Recover Gas During Condensate Loading

Technology/Practice Overview

Description
Lease condensate production, when transferred from storage into tank trucks, can generate significant volumes of methane vapor due to pressure and temperature changes and evaporation. This methane is typically vented to the atmosphere to prevent the internal tank pressure from rising.

One Partner reported capturing methane that would otherwise be vented by connecting the tank truck vent to the condensate storage tank, or to a vapor recovery line. This has provided the Partner with the flexibility to send the methane to a sales line, use the methane for lease fuel, or flare the methane vapors.

Operating Requirements
To avoid methane emissions, the low-pressure gas in the natural gas liquids storage tank must be either flared or recovered with a vapor recovery unit.

Applicability
This technology applies to all condensate production operations using tank trucks or railroad tanks.

Methane Emissions
Methane emissions occur when methane and volatile organic compounds (VOC) flash or evaporate into the air displaced during the loading process. Considering that a loading cycle may occur every 3 to 5 days, approximately 100 loading transfers can occur per year. Using the Pipeline Rules of Thumb handbook,

Economic and Environmental Benefits

<table>
<thead>
<tr>
<th>Methane Savings</th>
<th>Estimated annual methane emission reductions 100 Mcf per storage unit</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Economic Evaluation</th>
<th>Estimated Gas Price</th>
<th>Annual Methane Savings</th>
<th>Value of Annual Gas Savings*</th>
<th>Estimated Implementation Cost</th>
<th>Incremental Operating Cost</th>
<th>Payback (months)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$7.00/Mcf</td>
<td>100 Mcf</td>
<td>$745</td>
<td>$1,000</td>
<td>$200</td>
<td>20 Months</td>
</tr>
<tr>
<td></td>
<td>$5.00/Mcf</td>
<td>100 Mcf</td>
<td>$530</td>
<td>$1,000</td>
<td>$200</td>
<td>28 Months</td>
</tr>
<tr>
<td></td>
<td>$3.00/Mcf</td>
<td>100 Mcf</td>
<td>$320</td>
<td>$1,000</td>
<td>$200</td>
<td>45 Months</td>
</tr>
</tbody>
</table>

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

Additional Benefits
- Safer loading operations
- Reduced VOC emissions

Applicable Sector(s)
- Production
- Processing
- Transmission
- Distribution

Other Related Documents:
- Pipe Glycol Dehydrator to Vapor Recovery Unit, PRO No. 203
- Connect Casing to Vapor Recovery Unit, PRO No. 701
Recover Gas During Condensate Loading (Cont’d)

Fourth Edition, p. 492, the rate of methane emissions from evaporation can be estimated as 50 percent of the total volume filled. Partners have reported reducing methane emissions by 6,500 Mcf to 39,000 Mcf per year, which includes flashing loses.

Economic Analysis

Basis for Costs and Emissions Savings
Methane emissions reductions of 100 Mcf per year apply to the use of a single vapor recovery line used to recover vapor during truck loading every 3 to 5 days. Flashed gas savings can be estimated from site-specific data using GRI-GLYCalc.

The estimated costs of purchasing additional connections to route the tank truck vent to a useful outlet is approximately $1,000. The additional operating costs to connect the lines are estimated at $200.

Discussion
To implement this project, operators will need a vapor recovery line and the appropriate connections to attach the line to the tank, a VRU, or flare stack. If the methane is recovered to a sales or fuel line, the Partner can largely offset the cost of this project. In addition, operators will have a safer working environment since tank vents will not be a concern and the system will be closed loop. This project can payback in two years depending on frequency of loading, load volumes, temperature and pressure changes, the value of gas, among others.

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.