

Well-Site Flow Measurement Equipment

Canadian natural gas producers are continually looking at various options to ensure they receive the best fit-for-purpose well-site package. Today's well-site package typically offers a high accuracy electronic flow measurement in conjunction with a differential pressure meter at an economical price. When compared with installations of the past, often the well-sites themselves have become simplified. In the past many well-sites incorporated localized gas/liquid separators, but with the rapid increase in coal bed methane and shallow gas wells, these components are now often found only at group gathering points or local facilities.

While capital costs are often a key consideration in well-site equipment selection, a discerning end-user realizes that long-term cost of ownership, and product reliability are crucial as well. An economical well-site outfitted with quality instrumentation that provides accuracy of measurement, durability, and minimal pressure drop to ensure higher production efficiency is possible!

Natural gas production is rarely a completely clean process. It's uncommon that a natural gas production well actually produces completely clean, dry gas. In addition, over time as down-hole conditions change, the wells are more likely to experience liquid loading.

At this time, liquid production will increase as natural gas production decreases. There is a point where optimization will be required, however while the well is still capable of flowing naturally, the flow meter on site should be capable of handling this increasingly wet gas. Wet gas will contribute to potentially erroneous flow measurement, increasing the apparent flow rates.

Often during the production of coal bed methane, particulate in addition to the liquid is produced alongside the gas. For this reason, the diligent flow meter choice is a differential pressure-based meter with no moving parts. Meters with moving parts or bearings wear down, causing inaccuracy and eventually failure. However, if using differential pressure flow elements like the orifice plate, liquid hold-up will occur (in low flows, the liquid will hold up in front of the orifice, whereas in high flows, liquid will actually re-circulate on

the downstream side below the vena contracta). To combat this effect, the McCrometer V-Cone is the ideal solution. The V-Cone does not hold up liquid, offers a 10:1 turndown, and minimal permanent pressure loss.

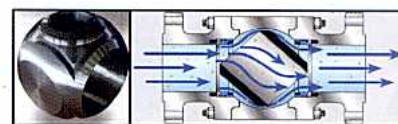
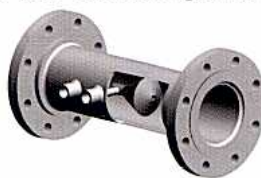
Well-Site Equipment Considerations:


Flow Element: Gas wells produce not only gas, but also liquid and entrained particulate. As a result, differential pressure measurement technologies are susceptible to a net positive error because they are based on single phase fluid calculations. The McCrometer V-Cone handles wet gas better than other flow elements due to its unique design. The cone shaped element conditions flow as it nears the V-Cone, and does not allow for liquid holdup. In addition, its unique design allows for a minimal installation envelope with only 0-3 diameters required upstream, and 0-1 diameters required downstream. The effects of particulate entrained in the flow stream are minimized as the V-Cone has no moving parts. The result? The well will operate using a single V-Cone flow meter to achieve a 10:1 turndown, and will require less maintenance to keep the well flowing. Even compression requirements downstream are reduced due to the minimal head loss (resulting in further ancillary-equipment savings). Not sure what size you need? The McCrometer V-Cone is available in line sizes from 1/2 to 120 inches for almost all fluid flow measurement requirements.

Electronic Flow measurement (EFM): Increasingly common as outdated circular chart recorders become obsolete, electronic flow measurement is quickly becoming the standard for Canadian gas producers. High accuracy, optimization (i.e. plunger lift), historical data logging, reporting, remote communication and control are only a few of the options afforded a user that chooses EFM. ABB Totalflow offers the experience of over 170,000 flow computer and remote terminal unit (RTU) installations. The Totalflow lineup incorporates integral well optimization schemes with unparalleled flexibility. Choose from over one dozen well optimization algorithms that come pre-loaded and simply need to be enabled when required. There is no longer a need for add-on control systems (i.e.

separate plunger controllers). Optimizing a single well is possible, but by optimizing an entire field of ABB Totalflow units together, you create a dynamic and hydrostatic network of cooperating wells that will work together to provide you with measureable increases in production.

Line Isolation / Bypass: Ball valves are typically found in use between the wellhead and the pipeline for isolation and/or additional bypass options. The valves are not necessarily operated on a regular basis and offer a place for hydrocarbon condensate, water, and production particulate to collect. These operational conditions can render the ball valve difficult to operate, and can cause the ball valve to malfunction or leak. The Quadro-



sphere ball valve uses a patented design that ensures self cleaning during operation. The Quadrosphere ball valve allows any collected particulate to be flushed through its body cavity, ensuring a clean seating surface after any movement, resulting in longevity and durability exceeding the lifetime of standard ball valve offerings. The Quadrosphere is available in 2 through 24 inch line sizes and in a variety of materials to suit your hardest conditions. Tundra Boiler & Instrumentation Ltd. has the experience and knowledge to provide a comprehensive package to cover your well-site metering needs. A vast product offering affords Tundra the ability to size and select the best-fit products to suit your application, while keeping your budget in mind. Tundra's selection incorporates and ensures long term maintenance free performance, and is backed by 24 hour on-call support. 

For additional information on well-site equipment options, please contact your local Tundra representative. In Calgary call 403.255.5222; in Edmonton call 780.482.3444 www.tundrasolutions.ca

See page 4 for more of Tundra Boiler & Instrumentation Ltd. products and services available to

