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Abstract - Note

A Conceptual Approach to the Exploration and Development of HC Fields at the Continental Shelf

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The subsurface of the Russian seas continental shelf contains more than 45% of the Initial Summary Resources (ISR) of hydrocarbons (HC) of the World Ocean shelf. Out of the total HC ISR at the shelf of the Russian Federation seas, gas constitutes 55.6%, and oil 38.8%. The reserves are predominantly in the categories C₃, D₁ and D₂, the explored reserves of gas constitute less than 10%, and of oil less than 4%. Despite this, 26 fields have already been discovered.

Exploration and development of HC resources at the shelf compared with adjacent on-shore areas, is characterised by the significantly higher costs. In such conditions, the increase of scientific and techno-economic substantiation of prospecting, survey and development is of tremendous importance. The main objectives, are:

- definition of optimal HC resources (in terms of geological structure, concentration and areal distribution);
- determination of zones and HC pools that are technically accessible, economically effective and ecologically suitable for exploration and development.

Due to the fact that the concept was worked out for the poorly studied and unevenly explored shelf of the Russian seas, it is necessary to strictly follow the principles below:

- analogy, i.e. when the investigated region of the water area over the whole section of sedimentary deposits, or its separate parts, is compared to the geologically similar off- and on-shore region with proven industrial oil and gas bearing ability;
- prediction in the studied region of the new HC fields of some definite phase type, concentration of resources and oil, gas and condensate reserves and their producing capacities;
- estimation of economic efficiency of prospecting-exploration works at the prospective structures, and economic viability of the explored edge-off-shore and marine oil and gas field development respectively, to define the feasibility of continuation of such works in the specific regions and zones;

- complex comparative analysis of structures and fields in order to select the rational directions and priorities of localisation and development;
- defining the temporal strategy and tactics of these works taking into account the progressive methods of using the improved and perfected technical means and technologies.

The off-shore of the Russian Federation is subdivided into 3 regions, according to the possibility for completed works up to the year 2030:

1. the shore shelf of the Pechora and Barents seas and the Tazov and Ob bays;
2. the deeper shelf of the Barents sea, Southern part of the Kara sea, south-western part of the Laptev sea, and the Okhotsk and Caspian seas shelf;
3. the shelf of the northern part of the Kara, Bering and Laptev seas.

On the basis of complex analysis the following regions are given priority for prospecting and exploration: the Pechora sea shelf and Southern shore part of the Kara sea. Analysing the techno-economic parameters of studies of the HC fields in the various seas, it became apparent that it is most feasible to begin development of the fields on the Pechora and Kara seas shelf. The first priority regions of development are the eastern part of the Pechora sea shelf (Prirazlomny oil field) and marine continuation of the Nurin and Nijnemessojaha bars at the shelf of the Kara sea, where there is a high concentration of proven reserves and predicted HC resources.

To develop off-shore HC fields in the specified regions, ice-proof stationary platforms are needed for all year round operation. As yet there are no such platforms in Russia. However their elaboration is underway at the converted military enterprises. It is planned to use not only foreign, but also domestic ice-proof platforms, and the off-shore part of the Kharasavei and Kruzenshtern fields should be explored by horizontal drilling from the shore. Such a method of development is possible and also for the shore-marine fields in the Ob and Tazov bays.

The respective works can only be undertaken on the basis of the highly productive technique and technology, meeting the demands of both the rational use of the

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subsurface, and the environmental protection requirements, while effectively combining both budget and non-budget sources of finance.

Taking into account the fact that the specific share of oil and gas in the fuel-energy complex of the Russian Federation will grow in the immediate future, the problem of prospecting, exploration, construction and operation of new off-shore oil and gas fields is going to be very real. Tactically, marine prospecting works should be undertaken on a large scale. This will provide, first-

ly, timely preparation of the objects for succeeding studies; secondly determining the areas, in which it is feasible to obtain licenses for exploration and development, it will also meet the terms of the return on investments. The main principle in exploration and production of oil and gas of the Arctic seas shelf will be the attraction (via tender) of a wide spectrum of domestic and foreign investors (while maintaining national interests), and their involvement in the domestic marine geological and processing complex.