

Russian Federation
“SURGUTNEFTEGAS”
PUBLIC JOINT STOCK COMPANY

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

2019

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 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 seven 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), Poluysky (SLKh 02571 NP), Hadyyakhinsky (SLKh 02570 NP).

For the Verkhne-Nadymsky (northern part) and the Soimlorsky license blocks with constructed field infrastructure facilities where commercial field operation is performed, programs on local environmental monitoring are developed and approved in the established order (hereinafter – the LEM). In 2018, we developed and agreed the LEM program for the Maloperevalny license block, commercial operation of which was planned to start in 2019.

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 license blocks in the territory of YaNAO in 2019: Verkhne-Nadymsky (northern part), Soimlorsky and Maloperevalny license 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, underground 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
Snowfall	Conditional baseline	3	13
	Conditional control	3	13
Surface waters	Conditional baseline	4	18
	Conditional control	8	18
	Control	2	18
Bottom sediments	Conditional baseline	4	12
	Conditional control	8	12
	Control	2	12
Soils	Conditional baseline	3	20
	Conditional control	3	20
	Control	13	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 Engineering and Economic Implementation Center (accreditation certificate №RA.RU.511426).

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

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 2019, 28 samples of surface waters were examined. The samples were taken from the rivers Tinegan, Yangegan, Nudya-Yangegan, Yaetoyakha, Simiegan, Yangyagun, Kamchinyagun, Asyagun, Mutiyagun, Tatlyagayakha, Lankiegan and lake Yaeyakhato. The results of researches (average values of core determined indicators) are shown in table 2.

Evaluation of the results of the LEM of surface waters at subsoil blocks is performed in compliance with the current specified parameters (hereinafter – MAC) established by Order No. 552 of the Ministry of Agriculture of the Russian Federation dated 13.12.2016 and average regional values (hereinafter – ARV) of controlled indicators in surface waters in Nadymsky and Purovsky Districts, YaNAO.

Table 2. The average values of hydrochemical indicators determined in surface waters in 2019, MAC and ARV of controlled indicators in surface waters in the territory of YaNAO

Hydrochemical indicator	Unit	MAC	Average value of hydrochemical indicators	ARV within Nadymsky District	ARV within Purovsky District
pH value	pH unit	6.5-8.5	6.95	6.93	7.04
Total BOD	mgO ₂ /dm ³	3.0	-	-	-
BOD5		-	1.85	1.86	1.68
Ammonium ion	mg/dm ³	0.5	0.13	0.78	0.78
Nitrate ion		40	0.74	0.51	0.74
Phosphate ion		0.2	0.1	0.038	0.046
Sulfate ion		100	0.37	3.059	5.39
Chloride ion		300	15.0	3.25	4.56
Anionic surfactant		0.1	<0.025	0.03	0.056
Oil products		0.05	0.032	0.023	0.016
Phenol		0.001	0.00034	0.00125	0.005
Total iron		0.1	0.19	1.09	2.11
Lead		0.006	<0.003	0.0017	0.00137
Zinc		0.01	0.038	0.008	0.0066
Nickel		0.01	0.0025	0.0023	0.0032
Manganese		-	0.011	0.024	0.044
Total chrome		-	<0.01	0.007	0.008
Copper	0.001	0.0051	0.001	0.00098	

In 2019, the average concentration of all determined components did not exceed MAC, except for total iron, zinc and copper. High concentration of zinc, nickel and copper was observed in surface waters in Nadymsky and Purovsky Districts, YaNAO, against the ARV of controlled indicators.

The average zinc, nickel and copper concentration exceeded the ARV by 4.7, 1.08 and 5.1 times respectively in Nadymsky District and in Purovsky District by 5.7 times for zinc and by 5.2 times for copper.

Wetland water-collecting areas are the main source of iron, nickel, zinc and copper found in the surface waters of water courses. Copper may come into water courses as a result of weathering of quaternary sediments, i.e. due to geochemical characteristics 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 2019, 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 2019, 14 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 (table 3).

Table 3. The average values of indicators determined in bottom sediments in 2019 and EQS determined for bottom sediments in the territory of YaNAO

Determined indicator	Unit of measure	Average value of indicator	EQS indicators within Nadymy District	EQS indicators within Purovsky District
pH value	pH unit	5.25	-	-
Chloride ion	mg/kg	22.4	-	-
Sulfate ion	mg/kg	19.54	-	-
Anionic surfactant	mg/kg	16.81	-	-
Oil products	mg/kg	11.2	7.77	10.14
Iron	mg/kg	4959	-	-
Lead	mg/kg	1.9	-	-
Zinc	mg/kg	14.9	18	11.79
Nickel	mg/kg	2.68	10.33	5.5
Manganese	mg/kg	69.3	211.38	222.11
Chrome VI	mg/kg	0.23	-	-
Copper	mg/kg	2.09	7.62	3.48

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 zinc and oil products. The average concentration of zinc exceeded the average values by 1.2 times in Purovsky District. The average concentration of oil products exceeded the average regional values by 1.4 times in Nadymy District and by 1.1 times in Purovsky District. Although it is important to note that concentration of oil products in all samples taken in 2019 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 2019, 19 soil samples were analyzed as part of the 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 2019 are presented in table 4.

Table 4. The average values of indicators determined in soils in 2019.

Determined indicator	Unit of measure	MAC, APC	Average value of indicator	Ratio of average values to MAC
pH of the water extract	pH unit	-	5.21	-
Total iron	mg/kg	-	1809	-
Phosphate ion	mg/kg	-	4.81	-
Nitrate ion	mg/kg	130	12.46	0.096
Sulfate ion	mg/kg	-	27.8	-
Chloride ion	mg/kg	-	18.68	-
Oil products	mg/kg	-	15.65	-
Anionic surfactant	mg/kg	-	19.35	-
Phenol	mg/kg	-	0.12	-
Benz(o)pyrene	mg/kg	0.02	0.00038	0.001
Copper	mg/kg	33	1.08	0.033
Nickel	mg/kg	20	1.6	0.08
Zinc	mg/kg	55	16.3	0.297
Lead	mg/kg	32	1.48	0.047
Mercury	mg/kg	2.1	<0.05	-
Cadmium	mg/kg	0.5	0.11	0.22
Chrome	mg/kg	-	0.052	-
Manganese	mg/kg	1500	9.2	0.007

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 blocks under development was 15.65 mg/kg on average, which coincides with a baseline content of oil products in the soil based on Pikovsky's measurement scale (1993).

Snow cover (snow melt)

In 2019, 6 samples of the snow cover were examined at three license blocks. Samples were taken during the period of maximum stored moisture (March) at three conditional baseline points (least affected by man) and three conditional control points (least affected by man-made infrastructure facilities). Mean values of core indicators determined in snow cover during 2019 are presented in table 5.

Table 5. The average values of indicators determined in the snow cover (melted snow) in 2019 and EQS of indicators determined in the snow cover (melted snow) in the territory of YaNAO

Determined indicator	Unit of measure	Average values of determined indicators		EQS within Nadymsky District	EQS within Purovsky District
		Conditional baseline points	Control points		

Determined indicator	Unit of measure	Average values of determined indicators		EQS within Nadymsky District	EQS within Purovsky District
		Conditional baseline points	Control points		
Ammonium ion	mg/dm ³	0.11	0.11	0.7	0.5
Nitrate ion	mg/dm ³	0.7	0.71	0.73	1.37
Sulfate ion	mg/dm ³	0.21	0.2	1.19	0.57
Chloride ion	mg/dm ³	0.54	0.54	1.21	0.7
Oil products	mg/dm ³	<0.02	<0.02	0.048	0.05
Phenol	mg/dm ³	<0.0005	<0.0005	0.0008	0.0005
Total iron	mg/dm ³	<0.05	<0.05	0.12	0.12
Lead	mg/dm ³	<0.001	<0.001	0.0063	0.008
Zinc	mg/dm ³	0.0055	<0.005	0.022	0.024
Manganese	mg/dm ³	<0.001	<0.001	0.007	0.014
Copper	mg/dm ³	0.0017	0.0018	0.0044	0.007
Nickel	mg/dm ³	<0.001	0.002	0.0012	0.0033
Chrome (VI)	mg/dm ³	<0.01	<0.01	0.008	0.008

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. The average concentration at conditional baseline and conditional control monitoring points does not exceed EQS.

The average concentration of all controlled indicators in the snow samples taken at conditional control points does not exceed values determined at conditional baseline points.

Ambient air

In 2019, 6 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) and 3 conditional control points (least affected by man-made infrastructure facilities).

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 2019 was below the low value of measurement ranges of methods for: methane <16 mg/cubic meters, carbon monoxide <4 mg/cubic meters, sulphur dioxide <0.054 mg/cubic meters, nitrogen monoxide <0.086 mg/cubic meters, nitrogen dioxide <0.086 mg/cubic meters, suspended materials (dust) <0.26 mg/cubic meters, carbon (carbon dust) <0.03 mg/cubic meters and benz(o)pyrene <0.5*10⁻⁶ mg/cubic meters.

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".

Conclusion

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.