

Russian Federation  
OPEN JOINT STOCK COMPANY  
“SURGUTNEFTEGAS”

APPROVED  
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“    ” \_\_\_\_\_ 2017

**Summary report  
on results of industrial environmental monitoring  
within license blocks of OJSC “Surgutneftegas”  
in Yamalo-Nenetsky Autonomous Okrug**

**2016**

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Surgut - 2017

Industrial environmental control (IEC) in OJSC “Surgutneftegas” is performed on the basis of GOST R 56059-2014 “Industrial environmental control. General Provisions” to provide information on environment condition and pollution level, required to perform activity on preservation and restoration of natural environment, rational use and reproduction of natural resources, prevention of 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 has license No. 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, water and soil.

In Yamalo-Nenetsky Autonomous Okrug industrial environmental monitoring within license blocks is performed in compliance with Decree of the Government of YaNAO No. 56-p “On territorial environmental monitoring system within license blocks for subsoil use for the purpose of oil and gas production on the territory of Yamalo-Nenetsky Autonomous Okrug” dated 14.02.2013.

OJSC “Surgutneftegas” holds seven license blocks for subsoil use within Yamalo-Nenetsky Autonomous Okrug: Verkhne-Nadymsky (northern part) (SLKh 00 422 NE), Maloperevalny (SLKh 14 785 NR), Vostochno-Soimlorsky (SLKh 14 823 NR), Severo-Soimlorsky (SLKh 14 824 NR), Soimlorsky (SLKh 14 822 NR), Poluysky (SLKh 15 412 NP), Hulymegansky (SLKh 15 415 NP), Khadyyahinsky (SLKh 15 416 NP).

For Verkhne-Nadymsky (northern part) and Soimlorsky license blocks with constructed oilfield infrastructure facilities where commercial oilfield operation is performed, programs on local environmental monitoring are developed and approved in the established order. On other blocks where field prospecting and exploration are carried out, industrial environmental control is performed on the object-by-object basis as per project documentation and current legislation in the sphere of industrial environmental control on the basis of sampling schedules and schemes.

In 2016, within license blocks of OJSC “Surgutneftegas” in YaNAO ecological monitoring was performed on five license blocks at 65 sampling points.

Location selection of natural environment components is based on the analysis of topographic base maps, Earth remote sensing data taking into account hydrography and soil cover features of license blocks as well as production facilities location.

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

The structure of observational network of environmental monitoring  
within license blocks of OJSC “Surgutneftegas”  
in YaNAO

Natural environment components	Status of monitoring points	Number of points	Number of controlled parameters
Ambient air	Conditional baseline	2	8
	Conditional control	4	8
Snowfall	Conditional baseline	2	13
	Conditional control	2	13
Surface waters	Conditional baseline	2	18
	Conditional control	7	18
	Control	3	18
Bottom sediments	Conditional baseline	2	12
	Conditional control	7	12
	Control	3	12
Soils	Conditional baseline	2	20
	Conditional control	2	20
	Control	27	20

Laboratory sample analysis is carried out by two in-house accredited laboratories by approved methodology in accordance with the current directives and guidelines. Lower range of pollutant detection techniques does not exceed approved standards for the safe content level (maximum allowable concentrations (MAC), approximate permissible concentration (APC), safe reference levels of impact (SRLI), etc.).

The results of research are submitted to the authorized government body by means of information analytical system “Territorial system of environmental monitoring in YaNAO” during the established period as well as in electronic and paper form until the first day of April of the year following the reporting year.

### Surface waters

In 2016, 23 samples of surface water were examined. The samples were taken from the rivers Tinegan, Yangegan, Nudya-Yangegan, Yaetoyakha, Simiegan, Yangyagun, Kamchinyagun, Asyagun, Mutiyagun, Lankiegan, unnamed river and lake Yaeyakhato. The results of research (average values of core determined indicators) are shown in table 1.

Evaluation of surface waters local monitoring results at the license blocks is based on current standard values (MAC), defined by order No. 552 Ministry of Agriculture of the Russian Federation dated 13.12.2016 and average regional values (ARV) of controlled indicators concentration in surface waters within Nadymsky and Purovsky Districts, YaNAO.

Table 1

Average values of hydrochemical indicators determined in surface waters in 2016, MAC and average regional concentration values of controlled indicators in surface waters within YaNAO

Hydrochemical indicator	Unit of measure	MAC	Average value of determined indicators	Average regional values within Nadymy District	Average regional values within Purovsky District
pH value	pH unit	6.5-8.5	6.4	6.93	7.04
BOD, ultimate	mgO <sub>2</sub> /dm <sup>3</sup>	3.0	2.9	-	-
BOD5		-	-	1.86	1.68
Ammonium ion	mg/dm <sup>3</sup>	0.5	0.23	0.78	0.78
Nitrate ion		40	<0.1	0.51	0.74
Phosphate ion		0.2	<0.1	0.038	0.046
Sulfate ion		100	0.28	3.059	5.39
Chloride ion		300	2.19	3.25	4.56
Anionic surfactant		0.1	<0.025	0.03	0.056
Oil products		0.05	<0.02	0.023	0.016
Phenol		0.001	0.00058	0.00125	0.005
Total iron		0.1	0.94	1.09	2.11
Lead		0.006	<0.001	0.0017	0.00137
Zinc		0.01	0.051	0.008	0.0066
Nickel		0.01	0.0015	0.0023	0.0032
Manganese		-	0.024	0.024	0.044
Total chrome		-	0.0014	0.007	0.008
Copper		0.001	0.0039	0.001	0.00098

In 2016, average concentration of all determined components did not exceed MAC, except for total iron, zinc and copper. High concentration of zinc and copper was present in surface waters in Nadymy and Purovsky Districts, YaNAO, against average regional concentration values of controlled indicators.

Average concentration of zinc and copper exceeded average regional values by 6.4 and 3.9 times in Nadymy District and by 7.7 and 4 times in Purovsky District respectively.

Wetlands and gathering grounds are the main source of zinc and copper found in the surface waters of water courses. Copper may come into water courses as a result of weathering of quaternary deposits, 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 under research.

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.

Concentration of oil products and chlorides in surface waters which characterizes technological pollutant flux in oil production regions has special urgency when assessing ecological situation. In 2016, MAC exceedance of chlorides and oil products in surface waters was not identified.

#### Bottom sediments

In 2016, 12 bottom sediments samples were analyzed. The samples were taken once in sampling points of the surface water.

There are no federal pollution standards set for bottom sediments. Current condition of bottom sediments was assessed against the reference average regional values of indicators determined for bottom sediments in YaNAO (table 2).

Table 2

Average values of indicators determined in bottom sediments in 2016 and average regional values determined for bottom sediments within YaNAO

Determined indicator	Unit of measure	Average value of indicator determined in 2016	Average regional values within Nadymsky District	Average regional values within Purovsky District
pH value	pH unit	4.7	-	-
Chloride ion	mg/kg	22	-	-
Sulfate ion	mg/kg	56	-	-
Anionic surfactant	mg/kg	6.4	-	-
Oil products	mg/kg	6.2	7.77	10.14
Iron	mg/kg	1812	-	-
Lead	mg/kg	1.5	-	-
Zinc	mg/kg	14.4	18	11.79
Nickel	mg/kg	3.2	10.33	5.5
Manganese	mg/kg	82	211.38	222.11
Chrome	mg/kg	3.1	-	-
Copper	mg/kg	2.4	7.62	3.48

There was no any exceedance identified against average regional values within YaNAO, except for zinc. Average zinc concentration exceeded average value by 1.2 times in Purovsky District.

### Soils

In 2016, 31 soil samples were analyzed as part of local environmental monitoring.

Current soil condition of license blocks in YaNAO was assessed against approved soil standards (MAC, APC). Average values of the indicators determined in soils in 2016 are presented in table 3.

Table 3

Average values of indicators determined in soils in 2016

Determined indicator	Unit of measure	MAC, APC	Average value of indicator determined in 2016	Average values to MAC ratio
pH of aqueous extract	pH unit	-	5.2	-
Total iron	mg/kg	-	2076	-
Phosphate ion	mg/kg	-	28	-
Nitrate ion	mg/kg	130	4.7	0.04
Sulfate ion	mg/kg	-	12.4	-
Chloride ion	mg/kg	-	126	-
Oil products	mg/kg	-	47	-
Anionic surfactant	mg/kg	-	21	-
Phenol	mg/kg	-	3.6	-
Benz(o)pyrene	mg/kg	0.02	0.0003	0.015
Copper	mg/kg	33	3.7	0.11

Determined indicator	Unit of measure	MAC, APC	Average value of indicator determined in 2016	Average values to MAC ratio
Nickel	mg/kg	20	3.8	0.19
Zink	mg/kg	55	17.7	0.32
Lead	mg/kg	32	3.5	0.11
Mercury	mg/kg	2.1	0.091	0.04
Cadmium	mg/kg		0.3	-
Chrome	mg/kg	-	3.6	-
Manganese	mg/kg	1500	88	0.06

Levels exceeding MAC and APC were not found in the soil. Average values of the determined indicators of soils samples taken under local environmental monitoring are tenth and hundredth of the approved environmental standards.

Oil products content in soil samples taken at license blocks under development was 47 mg/kg on an average which coincides with a baseline concentration of oil products in soil based on Pikovsky's measurement scale (1993).

#### Snow cover (snow melt)

In 2016, four samples of snow cover were examined at two license blocks. The samples were taken during the period of maximum stored moisture (in March) at two conditional baseline monitoring points (least affected by technological impact) and two control points (affected by technological infrastructure facilities). Average values of core indicators determined in snow cover in 2016 are presented in table 4.

Table 4

#### Average values of determined components in snow cover (snow melt) in 2016

Determined indicator	Unit of measure	Average values of determined indicators		Average regional values within Nadymsky District	Average regional values within Purovsky District
		Conditional baseline points	Control points		
Ammonium ion	mg/dm <sup>3</sup>	<0.1	<0.1	0.7	0.5
Nitrate ion	mg/dm <sup>3</sup>	0.68	1.3	0.73	1.37
Sulfate ion	mg/dm <sup>3</sup>	0.5	1.0	1.19	0.57
Chloride ion	mg/dm <sup>3</sup>	0.39	0.36	1.21	0.7
Oil products	mg/dm <sup>3</sup>	<0.02	<0.02	0.048	0.05
Phenol	mg/dm <sup>3</sup>	0.0018	0.0016	0.0008	0.0005
Total iron	mg/dm <sup>3</sup>	<0.05	<0.05	0.12	0.12
Lead	mg/dm <sup>3</sup>	<0.001	<0.001	0.0063	0.008
Zink	mg/dm <sup>3</sup>	0.032	0.013	0.022	0.024
Manganese	mg/dm <sup>3</sup>	0.0018	0.008	0.007	0.014
Copper	mg/dm <sup>3</sup>	0.0069	0.0070	0.0044	0.007
Nickel	mg/dm <sup>3</sup>	<0.001	<0.001	0.0012	0.0033
Chrome (VI)	mg/dm <sup>3</sup>	<0.01	<0.01	0.008	0.008

There are no approved environmental standards of snow cover pollutants. Snow cover quality assessment 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 control monitoring points with the reference average regional values of snow cover within YaNAO. High concentration of phenol is present at baseline and control monitoring points in relation to the indicated values. Concentration of copper in baseline and control monitoring points is at the level of average regional values approved within Purovsky District, however, exceeds average regional values for Nadymy District. Average concentration of zinc at baseline monitoring points exceeds the level of average regional values approved within YaNAO. Concentration of manganese at control monitoring points is at the level of average regional values approved within Nadymy District, however, exceeds the level of average regional values for Purovsky District.

Average values of nitrate ions, sulfate ions and manganese exceeded average values of baseline level determined in 2016 by 1.9, 2 and 4 times respectively.

### Ambient air

In 2016, 10 samples of ambient air were examined. The samples were taken at two conditional baseline monitoring points (least affected by technological impact) and four control points (affected by technological infrastructure facilities).

Concentration level of methane, carbon oxide, sulphur dioxide, oxide, nitrogen dioxide, suspended materials, carbon and benz(o)pyrene was determined.

In 2016, concentration of determined components was below lower limits of the measuring range of techniques: methane –  $<4 \text{ mg/m}^3$ , carbon oxide –  $<1 \text{ mg/m}^3$ , sulphur dioxide –  $< 0,054 \text{ mg/m}^3$ , nitrogen oxide –  $<0,086 \text{ mg/m}^3$ , nitrogen dioxide –  $<0,086 \text{ mg/m}^3$ , suspended materials (dust) –  $<0,26 \text{ mg/m}^3$ , carbon (carbon black) –  $<0.03 \text{ mg/m}^3$  and benz(o)pyrene –  $<0.5 \cdot 10^{-6} \text{ mg/m}^3$ .

Ambient air quality assessment was carried out on the basis of comparison of the results of quantitative chemical analysis with MAC and SRLI standards. Levels exceeding hygienic standards were not found; ambient air pollution level is within permitted limits and considered to be a low one.