A Paradigm Shift in Natural Gas Measurement

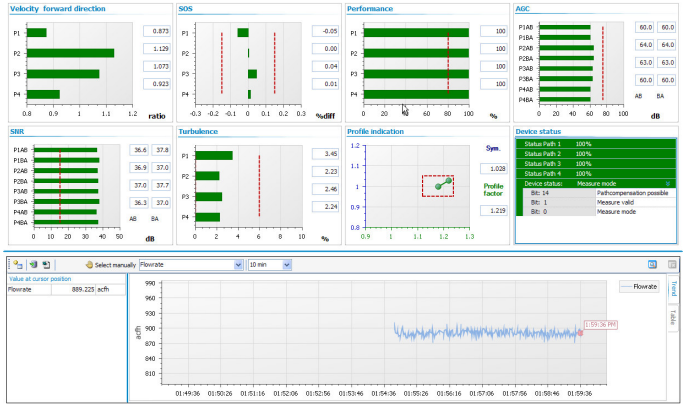
There is a paradigm shift taking place with respect to gas measurement that is driven by environmental and safety concerns, commodity prices, and operational inefficiencies. It is not likely natural gas prices are going to be coming down anytime soon. The price of natural gas varies greatly depending on location, time of the year, and type of consumer. In 2007, a price of $7 per 1,000 ft³ (28 m³) was typical in the United States. The typical caloric value of natural gas is roughly 1,000 BTU per ft³, depending on gas composition. This corresponds to approximately $7 per million BTU's, or $7 per gigajoule. In April 2008, the wholesale price was $10 per 1,000 ft³ (28 m³) ($10/MMBTU). From an energy perspective, there is approximately 5.8 MMBTU per barrel of oil, which makes the price of natural gas equivalent to $58 per barrel if the spot price is trading at $10/MMBTU. It is no longer a commodity producers are willing to ignore, and improving uncertainty is a growing concern.

Measurement uncertainty associated with traditional orifice metering has been well documented. Orifice plates with dull or nicked upstream edges have been known to cause errors ranging from 1% to as much as 10%. A leaking seal or grease deposits may generate errors as high as 25%. If a producer flows 7.1 million ft³ (200 thousand m³) per day, and experiences an uncertainty shift of only 1.5%, the accumulated loss amounts to $388,725/year at $10/MMBTU. Relatively speaking, these are not high gas volumes as one can effectively accomplish this with a 3" ultrasonic meter when operating at pressures of 435 psi (3,000 kpa).

Oil and gas producers have not only recognized the uncertainty associated with an orifice meter, but also of the turbine meter. Some ultrasonic meter manufacturer's can operate at atmospheric pressure like that of a turbine, and have an overall length of 3D for easy retrofits. There are major companies that no longer implement turbine meter technology due to mechanical parts that are subject to wear, rangeability and overall accuracy.

Multi-path ultrasonic meters for gas measurement have been in use for years and are approved for custody transfer. Gas ultrasonic meters utilize intelligent sensor technology and are being used in applications not previously considered. This includes the measurement of oxygen, nitrogen, hydrogen, high concentrations of H_2S, CO_2, and ethylene. Some ultrasonic meters require less than 1 watt of power making them a viable choice in solar power applications. The implementation of energy efficient, zero emission metering systems results in reduced pressure drop, reduced methanol and fuel gas use, and reduced winter freeze-offs. Ultrasonic meters are more accurate and have a much greater rangeability then orifice measurement, have far fewer leak paths, and with today's diagnostic capabilities, physical inspection is not required.

The gas industry has also recognized a shortage in qualified personnel and time restraints for those that exist. Fully automated "real time" monitoring of all diagnostic parameters can be communicated to a local flow computer by status output or by serial communication via Modbus. Maintenance programs can thus be significantly reduced, and operations groups can better focus their efforts on effectively running the plant or refinery.



For further information, please contact Curtis Gulaga, SICK MAIHAK, Inc. Canada, curtis.gulaga@sickmaihak.com.