Eliminate Unnecessary Equipment and/or Systems

Technology/Practice Overview

Description

As operating parameters change over time, Partners in all sectors have found that certain pieces of equipment or systems initially crucial to operations have become superfluous or greatly exceed operational demands to the point of inefficiency. Production facilities, for example, are designed to accommodate the maximum expected production rate. As fields mature, pressure decline causes production to decrease, resulting in excess processing capacity, inefficient operation, and unnecessary onsite emissions.

For example, crude oil is processed in the field to separate lighter hydrocarbons from produced waters. This process can lead to methane venting when the resulting crude oil and water flows are stored in fixed roof tanks.

As production decreases, partners have reported reducing the quantity of methane emissions by consolidating and centralizing their liquid storage facilities. Through a reduction in the number of field tanks, Partners have been able to reduce methane emissions associated with standing losses due to temperature variations and working losses resulting from changing fluid levels and tank agitation. Consolidated storage facilities are also more economic for vapor recovery.

While changing conditions allow Partners to eliminate some initial equipment, they can also necessitate the addition of equipment. For example, as

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

Applicable Sector(s)

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

Other Related Documents:

Install Pressurized Storage of Condensate, PRO No. 501

Convert Water Tank Blanket from Natural Gas to Produced CO_2 Gas, PRO No. 503

Installing Vapor Recovery Units on Storage Tanks, Lessons Learned

Economic and Environmental Benefits

Methane Savings

Estimated annual methane emission reductions — ***Consolidate storage tanks:*** *4,200 Mcf per tank*

Economic Evaluation

Estimated Gas Price	Annual Methane Savings	Value of Annual Gas Savings*	Estimated Implementation Cost	Incremental Operating Cost	Payback (months)
$7.00/Mcf	4,200 Mcf	$31,300	$10,000	$0	4 Months
$5.00/Mcf	4,200 Mcf	$22,300	$10,000	$0	5 Months
$3.00/Mcf	4,200 Mcf	$13,400	$10,000	$0	9 Months

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

Additional Benefits

- Operations and maintenance cost savings
- Increased operational efficiency

Consolidate Crude Oil Production and Water Storage Tanks and Eliminate Unnecessary Equipment and/or Systems

a high-pressure gas well matures, the initial separator and glycol unit would be oversized and require downsizing. At the same time, a compressor, water storage tank, and salt water disposal system might need to be added to continue production. The operator would need to evaluate the remaining gas reserves to justify these additional expenditures.

The more than 17 Partners that have reported this PRO found that eliminating or downgrading unnecessary pieces of equipment or systems increased efficiency, lowered operation and maintenance costs, and reduced methane emissions. Equipment eliminated or downgraded included tanks, compressors, glycol dehydrators, truck loading sites, heater/treater units, gas -driven water treating flotation cells, and CO_2 membrane units.

Operating Requirements

In general, eliminating or downgrading unnecessary equipment will not affect operating requirements, though some changes may require a facility redesign and the removal of unnecessary auxiliary systems.

Applicability

Facilities operating well below design rates should be good candidates for eliminating unnecessary equipment and/or systems.

Methane Emissions

When eliminating unnecessary equipment from facilities, reductions will vary according to the type of equipment eliminated, the equipment's efficiency/leakage rate, and equipment/facility throughput.

For example, emissions from crude oil production and water storage tanks occur due to the venting of gas liberated from standing and working losses. Methane emissions reductions can be estimated using EPA's AP-42 guidelines or API's "E&P Tank" software program for specific tank alternatives.

Economic Analysis

Basis for Costs and Emissions Savings

Partner reported reductions for this practice have ranged between 5 and 130,000 Mcf per year.

Methane emissions reductions of 4,200 Mcf per year apply to the consolidation of wellhead storage tanks in one central vessel. Methane emissions savings of 5 Mcf per year are associated with the removal of 10 stack pack separators and 3 glycol dehydrators. Methane emissions savings of 130,000 Mcf per year are associated with the elimination of 42 compressors at a processing facility.

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

Elimination of unnecessary equipment and/or systems can have a quick payback. Primary benefits are increased operational efficiency and reduced operation and maintenance costs. Associated benefits are the methane emission reductions from the elimination of unnecessary equipment and improvement in processing efficiency.

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.