

UDC 622.692.4.053 (571.122)

**FEATURES OF LAND POLLUTION BY ENTERPRISES  
OF OIL-AND-GAS PRODUCTION COMPLEX  
IN NIZHNEVARTOVSK REGION**

*G.K. Hodzhaeva*

*Nizhnevartovsk State Humanitarian University, Nizhnevartovsk, Russia  
Laboratory for geoecological researches, e-mail: geoeknggu@mail.ru*

**Abstract.** *During its development and working, oil-trunk pipeline network situated on the territory of Khanty-Mansiysk Autonomous Okrug had a significant technogenic impact on environment. In given article zoning territory of Nizhnevartovsk region on the area and volume of oil pollution after accidents is resulted.*

**Keywords:** *oil pollution, license sites oil industry, oil-trunk pipelines, oil-fields, oil spills*

Oil-and-gas production complex is one of economic growth engines in the country and has one of the maximum investment multipliers which provides a significant part of revenues for accounting system of the Russian Federation. Its share in tax revenues of the Russian budget makes up 40 % last years.

The oil industry of Russia involves oil-production enterprises, refineries and enterprises for transportation and oil and oil products distribution. There are 28 large active refineries (with capacity of 1 million tons per year), mini-refineries and oil-production plants in this sector. The oil-trunk pipeline length amounts to about 50 thousand kilometers and the oil-products pipeline length is about 19.3 thousand kilometers [4].

The key oil industry center in Western Siberia is Khanty-Mansiysk Autonomous Okrug. About 80 % of oil is produced here.

In the near-term outlook the Western Siberia (Khanty-Mansiysk Autonomous Okrug, Yamal-Nenets Autonomous Okrug, Tomsk region) and Sakhalin (including the shelf) will be the key regions of oil-delivery formations for Asian-Pacific Region [2]. It is planned to discover some additional thousands of oil-fields in this regions.

By 2020, the expected oil production in Western Siberia shall amount to 290-315 million tons per year [3].

The oil-trunk pipeline network providing tank oil transportation from oil-treatment centers of subsoil users to oil-refining enterprises, generally is situated in the Middle Ob, exactly in the western part of Nizhnevartovsk, Surgut, Nefteyugansk and Kondinsk districts.

As of January 20, 2010 (Analysis of the year 2009), the Ecology Department of Khanty-Mansiysk Autonomous Okrug registered 4,979 accidents including 2,417 oil-pipeline failures and 2380 water passage by reasons of loss of pipelines pressure. The

total pollutant mass in the environment amounted to 5,781.4 tons and the pollution area was about 229.6 hectares. The highest accident rate was shown by «RN-Yugansneftegaz» LLC, «Rosneft» Oil Company (2,398 accidents or 49.9 %), «TNK-BP Management» OJSC (1,102 accidents or 22.9 %) «Tomskneft VNK» OJSC, «Rosneft» Oil Company (1,029 accidents or 21.4 %). The key reason of accidents is the internal and external pipe corrosion (4,727 accidents or 98.5 %) [1].

Among districts of the studied territory, in 2009 the highest accident number was registered in Nizhnevartovsk (2,206 accidents or 45.9 %), Nefteyugansk (2,013 accidents or 41.9 %) and Surgut (513 accidents or 10.6 %) districts.

On the territory of Nizhnevartovsk district there are situated many intrafield oil pipelines owned by different oil companies (Fig. 1). Hundreds of thousands of wells, tens of thousands of pipeline kilometers affected by corrosion, compressor plants, they all are the source of ingress of hazardous substances and chemical compounds.

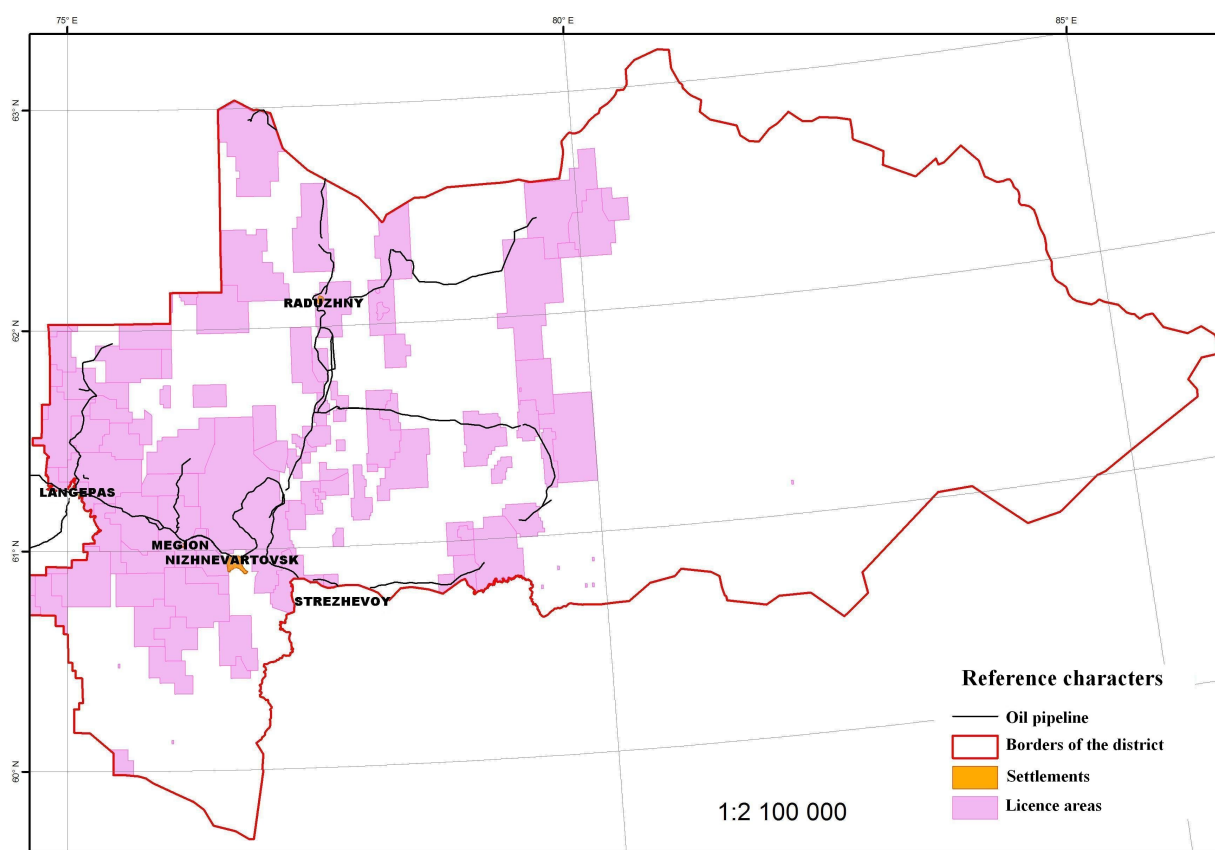


Fig. 1. The sketch map of intrafield oil pipelines in Nizhnevartovsk region

Only on the territory of Nizhnevartovsk district with the total area of 118.52 sq. km (about 2 million 370 thousand 400 hectares) are operated 68 oil fields which area covers 20 % of the whole district's territory. The oil products concentration in rivers and lakes of Samotlor licence area (Active of TNK-BP) exceeds Maximum Permissible Coefficient (MPC) for water-resources basins up to 44. Only one of 103 samples taken in 3 oil-fields of this licence area showed the value under MPC. Snow water contains many oil products; waters are polluted with iron, nitrogenous compounds, phosphorus, humic substances. Practically all lakes of Samotlor oil-field in Nizhnevartovsk district, Khanty-Mansiysk Autonomous Okrug, were ruined and destroyed for fauna and in general for the natural environment [5].

The findings of accident and oil spill analysis made for a pipeline transport in Nizhnevartovsk district allow to mark out the following zones:

1. *heavily polluted areas*: with the oil spillage volume from 70 tons and above, with the area of 240,000 m<sup>2</sup> and above – Samotlor, Sovetskiy, Strezhevoy and Varyegan;

2. *medium polluted areas*: with the oil spillage volume from 20 up to 70 tons and with the area of 20,000 m<sup>2</sup> up to 240,000 m<sup>2</sup> – Vakh, Tyumen, Severo-Varyegan and Nizhnevartovsk;

3. *poorly polluted areas*: with the oil spillage volume up to 20 tons and with the area up to 20,000 m<sup>2</sup> – Vatinsk, Agansk, Megion, Ermakov, Khokhryakov, Permyakov, Bakhilov.

A specific land use was performed on the basis of the registration of polluted areas and the oil spillage volume in oil-fields of Nizhnevartovsk district (Fig. 2).

Analysis of literary findings and our own researches show that problems of land pollution with oil on the territory of KhMAO-Ugra are still acute and need a comprehensive approach for their decision.

A nature conservation activity shall be based on the professionalism, objectivity of scientific research, an exact legal standardization of nature management and impact of a general public.

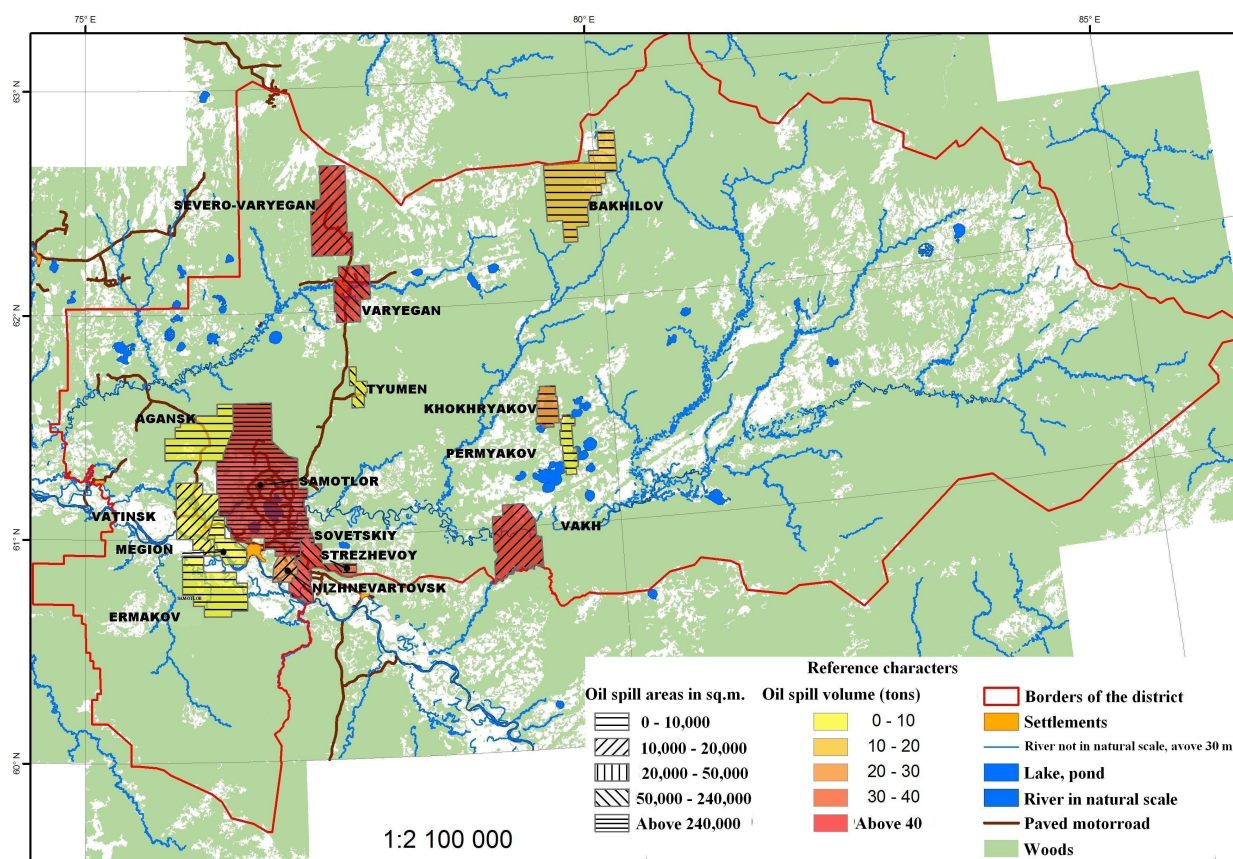


Fig. 2. The sketch map of polluted areas in oil-fields of Nizhnevartovsk district

## References

1. Zagryaznenie i rekul'tivatsiya zemel' i vodnykh ob"ektov nefte dobyvayushchimi predpriyatiyami (Pollution and recultivation of lands and water by oil and gas production enterprises). Official website of the state authorities of the Khanty-Mansiysk Autonomous Okrug - Ugra. URL <http://www.admhmao.ru/socium/ekologiya/voda2.htm>
2. Korzhubaev A.G. Neftegazovyi kompleks Rossii v usloviyakh transformatsii mezhdunarodnoi sistemy energoobespecheniya (Oil and gas complex of Russia in the conditions of transformation of the international energy supply system). Novosibirsk: "Geo" Academic publisher, 2007. 270 p.
3. Nefteprovod "Vostochnaya Sibir' - Tikhii Okean" oboidetsya v \$16 mlrd (The oil pipeline "Eastern Siberia - Pacific Ocean" will cost \$ 16 billion) // REGNUM News Agency. <http://www.regnum.ru/news/415532.html>
4. Struktura neftegazovogo kompleksa (The structure of the oil and gas industry). Ministry of Energy of the Russian Federation. <http://minenergo.gov.ru/activity/oilgas>
5. Fazlutdinov A.R. Khanty - Mansiiskaya ekologicheskaya katastrofa. (Khanty-Mansiysk ecological catastrophe). Project "Narodnyi interes". <http://narodinteres.ru/nature-and-man/2011-02-06-19-31-11.html>