

## **Estimation of chemical element resources in the gas phase of the condensation waters in the gas and gas-condensate deposits of Russia**

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At the beginning of the last century it was determined [1] that the gas interacting with water partially evaporates it with formation of steam-gas mixture. The quantity of water steam in the mixture depends on the type of the gas-carrier (CH<sub>4</sub>, CO<sub>2</sub>, H<sub>2</sub>S, N<sub>2</sub> etc.), thermo baric conditions and water mineralization [1] as the gas in gas and gas-condensate deposits always contacts with the residual water which partially saturates the pore space of rock-collectors, it is always represented with steam-gas mixture. The moisture content of steam-gas mixture varies in the wide range from 0,02 to 760 g/m<sup>3</sup> [1]. When changing the thermodynamic parameters in the installation for preparing gas to transport, the process of condensating steam like moisture with formation of fresh condensation waters takes place. Condensation waters contain a lot of chemical elements. The last come out to the surface together with gas output without any additional energy expenditures. The technological methods of extracting part of the chemical elements from the condensation waters are possible; so the estimation of their resources in the steam line moisture of gas and gas-condensate deposits is of not only theoretical but also of practical significance.

The stock of rock (natural) gas in the world in 2013 was estimated to be equal to  $95,106 \cdot 10^{12}$  m<sup>3</sup> [2]. Conditionally accept into consideration a conventional moisture content in the steam-gas mixtures of 10 g/m<sup>3</sup> as an average value for the whole quantity of gas, we obtain the water steam mass of  $951,06 \cdot 10^6$  tons, the gas equivalent of which in standard conditions makes up  $1270,62 \cdot 10^9$  m<sup>3</sup>.

We have all the reasons to expect that the number of chemical elements and their mass in the steam like moisture of gas and gas-condensate deposits of the world is more than the values presented and the evidence of this fact is a significantly larger list of elements in the gas-condensate steams mixed with water steams.

[1] D.L. Katz, D. Cornell, R. Kobayashi, F.H. Poettmann, J.A. Vary, J.R. Elenbaas, C.E Weinaug. Handbook of Natural Gas Engineering. – Mc GRAW-HILL BOOK COMPANY, INC. 1965. [2] The World Factbook, 2013.