

MULTIFACETED EVALUATION OF THE ECOLOGICAL RISK OF MAINTENANCE OF OIL AND GAS FIELDS

VOZNESENSKAYA, V.V.(1), VOZNESENSKY, E.A.(2), and SAMARIN, E.N.(2)
(1)A.N. Severtzov Institute of Ecology and Evolution, Moscow, Russia; (2)Moscow State University, Russia.

An inter-disciplinary methodology to investigate pollution from maintenance of oil and gas fields and to explore potential impact of new ones has been developed and tested at Luginetskoe oil/gas condensate field (OGCF) in Western Siberia. The field and laboratory investigations focused on the impact of oil, its derivatives and other chemicals on human health and biocenoses. The research included combination of methods of environmental geology, geophysics, bioindication, cytogenetics and analytical chemistry. It is based on the idea that reliable control of concentration, regularities of sorption and the complete tracing of oil pollution in the environment from the source of contamination through the soils, ground and surface water, soil biota and, finally, via the food chains and nets to small mammals and birds are needed for ecological risk assessment. The most dangerous toxic compounds in oil and gas fields are polyaromatic hydrocarbons, phenols and amines. Luginetskoe is actively exploited since 1987, now there are 480 wells. The primary sources of pollution are: productive oil and gas wells, casing-head gas burning facilities, oil reservoirs, local and main pipelines, pump stations and roads. The obtained data revealed the main regularities of the pollutants migration in soils and ground waters, the most dangerous sources of their contamination, for the first time we can demonstrate the impact of gas torches on soils, vegetation and soil-dwelling animals using new reliable and independent indices. The GIS and attributed databases are used to retrieve, analyze and present the multifactorial information, necessary to evaluate the ecological risk in oil/gas fields.