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LEVEL OF INDUSTRIAL POLLUTION BY HEAVY METALS OF SOILS OF THE REPUBLIC OF KAZAKHSTAN AND THE CASPIAN REGION*

It is known that heavy metals (HM) worldwide represent the main threat to human health and are the main toxicants of the soil layer, which belong to the 1st and 2nd classes of danger. This group also includes carcinogenic and mutagenic elements that cause a decrease in the enzymatic activity of any organism [1]. The main sources of TM in the landscapes of the Kazakhstan Caspian are crude oil, which is dumped on the soil surface [2, 3]. In crude oil there is a high content of HM. Studies show that, for example, the content of vanadium and nickel in oil can vary from 220 to 670 g/t [4]. In the Caspian Sea, industrial development of crude oil has been established (Fig. 1).

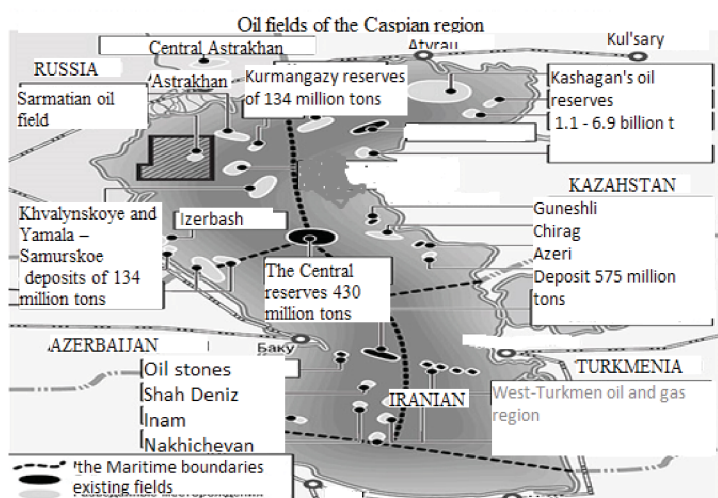


Fig. 1. The oil fields of the Caspian region

The developed and extracted oil of the Tengiz field (has a high concentration of hydrogen sulfide, as well as radioactive barium and thorium [4].

The conducted studies on the Nickel content in the soils of Ozenmunaigas ranged from 4.5 mg/kg in the residential zone to 25 mg/kg in oil fields (permissible concentration in the soil for Nickel – 3 mg/kg) [4].

The study of heavy oil fractions (fuel oil, tar) the content of vanadium, Nickel (compared with the content of crude oil) increases 2–2.5 times [5].

The vanadium-containing oil includes fuel oil, tar which is re-processed in the Atyrau refinery. However, the widespread introduction of this technology is constrained by the presence of significant amounts of sulfur (more than 8%) in the initial production [5].

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The study of landscapes, continuing to experience man-made transformations from the effects of the oil and gas industry on the territory of Kazakhstan showed that the fields of the Northern and Eastern Kazakhstan Caspian are located in the desert zone on brown, meadow-brown, meadow coastal soils of saline-saline complexes [6]. Soil cover for a long time under the influence of powerful man-made pressure, have a high degree of destruction. Soil sections of disturbed lands have changed morphological profile.

Conclusion. Thus, a comparative analysis of the chemical composition of the landscapes of The Kazakhstan Caspian Sea showed:

1. The content of vanadium and nickel in oil can vary from 220 to 670 g/t.
2. The developed oil of the Tengiz field has a high concentration of hydrogen sulfide, as well as radioactive barium and thorium.
3. Nickel content in the soils of «Ozenmunaigas» ranged from 4.5 mg/kg in the residential zone to 25 mg/kg in oil fields (permissible concentration in the soil for nickel – 3 mg/kg)
4. Deposits of the Northern and Eastern Kazakhstan Caspian Sea are located in the desert zone on brown, meadow-brown, meadow coastal soils of saline-saline complexes.
5. The soil cover of the Caspian landscape lands for a long time, which is under the influence of powerful man-made pressure, has a high degree of destruction.

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