FIELD EVALUATION OF A HYDRATE INHIBITION MONITORING SYSTEM

H. Bonyad, M. Zare, *National Iranian Gas Company*, **M. R. Mosayyebi**, *South Pars Gas Complex*, **S. Mazloum, B. Tohidi**, *Centre for Gas Hydrate Research, Institute of Petroleum Engineering, Heriot-Watt University*

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ABSTRACT

South Pars is a giant gas field shared between Iran and Qatar. In the Iranian part of this field, MEG (Mono Ethylene Glycol) injection is the design base for hydrate prevention. Wet sour gas is produced offshore and is transferred to onshore facilities for further treatment. A typical pipeline is 32" diameter and 105 km long, transferring 1000 MMSCF per day.

In general, the amount of MEG injected is calculated at worst case conditions (temperature and pressure) and is related to gas composition and water content. The MEG injection rate is a function of several parameters, including; the amount of water, concentration of the lean MEG from the regeneration unit, seasonal temperature variation, etc. As far as hydrate inhibition is concerned the concentration of MEG in the aqueous phase should be carefully monitored.

Methods for measuring MEG concentrations in the aqueous phase include densitometer, gas chromatography systems and a combination of both. In general, techniques based on density measurements are not reliable at MEG concentrations less than 10 wt%, as well as changes in the concentration of salts (or condensed water). Gas chromatography methods are reliable if there is no salt in the system, though they are time consuming and relatively labour intensive/costly. Both the above methods have limited scope for automation and on-line applications.

Through a Joint Industry Project a technique based on measuring electrical conductivity and acoustic velocity (CV Device) was developed for determining salt-MEG concentrations (also applicable for alcohols, KHI's and AA systems). After intensive laboratory evaluation, the prototype CV Device was transferred to South Pars Gas Complex for field evaluation. In this communication, we report the results of the field evaluation.

Samples were taken from the inlet and outlet of a MEG regeneration unit as well as inlet from the offshore platform and outlet from a slug-catcher and analyzed by both the CV Device and gas chromatography and other techniques. The results show that the combination of electrical conductivity and acoustic velocity can be used for accurate determination of salt and MEG. The resulting CV Device has good reliability even at MEG concentrations of less than 1% as well as high concentrations.

Additionally, there is no need for the use of chemicals and results were available in less than two minutes. Furthermore, the CV Device has potential for online application.