consider the individual operational limits and calibration requirements of the various leak detection devices based on manufacturer specifications. Infrared cameras rely on ambient conditions to supply the necessary infrared beams. Other devices which utilize infrared beams require a surface directly behind the leak to reflect the infrared beam back to the device.

Applicability

This applies to all flowlines in the production sector.

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

Applicable Sector(s)

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

Other Related Documents:

Conduct DI&M at Remote Sites, PRO No. 901

Directed Inspection & Maintenance at Compressor Stations, Lessons Learned

Directed Inspection & Maintenance at Gate Stations and Surface Facilities, Lessons Learned

Directed Inspection & Maintenance at Gas Processing Plants and Booster Stations, Lessons Learned

Economic and Environmental Benefits

Methane Savings

Estimated annual methane emission reductions	*58 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	58 Mcf	$430	$250	$1,080	37 Months
$5.00/Mcf	58 Mcf	$310	$250	$1,080	52 Months
$3.00/Mcf	58 Mcf	$190	$250	$1,080	84 Months

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

Additional Benefits

- Safer operating conditions

Inspect Flowlines Annually (Cont'd)

Methane Emissions

The methane emissions reductions are based on eliminating the average amount of methane emissions from production underground pipelines—53.2 scf per day per mile—as derived from the EPA/GRI study "Methane Emissions from the Natural Gas Industry, Vol. 2." One partner has reported natural gas emissions reductions of 68 Mcf per year.

Economic Analysis

Basis for Costs and Emissions Savings

The savings of 58 Mcf per year are based on finding and repairing leaks (at 53.2 scf per day per mile) in 3 miles of underground pipeline.

The capital cost assumes the purchase of an ultrasound detector for approximately $250. Operating costs include the labor needed to walk the pipelines with the detectors and the labor and materials needed to repair the pipelines. The labor cost for one crew to inspect 3 miles of pipeline are estimated to be $400. According to Oil and Gas Journal (October 9, 1995), the costs per repair using a type B steel sleeve is about $680, including labor.

Discussion

By inspecting flowlines annually, operators can more readily detect leaks, preventing the loss of a valuable product as well as providing safer operating conditions. There are numerous technologies that may be employed to more effectively detect leaks, ranging from ultrasonic to infrared based devices. The primary benefit of this project would be safety while also recovering lost product.

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 %