

Russian Federation  
PUBLIC JOINT STOCK COMPANY  
“SURGUTNEFTEGAS”



**Summary report  
on the results of production environmental monitoring within  
license blocks of “Surgutneftegas” PJSC in the territory of  
Yamalo-Nenetsky Autonomous Okrug  
in 2021**

Surgut - 2022

Production environmental monitoring (PEM) in “Surgutneftegas” PJSC is performed on the basis of GOST R 56059-2014 “Production 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 Yamalo-Nenetsky Autonomous Okrug environmental monitoring within subsoil blocks is performed in compliance with Decree of the Government of YaNAO No. 56-p “On the territorial environmental monitoring system within license blocks for subsoil use for the purpose of oil and gas production in the territory of Yamalo-Nenetsky Autonomous Okrug” dated 14.02.2013.

“Surgutneftegas” PJSC holds 8 subsoil blocks within Yamalo-Nenetsky Autonomous Okrug: Verkhne-Nadymsky (northern part) (SLKh 02565 NE), Maloperevalny (SLKh 02573 NR), Vostochno-Soimlorsky (SLKh 02566 NR), Severo-Soimlorsky (SLKh 02572 NR), Soimlorsky (SLKh 14822 NR), Тычельский (SLKh 02574 HP), Poluysky (SLKh 02571 NP), Hadyakhinsky (SLKh 02570 NP).

For the Verkhne-Nadymsky (northern part), Maloperevalny and Soimlorsky subsoil blocks with constructed field infrastructure facilities where commercial field operation is performed, programs on local environmental monitoring (hereinafter – the LEM) are developed and approved in the established order.

At other blocks where field prospecting and exploration are carried out, industrial environmental monitoring is performed on the object-by-object basis as per project documentation and the current legislation in the sphere of industrial environmental monitoring on the basis of sampling schedules and schemes.

Thus, we performed environmental monitoring of three subsoil blocks in the territory of YaNAO in 2021: Verkhne-Nadymsky (northern part), Soimlorsky and Maloperevalny subsoil blocks.

The location for points of sampling natural environmental components is selected on the basis of the analysis of topographic maps, Earth remote sensing data taking into account hydrography and soil cover features of license blocks as well as the location of production facilities.

Natural environmental components under study: surface waters, soils, bottom sediments, snow cover (melted snow) and ambient air.

Table 1. The structure of the observational network of local environmental monitoring within subsoil blocks of “Surgutneftegas” PJSC in the territory of YaNAO

Natural environment components	Points of monitoring status	Number of points	Number of controlled parameters
Ambient air	Conditional baseline	3	8
	Conditional control	3	8
	Control	2	8
Snowfall	Conditional baseline	3	13
	Conditional control	3	13
	Control	2	13
Surface waters	Conditional baseline	4	18
	Conditional control	5	18
	Control	4	18
Bottom sediments	Conditional baseline	4	12
	Conditional control	5	12
	Control	4	12
Soils	Conditional baseline	3	20
	Conditional control	3	20
	Control	4	20

The laboratory sample analysis was carried out by two in-house accredited laboratories according to approved methodology in compliance with the current regulations and guidelines:

1. Central Base Laboratory for Ecoanalytical and Technological Studies of the EEIC (accreditation certificate №RA.RU.511426).

2. Production and Research Laboratory for chemical and physical analyses of R&D Design Works Center of OGPД “Nizhnesortymyskneft” (accreditation certificate №RA.RU.21CP03).

3. Production and Research Laboratory for chemical and analytical research of R&D Design Works Center of OGPД “Lyantorneft” (accreditation certificate №RA.RU.517269).

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 the researches are submitted to authorized government bodies as hard and soft copies, and by means of information analytical system “Territorial system of environmental monitoring in YaNAO”.

### Surface waters

In 2021, 26 samples of surface waters were examined. The samples were taken from the rivers Simiegan, Yangyagun, Mutiyagun, Tatlyagayakha, Lankiegan, unnamed river, down the stream after crossing the communication line and from lakes Yaeyakhato, Mutylor, unnamed lake, Yangyaguntoilor. The results of researches (average values of core determined indicators) are shown in table 2.

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. The average values of hydrochemical indicators determined in surface waters in 2021 and MAC of controlled indicators in surface waters in the territory of YaNAO

Hydrochemical indicator	Unit	MAC	Average value of hydrochemical indicators
pH value	pH unit	6.5-8.5	6.9
Total BOD	mgO <sub>2</sub> /dm <sup>3</sup>	3.0	-
БПК <sub>5</sub>		-	1.9
Ammonium ion	мг/дм <sup>3</sup>	0.5	0.11
Nitrate ion		40	0.51
Phosphate ion		0.2	<0.10
Sulfate ion		100	4.2
Chloride ion		300	6.2
Anionic surfactant		0.1	<0.025
Oil products		0.05	0.03
Phenol		0.001	<0.0005
Total iron		0.1	0.27
Lead		0.006	<0.003
Zinc		0.01	0.007
Nickel		0.01	<0.005
Manganese		-	0.018
Total chrome		-	<0.01
Copper		0.001	0.0008

In 2021, the average concentration of all determined components does not exceed MAC, except for total iron.

Wetland water-collecting areas are the main source of iron found in the surface waters of water courses. MAC exceedance of these elements is the key feature of the surface waters in the region.

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 2021, MAC exceedance of chlorides and oil products in surface waters was not identified.

Generally, composition of the analyzed water courses and water bodies is characterized by features common to the taiga zone waters. Condition of surface waters was assessed as satisfactory.

### Bottom sediments

In 2021, 13 bottom sediments samples were analyzed. The samples were taken once at sampling points of the surface water. There are no federal pollution standards set for bottom sediments. The current bottom sediments condition of blocks was assessed against the environmental quality standards (hereinafter – EQS) for bottom sediments established in the territory of YaNAO by Order №3003 dated 08.09.2021 (table 3).

Table 3. The average values of indicators determined in bottom sediments in 2021 and EQS determined for bottom sediments in the territory of YaNAO

Determined indicators	Unit	Average value of indicator	EQS indicators within Nadymy District	EQS within Pur river basin
pH value	pH unit	6.3	6.15	6.37
Chloride ion	mg/kg	7.2	32.49	25.37
Sulfate ion	mg/kg	10.4	64.87	66.03
Anionic surfactant	mg/kg	8.36	1.22	1.64
Oil products	mg/kg	13.9	4.85	6.47
Iron	mg/kg	343	10699.6	13561.7
Lead	mg/kg	1.12	4.27	4.03
Zinc	mg/kg	3.22	18.47	12.94
Nickel	mg/kg	0.71	11.64	4.15
Manganese	mg/kg	6.22	141.97	179.09
Chrome VI	mg/kg	<0.050	23.6	10.56
Copper	mg/kg	0.38	4.08	2.59

Bottom sediments are a comprehensive multicomponent system the condition of which depends on intrabasin processes, sorption properties of sediments, landscape features of water courses, as well as properties of chemicals that make up their composition. Also, a significant impact is made by climatic factors, including the amount of precipitation and the level of floodwaters. The unstable composition and properties of bottom sediments is caused by the naturally-occurring environmental and climatic fluctuations.

There was no exceedance identified against EQS within YaNAO, except for anionic surfactant and oil products. The average concentration of anionic surfactant exceeded the EQS by 6.9 times in Nadymy District and by 5.1 times in Purovsky District. The average concentration of oil products exceeded the EQS by 2.9 times in Nadymy District and by 2.1 times in Purovsky District. Although it is important to note that concentration of oil products in all samples taken in 2021 did not exceed the average values of oil products concentration (132 mg/kg) that were established during the assessment of the baseline condition of the bottom sediments at the stated license blocks of "Surgutneftegas" PJSC in YaNAO.

### Soils

In 2021, 10 soil samples were analyzed as part of LEM.

The current soil condition of subsoil blocks in YaNAO was assessed against approved soil standards (MAC, APC). The average values of the indicators determined in soils in 2021 are presented in table 4.

Table 4. The average values of indicators determined in soils in 2021.

Determined indicators	Unit	MAC, APC	Average value of indicator	Ratio of average values to MAC
pH of the water extract	pH unit	-	5.73	-
Total iron	mg/kg	-	1376	-
Phosphate ion	mg/kg	-	<0.50	-
Nitrate ion	mg/kg	130	1.72	0.013
Sulfate ion	mg/kg	-	4.15	-
Chloride ion	mg/kg	-	8.59	-
Oil products	mg/kg	-	9.59	-
Anionic surfactant	mg/kg	-	14.60	-
Phenol	mg/kg	-	<0.010	-
Benz(o)pyrene	mg/kg	0.02	0.00024	0.012
Copper	mg/kg	33	2.0	0.06
Nickel	mg/kg	20	2.2	0.11
Zinc	mg/kg	55	5.8	0.105
Lead	mg/kg	32	1.74	0.054
Mercury	mg/kg	2.1	<0.05	-
Cadmium	mg/kg	0.5	0.081	0.162
Chrome	mg/kg	-	<0.05	-
Barium	mg/kg	-	18.31	-
Manganese	mg/kg	1500	30	0.02

Exceeding of MAC, APC in soil was not indicated. The average values of determined indicators in soil samples taken as part of LEM make up tenths and hundredths of established environmental standards.

The content of oil products in soil samples taken at subsoil blocks under development was 9.59 mg/kg on average, which coincides with a baseline content of oil products in the soil based on Yu. I. Pikovsky's measurement scale (1993).

#### Snow cover (melted snow)

In 2021, 8 samples of the snow cover were examined at the said subsoil blocks. Samples were taken during the period of maximum stored moisture (March) at three conditional baseline points (least affected by man), three conditional control points (affected by man-made infrastructure facilities) and two control points. Mean values of core indicators determined in snow cover during 2021 are presented in table 5.

Table 5. The average values of indicators determined in the snow cover (melted snow) in 2021 and EQS of indicators determined in the snow cover (melted snow) in the territory of YaNAO

Determined indicators	Unit	Average values of determined indicators		EQS within Nadymy District	EQS within Purovsky District
		Conditional baseline points	Conditional Control points		
Ammonium ion	mg/dm <sup>3</sup>	<0.10	0.11	0.27	0.25
Nitrate ion	mg/dm <sup>3</sup>	0.51	0.88	0.77	0.92
Sulfate ion	mg/dm <sup>3</sup>	0.96	1.21	0.54	0.37
Chloride ion	mg/dm <sup>3</sup>	0.67	0.82	0.82	0.58
Oil products	mg/dm <sup>3</sup>	<0.02	<0.02	0.028	0.0033
Phenol	mg/dm <sup>3</sup>	0.00067	0.00122	0.0008	0.0006
Total iron	mg/dm <sup>3</sup>	<0.05	<0.05	0.091	0.071
Lead	mg/dm <sup>3</sup>	<0.001	<0.001	0.0027	0.0024
Zinc	mg/dm <sup>3</sup>	0.0082	0.0069	0.0119	0.0102
Manganese	mg/dm <sup>3</sup>	<0.001	0.0018	0.0045	0.0074
Copper	mg/dm <sup>3</sup>	0.0044	<0.001	0.0026	0.0025
Nickel	mg/dm <sup>3</sup>	<0.001	0.0011	0.0019	0.0028
Chrome (VI)	mg/dm <sup>3</sup>	<0.01	<0.01	0.0018	0.0025

There are no federal environmental pollution standards set for snow cover. Snow cover quality appraisal was carried out on the basis of comparison of average values of the results of quantitative chemical analysis of samples taken at conditional baseline and conditional control monitoring points and of the environmental quality standards (EQS for snow cover established) in the territory of YaNAO.

There was no exceedance identified against EQS within YaNAO, except for nitrate, sulfate, chloride ions, phenol and copper. The average concentration of nitrate ion at conditional control monitoring points slightly exceeded EQS in Nadymy District by 1.14 times. The average concentration of sulfate ion at conditional baseline points and conditional control monitoring points exceeded EQS in Nadymy District by 1.8 and 2.2 times, in Purovsky District by 2.6 and 3.3 times respectively. The average concentration of chloride ion at conditional baseline points and conditional control monitoring points exceeded EQS in Purovsky District by 1.2 and 1.4 times respectively. The average concentration of phenol exceeded the EQS by 1.5 times in Nadymy District and by 2 times in Purovsky District. The average concentration of copper at conditional baseline points exceeded the EQS by 1.7 times in Nadymy District and by 1.8 times in Purovsky District.

The average concentration of nitrate, sulphate chloride ions, phenol and manganese in the snow samples, taken at the conditional control points, exceeded the baseline level of 2021 by 1.7; 1.3; 1.2; 1.8 and 1.1 times respectively. The average concentration of the rest of the controlled indicators did not exceed values determined at conditional baseline points.

### Ambient air

In 2021, 16 samples of ambient air were examined. The samples were taken at 3 conditional baseline monitoring points (least affected by man and transboundary masses from technological facilities at the blocks), 3 conditional control points (affected by man-made infrastructure facilities) and 2 control points.

The content of methane, carbon monoxide, sulphur dioxide, nitrogen monoxide, nitrogen dioxide, suspended materials, carbon and benz(o)pyrene was determined.

Concentration of determined components in 2021 was below the low value of measurement ranges of methods for: methane <16 mg/cubic meters, carbon monoxide <4 mg/m<sup>3</sup>, sulphur dioxide <0.054 mg/m<sup>3</sup>, nitrogen monoxide <0.086 mg/m<sup>3</sup>, nitrogen dioxide <0.086 mg/m<sup>3</sup>, suspended materials (dust) <0.15 mg/m<sup>3</sup>, carbon (carbon dust) <0.03 mg/m<sup>3</sup> and benz(o)pyrene <0.5\*10<sup>-6</sup> mg/m<sup>3</sup>.

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. Pollution level of ambient air is within maximum allowable ranges and is considered "low".

The area of operations of "Surgutneftegas" PJSC in YaNAO is not exposed to long and intensive exploitation of natural resources which in its turn translates into the low level of the human impact and burden on the environment.

The analysis of the results received during environmental monitoring of subsoil blocks "Surgutneftegas" PJSC in YaNAO confirms that the general 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.