**Inspect Flowlines Annually**

**Technology/ Practice Overview**

**Description**
All gas wells have flowlines that transport natural gas to transmission compressor stations or processing plant booster stations. These flowlines are normally buried and can leak methane as a result of internal corrosion (particularly in wet, sour gas service), external corrosion, and abrasion from thermal cycling. Methane leakage from flowlines is a significant source of emissions in the gas industry.

One partner has instituted a program of annual flowline inspection to reduce gas losses. Underground leaks may be discovered using ultrasound detectors, digital radiography, infrared cameras, aerial surveys utilizing infrared beams, remote methane leak detectors utilizing infrared beams, or through the temporary introduction of an odorant into the gas stream. Regular repair of underground leaks will prevent small leaks from increasing in volume over time.

**Operating Requirements**
Walking inspections are more effective when using enhanced leak detection devices or odorants. Operators should also consider the individual operational limits and calibration requirements of the various leak detection devices based on manufacturer specifications. Infrared cameras rely on ambient conditions to supply the necessary infrared beams. Other devices which utilize infrared beams require a surface directly behind the leak to reflect the infrared beam back to the device.

**Applicability**
This applies to all flowlines in the production sector.

### Economic and Environmental Benefits

**Methane Savings**

Estimated annual methane emission reductions

58 Mcf per year

<table>
<thead>
<tr>
<th>Economic Evaluation</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><strong>Estimated Gas Price</strong></td>
<td><strong>58 Mcf</strong></td>
<td><strong>$430</strong></td>
<td><strong>$250</strong></td>
<td><strong>$1,080</strong></td>
<td>37 Months</td>
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<tr>
<td>$7.00/ Mcf</td>
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<td>$5.00/ Mcf</td>
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<td>52 Months</td>
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<td>$3.00/ Mcf</td>
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<td>$190</td>
<td>$250</td>
<td>$1,080</td>
<td>84 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**
- Safer operating conditions

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Methane Emissions

The methane emissions reductions are based on eliminating the average amount of methane emissions from production underground pipelines—53.2 scf per day per mile—as derived from the EPA/GRI study “Methane Emissions from the Natural Gas Industry, Vol. 2.” One partner has reported natural gas emissions reductions of 68 Mcf per year.

Economic Analysis

**Basis for Costs and Emissions Savings**

The savings of 58 Mcf per year are based on finding and repairing leaks (at 53.2 scf per day per mile) in 3 miles of underground pipeline.

The capital cost assumes the purchase of an ultrasound detector for approximately $250. Operating costs include the labor needed to walk the pipelines with the detectors and the labor and materials needed to repair the pipelines. The labor cost for one crew to inspect 3 miles of pipeline are estimated to be $400. According to Oil and Gas Journal (October 9, 1995), the costs per repair using a type B steel sleeve is about $680, including labor.

**Discussion**

By inspecting flowlines annually, operators can more readily detect leaks, preventing the loss of a valuable product as well as providing safer operating conditions. There are numerous technologies that may be employed to more effectively detect leaks, ranging from ultrasonic to infrared based devices. The primary benefit of this project would be safety while also recovering lost product.