Russian Federation
"SURGUTNEFTEGAS"
PUBLIC JOINT STOCK COMPANY

**Summary report
on results of industrial environmental monitoring
within license blocks of "Surgutneftegas" PJSC
in the territory of the Republic of Sakha (Yakutia)**

2019

Surgut – 2020

Industrial environmental monitoring (IEM) in "Surgutneftegas" PJSC is performed on the basis of GOST R 56059-2014 "Industrial environmental monitoring". General provisions" to provide information on the environment condition and pollution level required to perform activity on preservation and restoration of the natural environment, rational use and reproduction of natural resources, prevention of the negative impact of business and other activity on the environment and elimination of its consequences.

According to GOST R 56059-2014 environmental analytical measurement can be performed only by in-house or third-party laboratories that are accredited for required measuring in compliance with the current legislation of the Russian Federation and have license to operate in the sphere of hydrometeorology and related areas.

"Surgutneftegas" PJSC has license №R/2013/2377/100/L dated 11.09.2013 to operate in the sphere of hydrometeorology and related areas, including determination of the pollution level of ambient air, soils and water bodies.

In the territory of the Republic of Sakha (Yakutia) environmental monitoring within subsoil blocks is performed in compliance with the developed and approved programs on environmental monitoring programs.

In 2019, within subsoil blocks of "Surgutneftegas" PJSC in the territory of the Republic of Sakha (Yakutia) environmental monitoring was performed at 17 subsoil blocks, including six blocks where local environmental monitoring (hereinafter – LEM) of the subsoil blocks areas at 89 sampling points was performed and at all 17 blocks – monitoring in the areas of waste disposal (sludge pits).

This report presents the results of LEM of the territories of the Central Block of the Talakanskoye oil and gas condensate field, Alinskoye, Severo-Talakanskoye, Vostochno-Talakanskoye, Vostochno-Alinskoye and Yuzhno-Talakanskoye subsoil blocks.

During organization of monitoring, the regional features were taken into consideration: developed river net, existence of temporary (drying up with the seasonal runoff) brooks, which appear mainly during the spring flooding, open and closed lakes with marshlands in bottom-lands of the small rivers and brooks, the results of evaluation of the current background pollution of the block as well as the location of the production facilities. Monitoring points are installed at major water bodies, at the prevailing types of soils as well as the areas where the Company's production facilities are placed that pose potential environmental risks. All points are fixed in the field by identification marks containing information about number, geographical coordinates and name of the subsoil block.

Monitoring points network is divided into two groups:

- Baseline monitoring points located outside the zone of the direct impact of man-made facilities;

- monitoring checkpoints located in the areas of potential sources of a man-made impact.

Natural environment components under study: surface waters, bottom sediments, soils, ambient air.

Table 1. The structure of the observational network of local environmental monitoring within subsoil blocks of "Surgutneftegas" PJSC in the Republic of Sakha (Yakutia)

Natural environment components	Number of points		Number of controlled parameters
	Baseline	Control	
Ambient air	6	4	5
Surface waters	13	22	21
Bottom sediments	11	22	14
Soils	6	5	27

The laboratory sample analysis was carried out by an in-house accredited laboratory of Oil and Gas Production Division "Talakanneft" of "Surgutneftegas" PJSC (accreditation certificate №POCC RU.0001.517587 dated 20.11.2014) according to approved methodology in compliance with the current directives and guidelines. Lower range of pollutant detection techniques does not exceed established standards for the safe content level (maximum allowable concentrations (MAC), approximate permissible concentration (APC), safe reference levels of impact (SRLI), etc).

The results of researches are submitted to authorized government bodies as hard copies until the 1st of April of the year following the reporting year.

Surface waters

In 2019, 74 samples of surface waters from six subsoil blocks where LEM is performed were taken and examined. Samples were taken in a snowless period from June till September.

The average concentration of hydrochemical indicators of LEM was calculated following the researches. Evaluation of the results of surface waters at subsoil blocks is performed in compliance with the current specified parameters (MAC) established by Order No. 552 of the Ministry of Agriculture of the Russian Federation dated 13.12.2016.

Table 2. Average concentration of hydrochemical indicators determined in surface waters in 2019

Hydrochemical indicator	Unit	Average value of hydrochemical indicators	MAC	Ratio of average values to MAC
pH value	pH unit	7.3	-	-
Specific electrical conductivity	mmhos/cm	139	-	-
Ammonium	mg/dm^3	<0.1	0.5	<0.2
Nitrate ion	mg/dm^3	0.108	40	0.0027
BOD_5	mgO_2/dm^3	2.2	3.0	0.73
Phosphate ion	mg/dm^3	<0.1	0.2	<0.5
Sulfate ion	mg/dm^3	20	100	0.2
Chloride ion	mg/dm^3	12.8	300	0.043
Anionic surfactant	mg/dm^3	<0.025	-	-
Oil products	mg/dm^3	<0.02	0.05	<0.4

Hydrochemical indicator	Unit	Average value of hydrochemical indicators	MAC	Ratio of average values to MAC
Phenol	mg/dm^3	<0.0005	0.001	<0.5
Total iron	mg/dm^3	0.21	0.1	2.1
Lead	mg/dm^3	<0.002	0.006	<0.33
Zinc	mg/dm^3	0.0019	0.01	0.19
Nickel	mg/dm^3	<0.005	0.01	<0.5
Manganese	mg/dm^3	0.017	0.01	1.7
Chrome	mg/dm^3	<0.002	0.02	0.1
Copper	mg/dm^3	0.0025	0.001	2.5
Mercury	mcg/dm^3	<0.00001	0.00001	<1
Suspended substance	mg/dm^3	3.3	10	0.33
Toxicity	s.u./ toxicity level	0.16/ acceptable	-	-

Water courses in the territory under study are located within the area of karst rocks. Water courses that disappear during the summer, the mismatch of watersheds of surface and underground waters are typical of karst regions. This results in an underground flowing of waters between river basins, the share of underground waters in the river recharge reaches 35-45%, the share of snow and rain recharge are approximately the same. In the winter period, the rivers are recharged solely by underground waters that are relieved into channel alluvial sediments. The natural state of rocks and soils in the territory forms geochemical specifics of surface watercourses in which almost widespread exceedance of the approved standards related to iron, manganese and copper is observed.

Concentration of oil products and chlorides in surface waters which characterize the man-made pollutant flux in oil production regions has special urgency when assessing the environmental situation in the region. In 2019, MAC exceedance of chlorides and oil products in surface waters was not identified.

Generally, the chemical composition of the analyzed water courses and water bodies is characterized by features common to the waters of the region.

Bottom sediments

In 2019, 33 samples of bottom sediments from subsoil blocks were taken and analyzed. These samples were taken at the subsoil blocks where LEM is performed. The samples were taken once per year in sampling points of the surface water in Summer.

There are no federal pollution standards set for the content of pollutants in the bottom sediments.

For the reporting period, the total form of metals in the bottom sediments samples was taken into account.

Table 3. Average values of determined indicators in bottom sediments when analyzing the background pollution level (2006 – 2012) and when performing LEM in 2019

Indicator	Unit of measure	Average values of determined indicators

Indicator	Unit of measure	Average values of determined indicators	
		Background pollution level (2006 – 2012)	LEM 2019
pH value	pH unit	6.78	7.2
Chloride ion	mg/kg	19.87	13.2
Sulfate ion	mg/kg	160.75	31.7
Oil products	mg/kg	69.14	<50
Iron (total form)	mg/kg	4933.08	4344
Lead (total form)	mg/kg	4.97	4.6
Zinc (total form)	mg/kg	75.85	37
Manganese (total form)	mg/kg	533.08	292
Chrome (total form)	mg/kg	16.08	11.2
Copper (total form)	mg/kg	8.78	7.1
Nickel (total form)	mg/kg	16.83	13
Mercury	mg/kg	<0.1	<0.1
Specific electrical conductivity	mmhos/cm	166.05	93.3
Toxicity	s.u./ toxicity level	0.2/ acceptable	0.17/ acceptable

The current bottom sediments condition of blocks was assessed against results of background pollution measurement, determined in 2006-2012.

The average values of indicators determined in samples of bottom sediments taken in 2019 do not exceed the average values of the background pollution level determined in 2006-2012.

Soils

In 2019, 11 samples taken from subsoil blocks where LEM was performed, were analyzed as part of environmental monitoring.

Table 4. Average values of indicators determined in soils in 2019

Indicator	Unit of measure	Average values of determined indicators	MAC	Ratio of average values to MAC
pH of salt extract	pH unit	6.7	-	-
Chlorides	mg/kg	5.1	-	-
Sulphates	mg/kg	13.3	-	-
Exchangeable ammonium	mg/kg	<5	-	-
Nitrites	mg/kg	-	-	-
Nitrates	mg/kg	1.19	130	0.0092
Phosphates	mg/kg	1.05	-	-
Oil products	mg/kg	77	-	-
Iron (total form)	mg/kg	4800	-	-
Manganese (total form)	mg/kg	410	1500	0.27
Zinc (total form)	mg/kg	62	-	-
Lead (total form)	mg/kg	5.1	-	-
Nickel (total form)	mg/kg	23	-	-
Copper (total form)	mg/kg	7.5	-	-
Chrome (total form)	mg/kg	17	-	-
Iron (active form)	mg/kg	237	-	-
Manganese (active form)	mg/kg	53	-	-

Indicator	Unit of measure	Average values of determined indicators	MAC	Ratio of average values to MAC
Zinc (active form)	mg/kg	10.1	23.0	0.44
Lead (active form)	mg/kg	<0.5	6.0	<0.083
Nickel (active form)	mg/kg	0.82	4.0	0.205
Copper (active form)	mg/kg	1.15	3.0	0.38
Chrome (active form)	mg/kg	1	6	0.167
Organic substance	mg/kg	6.4	-	-
Benz(o)pyrene	mg/kg	<0.001	0.02	0.05
Specific electrical conductivity	mmhos/cm	52	-	-
Mercury	mg/kg	<0.1	2.1	<0.048
Toxicity	s.u./ toxicity level	0.18/ acceptable	-	-

The average values of determined indicators in soil samples taken as part of local environmental monitoring in 2019 do not exceed MAC and APC.

Ambient air

In 2019, 10 samples of ambient air from six subsoil blocks were examined. These samples were taken at the subsoil blocks where local environmental monitoring is performed.

The samples were taken at 6 baseline monitoring points (least affected by a man and transboundary masses from technological facilities at the blocks) and 4 control points (affected by man-made infrastructure facilities).

Five components were under research: methane, carbon monoxide, sulphur dioxide, nitrogen monoxide and dioxide.

In accordance with environmental monitoring programs the ambient air quality assessment was carried out on the basis of comparison of the results of the quantitative chemical analysis with MAC and SRLI standards. Levels exceeding hygienic standards were not determined.

Thus, the comprehensive analysis of the results of environmental monitoring within subsoil blocks of "Surgutneftegas" PJSC for 2019 shows that the Company's oil production facilities located within the Republic of Sakha (Yakutia), do not have a significant negative environmental impact. The overall characteristic of the environmental situation in the area where the Company operates is favorable. The impact of the Company's production facilities is characterized as acceptable, i.e. it maintains the quality of the environment.