Reroute Glycol Skimmer Gas

Technology/Practice Overview

Description

In the glycol dehydration process, rich glycol is circulated through a regenerator where the dissolved water, methane, volatile organic compounds (VOCs), and Hazardous Air Pollutants (HAPs) are vaporized and vented to the atmosphere. Some glycol dehydrators have glycol vent condensers and condensate separators to recover natural gas liquids and reduce VOC and HAP emissions. The non-condensable gas from the condensate separator, which contains mostly methane, is vented to the atmosphere.

A Partner reported rerouting the condensate separator gas, called skimmer gas, to the reboiler firebox or other low pressure fuel gas systems for fuel use. In addition to reducing methane emissions, this practice further reduces VOC and HAP emissions, and increases product revenue.

Operating Requirements

The condensate separator must operate at a higher pressure than the destination to which the skimmer gas is routed.

Applicability

This practice can be employed on all dehydrators with vent condensers but is based on the assumption that fuel gas consumption levels can accommodate the volume of re-routed skimmer gas.

Methane Emissions

The methane emissions savings are based on the dehydrator having a gas entrainment rate of 3 scf per gallon of TEG, and vent gas containing 95 percent methane.

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

Applicable Sector(s)

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

Other Related Documents:

Pipe Glycol Dehydrator to Vapor Recovery Unit, PRO No. 203

Economic and Environmental Benefits

Methane Savings

Estimated annual methane emission reductions — *790 Mcf per dehydrator unit*

Economic Evaluation

Estimated Gas Price	Annual Methane Savings	Value of Annual Gas Savings*	Estimated Implementation Cost	Incremental Operating Cost	Payback (months)
$7.00/Mcf	790 Mcf	$5,900	$2,000	$100—$1,000	4 - 7
$5.00/Mcf	790 Mcf	$4,200	$2,000	$100—$1,000	6 - 9
$3.00/Mcf	790 Mcf	$2,520	$2,000	$100—$1,000	10 - 15

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

Additional Benefits

- Fuel gas savings

Reroute Glycol Skimmer Gas (Cont'd)

Methane emissions reductions of 7,600 Mcf per year can be achieved for a 20 MMcf per day dehydrator having a vent condenser, without a flash tank separator, circulating 300 gallons of glycol per hour with an energy exchange pump. The absence of a flash tank separator (as is common with some International Natural Gas STAR Partners) would result in greater emissions and, by extension, a greater amount of gas possibly being recovered through this practice.

One Partner reported methane savings of 24 Mcf per day per unit (8,760 Mcf per year per unit). Methane savings may be limited by the amount of low-pressure fuel gas consumption at the site.

Economic Analysis

Basis for Costs and Savings

Methane emissions reductions of 790 Mcf per year apply to a 20 MMcf per day dehydrator with a vent condenser and a flash tank separator, circulating 300 gallons of glycol per hour with an energy exchange pump.

The cost of this project would include planning, design, and implementation by an engineer and installation of additional piping. Using expert judgment and rudimentary estimates of equipment capital and installation costs, the implementation costs are estimated to be approximately $2,000.

Discussion

This technology pays back quickly. Using glycol skimmer gas as a fuel directly offsets use of saleable natural gas, increasing product revenues. The significant gas savings from rerouting glycol skimmer gas to a fuel gas system will offset the low capital, operating, and maintenance costs. This practice is more cost effective for dehydrators without flash tank separators.

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.