



Connect Casing to Vapor Recovery Unit



Technology/Practice Overview

Description

Crude oil and natural gas wells that produce through tubing may collect methane and other gases in the annular space between the casing and tubing. This gas, referred to as casinghead gas, is often vented directly to the atmosphere. One way to reduce methane emissions is to connect the casinghead vent to an existing vapor recovery unit (VRU).

VRUs are finding wider application at production sites with multiple oil or condensate storage tanks that have significant vapor emissions. This practice takes advantage of the similarities in gas pressure, composition, and rates between tank emissions and casinghead gas.

Operating Requirements

Pressure regulators would be necessary if low pressure casinghead gas is combined with higher pressure sources (e.g., dehydrator flash tank separator) at a VRU suction. Only small diameter piping is required to join a casinghead vent to the VRU suction.

Applicability

This option is applicable at wells producing through tubing with packerless completions.

Methane Emissions

Casinghead gas vents vary widely in quantity and methane content. One Partner reported an annual average casinghead gas methane recovery of 7,300 Mcf per year over a five-year period.

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

Applicable Sector(s)

- Production
- Processing
- Transmission
- Distribution

Other Related PROs:

Installing Vapor Recovery Units on Storage Tanks, Lessons Learned

Install Compressors to Capture Casinghead Gas, PRO No. 702

Economic and Environmental Benefits

Methane Savings

Estimated annual methane emission reductions 7,300 Mcf per well

Economic Evaluation

Estimated Gas Price	Annual Methane Savings	Value of Annual Gas Savings*	Estimated Implementation Cost	Incremental Operating Cost	Payback (months)
\$7.00/Mcf	7,300 Mcf	\$54,400	\$4,300	\$3,400	2 Months
\$5.00/Mcf	7,300 Mcf	\$38,800	\$4,300	\$3,400	3 Months
\$3.00/Mcf	7,300 Mcf	\$23,300	\$4,300	\$3,400	4 Months

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

Additional Benefits

- Recovery of valuable product
- Fewer hydrocarbon emissions

Connect Casing to Vapor Recovery Unit (Cont'd)

Economic Analysis

Basis for Costs and Emissions Savings

Methane emission reductions of 7,300 Mcf per year are the Partner savings from connecting one well to an existing VRU.

The costs (operating and implementation) are based on Partner experiences. At 7.5¢ per kWh, the Partner reported gas recovery would increase electricity costs by \$3,400 per year. Another Partner reported implementation costs of \$4,300.

Discussion

This technology can pay back quickly. Revenue from gas recovery will pay back the piping cost and the incremental electrical power required by the VRU to inject the gas into a 100 psig system.

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 %