FLUID COMPONENTS INTERNATIONAL LLC

FCI ST100; fracking site natural gas flare

Wellhead Flare Flow Measurement

How to comply with US-EPA to measure and report flared gas from frack well

Application Note Case Study ANCS 005

Surface logging systems, including gas detection systems, are used to help maintain the correct drilling direction when a new oil well is first commissioned. As part of the drilling operation, drilling mud is pumped down the hole to help the drill bit from overheating and to bring cuttings to the surface. When this mud is returned to the surface it also contains natural gas. This gas is then separated from the mud via a "gas buster" system. The mud is then recycled back to the drilling system and the gas is vented to a flare to be burned off.

Problem

The US-EPA directive 40 CFR Part 98 requires flow measurement and reporting of these flared gases. The flow rate is very low at 15 fps to 20 fps [4 mps to 6 mps], mixed gas composition, potentially dirty gas, along with potentially high gas temperatures and wide pressure variation which eliminates most flow meter technologies from consideration. The wellhead sites are remotely located with limited access to recording and data acquisition systems on site. Installation sites are outdoors where flow meters will be exposed to severe weather conditions and blowing dirt/dust. Area requires instruments with Ex approvals rated for Class 1, Div.1 [Zone 1] installation.

Flow Conditions

- Line size: 8" [200 mm]
- Process connection: 1" 300# Flange [DN25, PN16]
- Pressure: 10 psig to 250 psig [0,7 bar(g) to 17 bar(g)]
- Process temperature: 50 °F to 500 °F [10 °C to 260 °C]
- Flow rate: 23 SCFM to 1,200 SCFM [0,65 NCMM to 34 NCMM]
- Media: Flare gas – 7 component mix

Solution

Install an FCI ST100 Series insertion-type, constant power thermal dispersion mass flow meter which includes digital readout with totalizer and on-board data logger. The thermal flow meter is not susceptible to the pressure variation and has temperature compensation. It can measure low flow rates with 100:1 turndown. It will be calibration-matched to the mixed gas composition and the flow conditions. It is IP67 rated and carries global agency approvals for Ex locations.

FCI ST100 Series: Model ST100-80JA060220DMEFA0001

Benefits

- The ST110 meter with dual-range calibrations provides required accuracy across a wider flow range and meets the regulatory accuracy requirements.
- The insertion-style flow meter simplifies installation to save time and cost.
- The VeriCal™ feature meets the operator in-service calibration verification requirements and eliminates unnecessary de-installation/re-calibration costs.