Install Electronic Flare Ignition Devices

Technology/Practice Overview

Description

Flares are used to safely dispose of combustible gas and avoid releasing it to the atmosphere. Some flares have one or more continuously burning pilot flames, while others save gas by only igniting pilot flames in preparation for use. Pilots can be blown out by wind and gas leakage and/or waste gas is occasionally released to an unlit flare. Both of these situations result in methane, volatile organic compounds (VOC) and hazardous air pollutant (HAP) emissions to the atmosphere.

This technology replaces the intermittently or continuously burning flare pilots with electrical sparking pilots similar to a modern gas stove. These sparking pilots require low electrical power that can be supplied from a battery with solar recharge in remote sites. In addition to using electronic flare ignition devices for pilots, facilities may also install sensors to detect the pilot

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

Economic and Environmental Benefits

Methane Savings

Estimated annual methane emission reductions	*1.68 Mcf per year*

Economic Evaluation

Estimated Gas Price	Annual Methane Savings	Value of Annual Fuel Gas Savings*	Estimated Implementation Cost[1]	Incremental Operating Cost	Payback (months)
$7.00/Mcf	1.68 Mcf	$4,564 [2]	$5,000 *(without on-site power)* $3,000 *(with onsite power)*	$0	14 Months 8 Months
$5.00/Mcf	1.68 Mcf	$3,260 [2]	$5,000 $3,000	$0	19 Months 11 Months
$3.00/Mcf	1.68 Mcf	$1,956 [2]	$5,000 $3,000	$0	31 Months 19 Months

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

[1] Two cost scenarios are considered: A) where power is not already available on-site to power the electronic flare ignition device; B) where power is already available on-site to power the electronic flare ignition device. Scenario A includes capital and installation costs for the electronic flare ignition device plus the costs to install a solar array.

[2] The value of the gas savings is based on the volume of fuel gas savings., which is estimated to be 652 Mcf and includes the avoided methane emissions.

Additional Benefits

- Avoiding significant fuel gas requirements since a pilot flare is no longer required
- Reducing methane emissions was an associated benefit of this project
- Operators must no longer travel to site to relight a pilot flare

Applicable Sector(s)

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

Other Related Documents:

Install Flares, PRO No. 904

Install BASO® Valves, PRO No. 604

Install Electronic Flare Ignition Devices (Cont'd)

flame and shut off fuel gas if the pilot is extinguished.

Operating Requirements

A low amperage electrical power supply is required, such as solar recharged batteries.

Applicability

This technology can be applied to all pilot flame ignition systems, including flares and heaters.

Methane Emissions

Methane emissions occur from leaking or venting un-combusted natural gas through an unlit flare. Leakage may occur through emergency relief valves and blowdown valves connected to a flare. Venting occurs when flare pilot flames are occasionally blown out by high winds, causing release of methane at 70 scf per hour per pilot until they are relit or shut off. In order to model methane savings, it was assumed that a pilot would be blown out for 24 hours in a year, leading to 1.68 Mcf of methane being vented. In addition to the volume of methane that is vented when the pilot is blown out, there are emissions from incomplete combustion of the fuel gas used for the pilot. To be conservative, these emissions are not included in this analysis.

Economic Analysis

Basis for Costs and Emissions Savings

Methane emissions reductions of 1.68 Mcf per year apply to the installation of one electronic ignition device replacing a single pilot that is blown out for 24 hours per year. This value does not include unburned hydrocarbon emissions, making it conservative. However, the primary economic justification for implementation of this mitigation option is the value of the fuel gas savings. Since flare pilot flames require approximately 70 scf of methane per hour, yearly fuel gas savings reach 652 Mcf, assuming a methane content of 94% in fuel gas.

The cost of this project will depend on the availability of sufficient power on site to supply the electronic flare ignition device. If sufficient power is available, the incremental installation and equipment cost would be $3,000. If sufficient power is not available, the full cost of equipment and installation of an electronic ignition device is estimated to be $5,000. The difference is a result of purchasing and installing a solar array, estimated to be $1,000 per panel and $1,000 per solar stand. [1]

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 %

Discussion

This technology can pay back in less than a year. The primary economic justification is the savings of natural gas burned in flare pilots, and not in the reduction of natural gas released through unlit pilots or flares. The gas savings associated with converting a continuous burning pilot to an electronic ignition are, on average, 70 scf per hour per pilot.

[1] http://epa.gov/gasstar/documents/workshops/billings2009/07_solar.pdf

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.