

Cost-Effective Solutions for Reducing Methane Losses

Vapor Recovery Units

Instrument Air Skids

Economic and Environmental Benefits

■ Methane

Methane is a primary constituent of natural gas and an important energy source. Efforts to capture or utilize methane emissions can provide significant energy, economic and environmental benefits. The production, processing, transmission, and distribution of oil and natural gas together released an estimated 1,600 MMTCO₂E of methane into the atmosphere in 2010.

Many methane reduction solutions are cost-effective and pay for themselves in a short period of time. The economics of recovering lost methane vary based on a few factors.

Gross Revenue per Year = (Q x P x 365 x B) NGL

Q = Gas saved (Mcf/d)

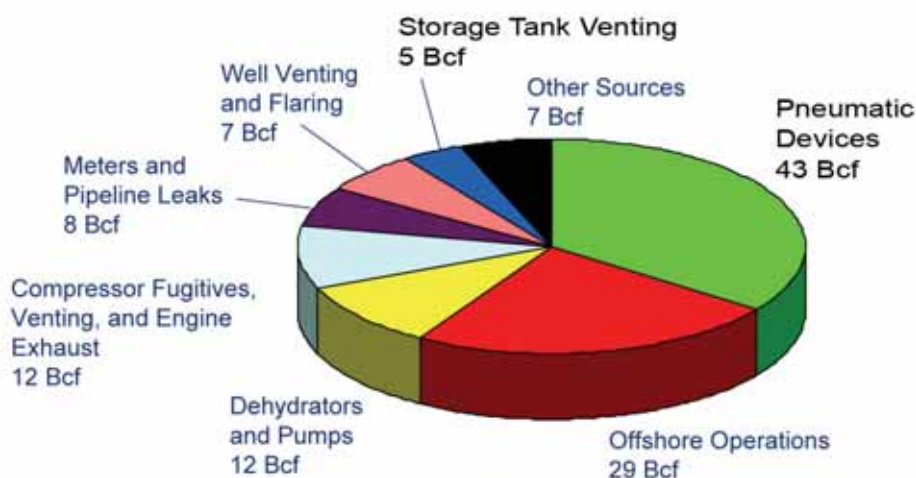
P = Price of natural gas

B = Btu adjustment (up to 2.5 times for VRU)

NGL = Value of natural gas liquids

In addition to the economic benefit there is an environmental benefit. Methane (CH₄) is a greenhouse gas that remains in the atmosphere for approximately 9-15 years and is 21 times more effective in trapping heat in the atmosphere than carbon dioxide (CO₂) over a 100-year period. Methane offers a unique opportunity to mitigate climate change and simultaneously increase available energy supply.

🔥 U.S. Natural gas production sector emissions in 2007



EPA. *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990 – 2007*. April, 2008.
Available on the web at: epa.gov/climatechange/emissions/usinventoryreport.html
Natural Gas STAR reductions from gathering and boosting operations have been moved to the production sector.

■ Convert to Instrument Air Systems (estimated payback 8 months*)

Pneumatic instrument systems powered by high-pressure natural gas are often used in the natural gas and petroleum industries for process control including pressure, temperature, liquid level and rate regulation. The constant bleed of natural gas from these controllers is collectively one of the largest sources of methane emissions in the natural gas industry.

Companies can achieve significant cost savings and methane emission reductions by converting natural gas-powered pneumatic control systems to compressed instrument air systems. **For more information see “Convert Gas Pneumatic Controls to Instrument Air”** at http://www.unimaclp.com/pdf/technical/instrument_air_conversion.pdf.

■ Install Vapor Recovery Units (estimated payback 4-23 months*)

When crude oil is stored in tanks, light hydrocarbons, including methane, “flash out” and are typically vented to the atmosphere. Vapor recovery units installed on crude oil storage tanks capture nearly 95 percent of this methane and other light hydrocarbon vapors. **For more information see “Installing Vapor Recovery Units on Storage Tanks”** at http://www.unimaclp.com/pdf/technical/install_vru_storage_tanks.pdf.

* Estimate from www.epa.gov/gasstar/tools/recommended.html based on \$5/Mcf

Instrument Air Systems

■ Complete Packaged Skids

Typically instrument air packages are designed to meet ANSI/ISA-S7.3 quality standards for Dew Point (-40F), Oil Content (less than 0.01 ppm), Particulate, (less than 0.01 micron) and temperature (100F). Duplex compressors are the standard, however simplex units are also requested. Options include wet and dry receivers, duplex or simplex dryers and a host of others for controls and instrumentation. Rotary screw or reciprocating compressors can be used depending on site flow requirements.

- Onshore and Offshore environments
- Hazardous locations
- High or low ambient conditions

■ Design

Products are designed using the latest 3D Autodesk INVENTOR 2012 software which allows solid modeling of the package assembly for improved form, fit & function. Solid modeling and constraint features allow thorough evaluation prior to construction and testing.

■ Fabrication

In-house fabrication adheres to standardized quality control procedures. Our 16,000 sq. ft. shop is located on over an acre with an overhead crane, welding shop, metal-cutting saws and paint booth

Critical steps in the fabrication process, such as cutting, welding, piping, wiring and painting, are performed by fabricator-welders, mechanics and technicians experienced in their craft with a proven track record of success in producing quality equipment. The end result is a consistent level of high quality that ships on time and performs as expected.

■ Testing

Every package is fully tested at operating and relief valve pressures. A test data sheet records amperage at multiple conditions, voltage, temperatures, and blower RPM as well as component nameplate data.

A 600-amp test stand allows full load testing up to 250 HP and a VFD drive allows testing with 50 Hz power, common for international voltages.



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Vapor Recovery Units

■ Complete Packaged Skids

Recovery of fugitive gas emissions, including methane and other volatile organic compounds (VOC), natural gas liquids (NGLs), hazardous air pollutants (HAP), can yield significant economic savings while at the same time reducing emissions by 95%.

Unimac LP offers solutions tailored to your specific application. We focus on selecting the correct compression design that maximizes recovery, minimizes initial cost while providing dependable performance, efficient operation and minimal preventive maintenance.

■ Lobe Blower

Rotary lobe blowers are efficient (MCFD per input HP) and ideally suited for VRU applications where the discharge pressure is below 15 PSIG. A wide range of gas flows from 50 to 6,000 MSCFD are available.

The lobe blower features a dry compression chamber, which means it does not require a separate coolant or sealing circuit like a flooded screw, liquid ring or vane design.



■ Sliding Vane

Sliding Vane Compressors are a cost-effective solution for vapor recovery and very efficient (MCFD per input HP) when the discharge pressure is below 60 PSIG (up to 150 PSIG available). A wide range of gas flows from 3 to 3,500 MSCFD are available.

Vane compressors can handle the toughest corrosive, sour, wet gas applications. The simple, rugged design has built a reputation for reliable service in extreme environments for decades and can be repaired in the field. Constant efficiency is maintained as the self-adjusting vanes stay in contact with the cylinder.



■ Rotary Screw

Rotary Screw Compressors are extremely versatile; capable of discharge pressures up to 350 PSIG. They are particularly efficient at discharge pressures from 50 to 200 PSIG. A wide range of gas flows from 20 to 15,000 MSCFD are available.

Unlike reciprocating designs the rotary screw features smooth operation resulting from no unbalanced forces and no pressure pulsation. No foundation is required and there are no piping vibrations from pressure pulsation. Relatively low maintenance and high reliability are inherent with rotary screws because they have few moving parts, no valves, rings or packing to wear out or cause loss of efficiency.



■ Design

VRU packages are designed to handle the wet gas streams inherent in a vapor recovery application. Large suction scrubbers effectively separate condensate from the gas and drain to waste or back to the stock tank.

The bypass system automatically responds to minute pressure changes as small as 0.5 inches W.C. diverting a portion of the discharge stream back to the suction scrubber. Stock tank pressures are maintained at 1 -1 ½" W.C. Should the tank pressure decrease, the VRU shuts down waiting to re-start when the tank pressure rises.

Packages are pre-engineered, featuring either an electric or natural gas engine driver. Basic units include all of the necessary primary components, safety devices and controls to provide a complete solution when combined with properly configured tanks. Standard units are customizable with numerous options available to choose from.

Contact UNIMAC today for more information or a quote.



850 MSFD Electric powered, Class 1 Div. 1 with optional acoustic enclosure, -20F low ambient package and VFD with color touch-pad HMI.