

## **Tersko-Sunzhensky Oil and Gas Region: Contemporary Problems of Oil Pollution**

Ibragim Kerimov<sup>1,2</sup>, Zulfira Gagaeva<sup>1,3</sup>, Umar Gairabekov<sup>1,3</sup>, Lyubov Makhmudova<sup>2</sup>

<sup>1</sup>Academy of Sciences of the Chechen Republic, 13, M. Esambaev Ave., 364024, Grozny, Russia

<sup>2</sup>Millionshchikov Grozny State Oil Technical University, 100, Kh.Isaev Ave., 364051, Grozny, Russia

<sup>3</sup>Chechen State University, 32, A. Sheripov Str., 364907, Grozny, Russia

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### **ABSTRACT**

Oil continues to be one of the most important resources for the development of the economy of many countries. However, the problems of environmental pollution by oil production and oil refining products remain relevant. The problem of the negative impact of the oil and gas industry on natural components is characterized by various aspects, including air pollution due to fires at production and processing sites, flaring of associated gas, and breakthroughs of gas pipelines; the formation of man-made deposits of hydrocarbon raw materials and associated groundwater pollution. Tersko-Sunzhensky oil and gas region is one of the oldest in the world. The long-term functioning of the oil and gas industry has contributed to the technogenic transformation of the natural environment. Oil leaks in the process of oil production, including from the storage of petrochemical enterprises, have led to the formation of technogenic hydrocarbon deposits. This in turn led to the pollution of groundwater and water intakes by oil products, phenols. For territories where oil production and refining was carried out, the issue of pollution of the geological environment is an acute issue.

Groundwater, due to its mobility, has become an active agent for the transfer of oil pollution products from the source of its formation over long distances. In addition, technogenic hydrocarbon deposits formed on the surface of groundwater have become sources of pollution of groundwater and drinking water intakes in Grozny. So, the Zavodskoy district of Grozny is one of the most unfavorable from an environmental point of view and represents a zone of ecological disaster (I.A.Kerimov, N.S.Uzdieva, 2008; U.T.Gairabekov, 2011).

The consequences of oil pollution are characteristic not only for the Tersko-Sunzhensky oil and gas region, but also for other oil and gas producing regions of Russia and foreign countries. If in Russia serious problems began to be paid only in recent decades, then in industrialized countries numerous, design and production companies are engaged in their study and solution and quite impressive sums of money are invested in solving them. The experience of these countries shows that if small focuses of pollution (hundreds of square meters) can be eliminated relatively quickly (in several years), then the localization and elimination of large foci lasts for many decades. Especially long-term, labor-intensive and expensive is the process of final rehabilitation of the geological environment due to its high inertness with respect to the formed pollution. At the end of the XX - beginning of the XXI century, the infrastructure of the oil-producing complex of the Chechen Republic was seriously damaged. So, due to the unstable social political situation, during the indicated period of time, about 200 oil pores gushed open with ignition (I.A.Kerimov, 2008). So, on the examples of fires at pores, it is possible to demonstrate some aspects of the situation with oil pollution in areas of ignition of an oil pore. An analysis of the soil in areas adjacent to the burning pores showed the degree of damage to the natural components of oil pollution products. So, pore No. 712 burned twice (fire duration - 159 days). The greatest contamination of soils by the content of petroleum hydrocarbons was observed at a depth of 0-20 cm in a radius of 50 m from a burning pore (48.27 gram per kilogram). At



another pore (No 714), the fire lasted 1 year and 8 months. In soil samples taken a month after the fire was liquidated, the content of oil products within the boundaries of the halo of pollution was 1.35-7.16 gram per kilogram. The soil layer near the pore from continuous burning was sintered and was a product of the combustion of oil-saturated soil.

In this paper, only some aspects of the problem of oil pollution are discussed, which destabilize the geo-ecological situation in certain areas of hydrocarbon production and processing of hydrocarbons within the Tersko-Sunzhensky oil and gas region. Oil pollution problems are still relevant for the areas of extraction and processing of oil products (both former and existing) within the Tersko-Sunzhensky oil and gas region. As a result of the bombing during the hostilities of 1999-2000 virtually all oil refineries in Grozny were destroyed, which led to chemical and radioactive contamination of the territory of the Zavodskoy district. The oil industry ranks third among 130 branches of modern production in terms of environmental impact hazard (G.E.Panov, 1986; N.P.Solntsev, 1988). It is noted that technogenic loads on the landscape environment are mainly associated with oilfield facilities - wells, sludge pits, sumps, intra- and interfield oil pipelines, and the accumulated volumes of drilling waste in their composition and physicochemical properties are dangerous sources of environmental pollution.

Solving oil pollution problems is a long-term process. To improve the geo-ecological situation in the Tersko-Sunzhensky oil and gas region, it is necessary: a rational approach to the development of existing fields, taking into account the ecological balance and integrated use of mineral resources; development of non-waste and / or low-waste production; geocological certification of mining facilities and the organization of a monitoring system for environmental pollution.

In addition to the above measures, specifically for the territory of the city of Grozny, in order to improve the geo-ecological situation and solve problems caused by the development of technogenic oil deposits, it is proposed to implement the following measures: conduct comprehensive geophysical, geochemical and georadar studies to study the modern spatial distribution, migration, and dynamics of technogenic oil deposits ; development of an optimal network for placing engineering pores in order to study the spatio-temporal state of technogenic deposits on the territory of Grozny and its environs; regular monitoring of the migration of technogenic deposits on the territory of Grozny and the adjacent territory; creation of a geocological database on the state of technogenic hydrocarbon deposits and the use of GIS.