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

<table>
<thead>
<tr>
<th>Methane Savings</th>
<th>4,200 Mcf per tank</th>
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<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>4,200 Mcf</td>
<td>$31,300</td>
<td>$10,000</td>
<td>$0</td>
<td>4 Months</td>
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<td>$5.00/ Mcf</td>
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<td>5 Months</td>
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<td>$3.00/ Mcf</td>
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<td>$13,400</td>
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<td>9 Months</td>
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* 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

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 CO₂ Gas, PRO No. 503
- Installing Vapor Recovery Units on Storage Tanks, Lessons Learned
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 CO₂ 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.

**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.