Modern state and perspectives of the gas industry development are connected with the development of such unique northern fields as Urengoy field, Medvezhye field, Yamburg field, Zapolarnoye field in Nadym-Pur-Tasovskiy region, Bovanenkovskoye, Kruzenshternovskoye and Kharasaveyskoye on the Yamal peninsula and others, where more than 85% of country gas resources are situated. For the perspective this situation will be retained till the middle XXI century. In connection with the foresaid, the high-performance development provision of large oil, gas, condensate field of the Far North which are exploiting in the hard-to-reach areas with the severe nature-climatic and difficult geological and technical conditions is all-important for economy the Russian Federation.

Effective development and maintenance of the high production level are significantly determined by the technically qualified exploitation of wells and
deposits, i.e. so modes of operation should be set, which are determined by the productive stratum state, the hydrodynamic factors for the wellbore from the bottom hole to the mouth and throttling characteristics (discharge of liquid and gas, shot content). One of the primary tasks is objective information gaining about the well mode of operation.

Traditional control methods and means, operation mode exploration (for oil and gas-condensate wells – exploration with the cumbersome gaging separators, for gas wells – special methods of gasdynamic researches with the gas kick into the atmosphere) are inefficient. They are oriented for considerable labour power industrial intake. These methods do not serve the modern needs of the extractive industries on operational efficiency, representativity of the accepted data, and they do not meet the environmental requirements for field development. The information about the basic wellhead parameters (production rate, pressure and temperature) and depth parameters (pressure and temperature), which determines the operation mode of wells, is succeeded to accept with the time discontinuity and the information reliability is not high.

Serious problems are connected with the measurement of discharge (separated for gas and liquid) and estimate of abrasive admixtures (sand) in flow by the on-line test. The tries of many native and foreign researches to construct new technological metering means of these important parameters, particularly means which are connected with the combined usage of the classical single-phase flow metering methods and with the usage of mini-separators have not led to the demanded results because of their low reliability in actual operating conditions until very recently. The well production represents a complex and composition changeable mixture of gas, liquid (water, oil, and condensate) and hard (sand and other mechanical extraneous materials) phases. It characterizes by form diversity of the mixture movements. That is why the phase consumption gaging of such flow with the acceptable accuracy (inaccuracy till 5%-10%) for the technological control is a very difficult scientific-technological task.
The most vulnerable part by the depth parameter control is the gaging equipment. Strong requirements on reliability and accuracy are making to the gaging equipment. Depth equipment is used under trying exploitation conditions. It should be reliable by pressure till 100 MPa, temperatures till 120°C and over. It should stand a total quality of strikes till 2000 with mps² and vibration frequency till 70 hertz. The accuracy of the basic parameters gaging (temperature and pressure along borehole) should be not under 0.25%.

Taking into consideration foresaid, the development problem of new non-traditional methods of metering and thermobaric well characteristics; the construction on their basis and introduction of the new generation informational-metering systems is very important and actual task for oil, gas production industry of national economy.

Long term researches of the given work authors in the field of flowmeter survey of many phases mediums, manometry and thermometry allowed to suggest the problem solving and practically realize it on the Urengoy oil, gas, condensate field, Yamburg gas, condensate field and other oil, gas fields of the Western Siberia, Ural-Povolzhye and Kazakhstan as well as by the ultradeep well drilling in Antarctica. These are scientific-practical principals development of new directions in flowmeter survey of many phases flows, manometry and well thermometry, construction and successful introduction of new informational technologies and informational and metering systems (IIS) of well operation mode control. Fundamental researches in the field of informational technologies, measurement theory serve as a basis. As a result of their development, new spectral method of the flow rate measurement (gas, liquid and solid particle s) without mixture separation as well as new precise methods of pressure and temperature measurement by gas hydrodynamic exploration of the productive stratum including for the permanent long term researches were suggested.

Different models and modifications of informational and metering systems (IIS) of on-line test of ‘POTOK’ serieswells operation mode which are designed
for functioning in severe climatic conditions and harsh field environment were constructed and introduced on the basis of developed spectral method on Russia’s the gas, oil, condensate fields. These systems exceed modern foreign developments on performance specifications and at the same time they differ in moderate cost.

The informational and metering systems are developed and introduced for pressure and temperature gaging along the wellbore and well bottom of AMT, SMT, and PGA well series as well as IIS for pressure and temperature gaging on the mouth of MTU and RTP well series, which are designed for the exploitation in the severe climatic conditions. The developed informational and metering systems have a world standard level on reliability and measurement accuracy characteristics but for all that they win by cost.

Methods and technical solutions which are used in these metering systems are protected by 18 Russia’s patents on methods and devices for their modification. Constructed equipment was demonstrated at many international exhibitions in Russia and abroad.

For many years of successful cooperation of OAO Gazprom and Gazpromdobycha Urengoy LLC specialists, the scientists of Russian State Oil and Gas University named after I.M. Gubkin and Ufa State Oil Technical University, the set of principally new gaging equipment was constructed. Its wide application in the field exploitation assists to increase the exploitation efficiency and development management of gas, oil, condensate fields of the Russia’s northern regions.

It was developed a set of new program-technical solutions, which provides a high level of informational and metering systems intellectuality by the performance of the calibration, measurement, processing, presentation, and interpretation procedures of the measuring information.

Developed set of new scientific-technological solutions introduced by the construction of informational and metering well operation mode control systems
and informational and metering systems for the well exploration allow to provide:
- construction flexibility of different structural system modifications
- high technological and metrological characteristics
- high level of reliability in the severe exploiting conditions which are characterized for the Far North
- gathering, processing, accumulation, storage and transfer of considerable information volumes
- operation mode control and well exploration on the basis of unmanned technologies
- timely decisions taking on well operation mode control.

The opportunities promptly to discover negative changes and promptly to make geological and technological arrangements for their elimination have been occurred with new informational and metering systems in course of field development.

Thus, developed informational and metering systems show themselves well in gas production enterprises of Russia and allow to organize the field development management on a higher quality level. Large-scale introduction of the developed informational and metering systems in Russia’s gas production enterprises gives a considerable economic effect which makes up 1,5 milliard roubles.

Key words: production, operation, IT, new technologies.

Classification after 24th World Gas Conference themes - Special project – Advanced experience exchange in gas industry.