



GAS LIFT MEASUREMENT IN OIL PRODUCTION



Oil & Gas / Upstream

“Flexim’s non-intrusive flowmeter gives us excellent readings which provide us with the data needed for gas lift optimization.”

*Mr. Abdel Nabi Bohoush,
Production Superintendent,
AGOCO*



Measuring Task

Non-intrusive gas flow measurement at injection wells on AGOCO’s Al Nafoora oil field

When mature field production starts to decline, operators are forced to re-think how they operate and use new and advanced technologies to extract every drop of their “black gold” from the ground safely and economically. Artificial lift systems are among the most widely used production technologies in global oil operations. Wells that cannot produce liquids at the surface under their own pressure require lift technologies to enable production. Some liquid wells need lift assistance from the beginning and almost all require it sooner or later. The majority of producing wells worldwide currently use artificial lift. One of the most popular artificial lift methods applied in the oil industry, in order to improve oil recovery, is the gas lift method. Its main principal is the injection of gas in the well to reduce the average density of the fluids produced from the reservoir, hence the weight of the fluid column. As a result, the declined reservoir pressure is sufficient to lift the fluids up to the surface. In most cases natural gas recovered from the reservoir is used for gas lift. Depending on the number of wells and size of the gas lift network, real-time flow measurement is required to accurately calculate how much gas is injected into each well and to optimize the gas oil ratio (GOR).

Gas lift measurement and optimization in remote assets can be a challenging task. At AGOCO's Al Nafoora oil field, most of the wells are in the middle of the Libyan desert where no electrical power is available. Some of the wells, but not all, are equipped with Barton Δp flowmeters. As the wetted measuring technology is exposed to wear and tear, it requires frequent maintenance, otherwise it loses accuracy over time. This is the case at AGOCO's Al Nafoora oil field: The rare measuring instrumentation is outdated and not trusted by the operating personnel. Considering the large number of wells without power supply, AGOCO was on the lookout for an autonomous flowmeter.



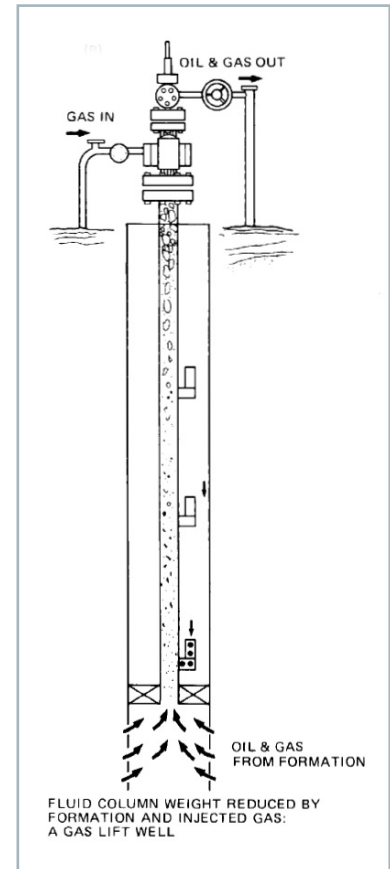
Solution

As part of their search, AGOCO engineers also contacted QAFSCO, Flexim's sales partner for Libya. QAFSCO identified Flexim's portable and hazardous area rated gas flowmeter FLUXUS® G608 to be the ideal solution for this kind of measuring task and mobilized a sales engineer for

test and demonstration measurements in Libya.

Eng. Abed M. Madhi, QAFSCO's instrument engineer, demonstrated on three different wells the perfect suitability of the FLUXUS® G608 for the task. AGOCO's technicians were impressed that installation is so fast and that the FLUXUS® G608 immediately delivers plausible readings. As the ultrasonic clamp-on transducers are simply mounted onto the pipe wall outside, the measurement does not require any pipe modifications and does not impair the operability of the respective well. With its powerful internal battery, the FLUXUS® G608 can measure up to 25 hours independently from external power supply, measuring data is recorded in the internal data logger. Two flow channels allow for high-precision multipath measurements under difficult flow conditions, inputs for pressure and temperature measurements allow for exact calculation of standard volume flow. FLUXUS® G608 not only measures gases, but can be also used for the flow measurement of liquids, e.g. produced crude oil.

Convinced by Abed M. Madhi's demonstrations, AGOCO purchased a FLUXUS® G608 system which now serves primarily for gas lift optimization projects.



*Schematic of the gas lift process
© American Petroleum Institute (API)*



A complete measuring system, compact in its rugged case: The portable and battery-powered FLUXUS® G608 with clamp-on ultrasonic transducers and all necessary accessories.



Measuring Points and Instrumentation

Pipeline	typically OD 3½" carbon steel, wall thickness 0.31'
Medium	Natural gas
Flow rates	typically ~ 1.25 MMSCFD (standard volume flow)
Measuring Device	portable FLUXUS® G608 clamp-on ultrasonic flowmeter for use in hazardous areas (ATEX/IECEX zone 2, FM Class I, Div. 2) 1 pair of clamp-on ultrasonic transducers type GDM (ATEX/IECEX zone 1), installed in Variofix P

Advantages

- Battery-powered for use in remote locations
- Ease of installation and operation
- Pressure and temperature inputs for standard flow rate reporting
- High flexibility: One measuring system for both liquids and gases and for various pipe sizes

Customer

Arabian Gulf Oil Company (AGOCO), Al Nafoora oil field, Libya

Arabian Gulf Oil Company (AGOCO) is an oil company based in Benghazi, Libya, engaged in crude oil and natural gas exploration, production and refining. It is a subsidiary of state-owned National Oil Corporation (NOC).

Agoco has upstream operations in eight oil fields, including Sarir, Messla, Nafoora, Beda and Hammada oil fields. The company also operates two refineries in Tobruk and Sarir and a crude oil terminal in Tobruk.

QAFSCO is FLEXIM's sales partner for Libya and Tunisia.



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