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Base project: Report on the status of Russian hot spots

This document was a background document for the
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Baltic Marine Environment Protection Commission

"Environmental monitoring, management, audit and consulting" Ltd.
("EcoMMAC")

"Preparation of hot spots report including hot spot questionnaire"

Report on BASE project, HELCOM

"Preparation of materials on the current state of affairs with Russian "hot spots" of the JCP Program in accordance with the decision of the HELCOM Ministerial Meeting (Moscow, May, 2010) for the report of the Secretariat at the Ministerial Meeting in 2013"

Kaliningrad
2013

Content

Introduction

The present Report is prepared in compliance with the requirements specification of the contact between HELCOM and OJSC "EcoMMAK" dated 19 December 2012.

The contract envisaged preparation of materials for assessment of the current state of the Russian "hot points" of the HELCOM list in accordance with the decision of the HELCOM Ministerial Meeting, held in Moscow on 20 May 2010, for the consolidated report of the Secretariat at the Ministerial Meeting in 2013.

To fulfill the requirements specification, the questionnaire has been drawn and submitted to the regional authorities, as well as to the representatives of enterprises and organizations of St.-Petersburg, Kaliningrad and Leningrad Regions, included into the "hot points" list.

On the basis of the obtained information analysis the conclusions have been made on the probability of exclusion of the Russian "hot points" from the HELCOM list.

The report presents information and conclusions for the following 12 Russian "hot points"

- **St. Petersburg**

1. № 18 (hot sub-spots 18.1-18.19). Municipal waste water treatment in St.-Petersburg

2. № 23 «Hazardous Waste Landfill - State Unitary Nature Conservation Enterprise (SUNE) "Krasny Bor Landfill"

- **Leningrad Region**

3. № 14 «Syaskiy Pulp and Paper Mill (PPM)»

4. № 15 "Volkhov Aluminium Plant (Limited Liability Company "Metankhim")"

5. № 24 "Large livestock farms (sewage water treatment and sediment processing)"

- **Kaliningrad Region**

6. № 49 "Sovietsk PPM"

7. № 50 "Neman PPM"

8. № 67 "Waste Water Treatment Plant of the Kaliningrad City"

9. № 69 "Cepruss PPM"

10. № 70 "Landfill of Hazardous Wastes of the Kaliningrad City"

11. № 71 "Fuel and Cargo Complex FSUE "State Sea Fishing Port" (Port Oil Bunkering Station of the Kaliningrad City)"

12. № 72 «Agriculture of the Kaliningrad Region»

Summary

The report presents information on 12 Russian "hot points" of HELCOM located in St.-Petersburg, the Kaliningrad and the Leningrad Regions (Fig. 1 and 2).

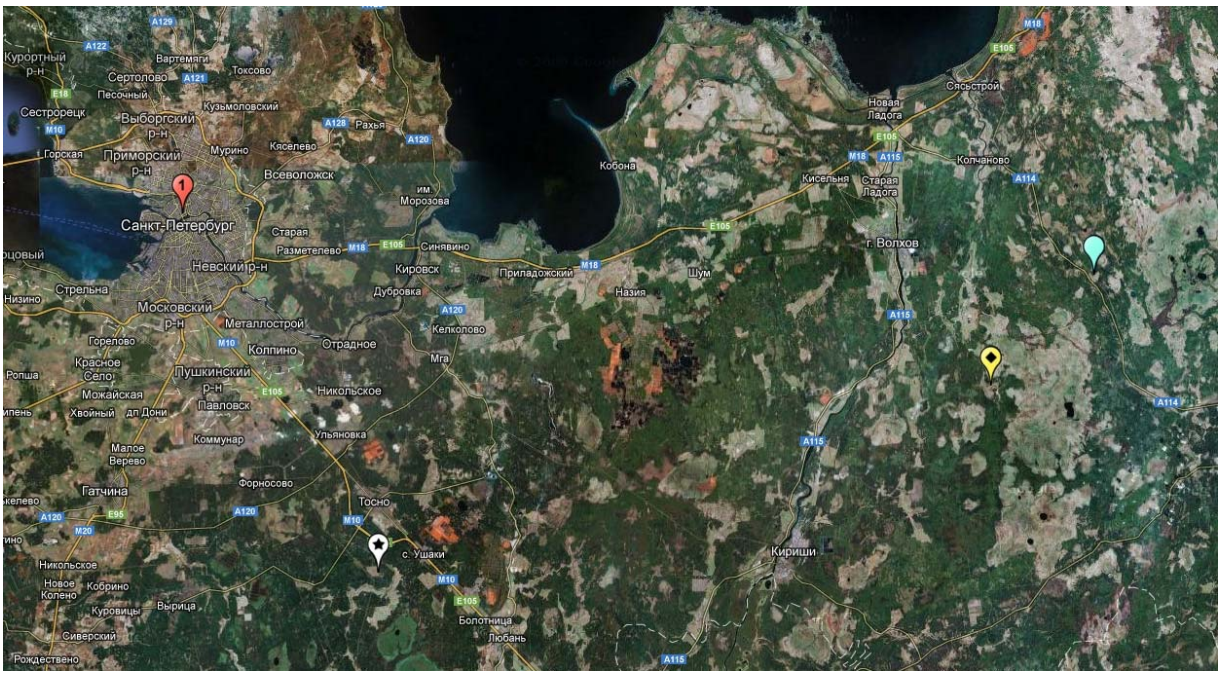


Figure 1 – Hot Spots of St.-Petersburg and the Leningrad Region:

- №18. (hot sub-spots 18.1-18.19). "Municipal waste water treatment in St.-Petersburg"

- № 23 "Hazardous Waste Landfill - State Unitary Nature Conservation Enterprise (SUNE) "Krasny Bor Landfill"

- № 15 "Volkhov Aluminium Plant (Limited Liability Company "Metankhim")"

- № 14 "Syaskiy Pulp and Paper Mill (PPM)"

№ 24 "Large livestock farms (sewage water treatment and sediment processing)"

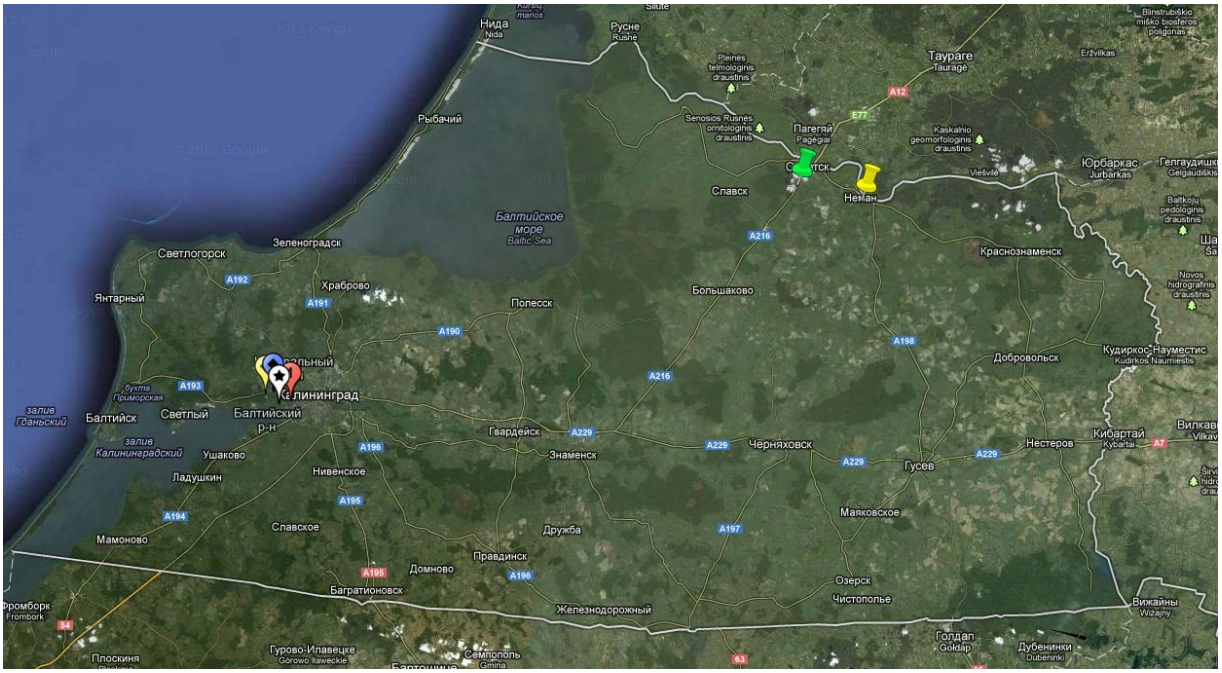


Figure 2 - Hot Spots of the Kaliningrad Oblast:

- № 67 "Waste Water Treatment Plant of the Kaliningrad City"

- № 69 "Cepruss PPM"

- № 70 "Landfill of Hazardous Wastes of the Kaliningrad City"

- № 71 "Fuel and Cargo Complex FSUE "State Sea Fishing Port" (Port Oil Bunkering Station of the Kaliningrad City)"

- № 49 "Sovietsk PPM"

- № 50 "Neman PPM"

№ 72 «Agriculture of the Kaliningrad Region»

St.-Petersburg

Hot spot № 18 (hot sub-spots 18.1-18.19). Municipal waste water treatment in St. Petersburg

Currently the following three hot sub-spots remains:

- 18.1 Waste Water Treatment Plant, collectors;
- 18.11 WWTP "Town of Kolpino";
- 18.15 WWTP "Settl. of Metallostroy"

- Sub-spot 18.1

During the period from 2006 to 2012 the SUE "Vodokanal of St.-Petersburg" had done a great job to finish construction of the main sewerage collector in the northern part of the city with the liquidation of the direct untreated sewage water outfalls.

In 2011 the next construction stage of the Main sewerage collector was finished, 6 direct outfalls were closed reducing discharges of untreated sewage water by 30 thousand m3/day and providing treatment of 94% of urban sewage water.

The completion of this project is scheduled to November 2013, when 98% of urban sewage water will be treated.

St.-Petersburg is the first city in the world with such high percentage of urban sewage water treatment.

Application for exclusion of the hot sub-spot №18.1 from the list will be prepared and submitted at the 19th meeting of the HELCOM LAND Group in May 2014.

- Sub-spot № 18.11 STP "Town of Kolpino"

It is planned to reconstruct the treatment facilities increasing the capacity up to 150 thousand m3/day and to put into operation the sewage incineration shop. Tentative time of the completion is 2014-2015.

- Sub-spot № 18.15 STP "Settl. of Metallostroy"

Tentatively, decommissioning of STP is scheduled in 2014-2015 with the transferring of the entire amount of untreated sewage water to the Central aeration station.

Hot spot № 23 «Hazardous Waste Landfill - State Unitary Nature Conservation Enterprise (SUNE) "Krasny Bor Landfill"

The State Unitary Nature Conservation Enterprise "Krasny Bor" Landfill is intended for receiving, disposal and burial of toxic industrial wastes from enterprises of St.-Petersburg and the Leningrad Region. The Landfill area is 67.8 hectares It is located at the distance of 30 km from St.-Petersburg. The industrial site area is 52 hectares.

The main activities of the SUNE "Krasny Bor Landfill" include:

1. Collection and transportation of industrial wastes from the enterprises of the city and the region to the Landfill.

2. Neutralization, utilization and burial of industrial toxic wastes.

3. Laboratory analysis of accepted industrial wastes from enterprises and organizations of St. Petersburg and Leningrad Region. Ecological monitoring of the sanitary-protection zone of the Landfill.

4. Construction of the plant for industrial wastes treatment (customer's function).

5. Development and implementation of nature protection technologies, aimed at decrease of impact on the environment.

6. Collection and demercurization of exhausted fluorescent lamps (HELCOM Recommendation 18/5).

The company has a significant negative impact on the environment, since continue to use outdated technologies of handling toxic wastes. The comparative analysis of hot spot for the previous period shows, that, in spite of reduction of waste acceptance volumes and closing of some foundation pits, the negative impact level is still increasing. A special concern is provoked by more frequent emergency situations at the facility. The safety operation of the Landfill is not possible without construction of the designed plant for hazardous wastes treatment, which should have been launched in 2005. At present, putting into operation of the plant with capacity of 40 000 tons of wastes per year is planned in 2015. The construction will be funded from the federal and regional budgets.

The Leningrad Region

Hot spot № 14 «Syaskiy Pulp and Paper Mill (PPM)»

Open Joint-Stock Company (OJSC) "Syaskiy Pulp and Paper Mill" is located at the distance of 140 km from St.-Petersburg. The enterprise is located on the right bank of the Syas River at the distance of 2.5 km from the Ladoga Lake. The Mill was founded in 1928. Today Syaskiy PPM, converted into the state corporation in 1993, is one of the multi-functional modern pulp and paper mills of the North-West Region of the Russian Federation.

The Mill is discharging the sewage water into the Valgoma River and the Volkhov Bay of the Ladoga Lake. It has been included into the HELCOM's list of "hot spots" as one of the biggest polluters of the Ladoga Lake and atmospheric air with nitrogen and phosphorous.

In the recent years, a number of works on reconstruction of production departments as well as reconstruction of the treatment facilities were implemented by the enterprise. Introduc-

tion of special measures allowed to reduce emissions to the atmosphere and significantly reduce the water consumption. Discharge of the untreated storm water from the industrial sits into the Valgoma River also was completely ceased. Significant reduction of pollutants discharge into the Volkhov Bay occurred mainly not due to improvement of the sewage water treatment, but owing to decrease of discharged volumes. Further modernisation of the technological processes of cellulose cooking and bleaching, as well as modernisation of the treatment facilities are necessary.

The solution of environmental problem is associated with high financial costs. Taking into account the current economic situation of the Mill, it is seems not possible to solve quickly the problem of excluding the enterprise from the list of "hot spots" without investment support.

Hot spot № 15 "Volkhov Aluminium Plant (Limited Liability Company "Metankhim")"

Volkhov Aluminium Plant is one of the largest industrial enterprises of the Volkhov Town. The Plant site is located on the right bank of the Volkhov River at the distance of 120 km from St.-Petersburg, in the northern part of Volkhov, and at the distance of 20 km from the Ladoga Lake. The Volkhov River is a source of industrial water supply to the plant, and the industrial sewage water of the plant is discharged into the river.

Three sewage water outfalls, sewerage treatment facilities, sludge collector of the aluminous shop and gypsum collectors were on the balance of the plant. The sewage water discharge was 3609 thousand m3/year, the mass of discharged pollutants exceeded 6000 tons. The annual volume of emissions constituted 7735.7 tons. The main reasons of the plant inclusion into the HELCOM's list of "hot spots" as the one of the largest polluter of the Ladoga Basin, are indicated below.

Taking into account the division of the enterprise into three independent organisations, it is reasonable to consider the required measures for each of them:

1) Branch VAZ-SUAL of the OJSC "SUAL"

- proposal of recommendations for improvement of environmental management on the enterprise can be implemented only after final solution of the problems of the enterprise restructuring or closing;

- since the current share of the enterprise in the total volume of waste water is about 3%, and the sewage water is not discharged into the water body but is transported to the LLC "Metakhim" for treatment, the planned environmental activities should be aimed at additional treatment of industrial emissions.

The enterprise should stay in the HELCOM's "hot spot" list only for the impact upon the atmospheric air.

2) Limited Liability Company "Metakhim"

- the Limited Liability Company "Metakhim" is the major source of impact on the environment. The main and the only reason for exclusion of the enterprise from the list of «hot spots" should be the treatment plant construction.

- to reduce emissions into the atmosphere, it is necessary to increase the efficiency of gas cleaning, especially in reconstructed sections for production of phosphoric acid and polymineral fertilizers.

3) Limited Liability Company "Parosilovoe hozyaystvo - Volkhov"

- the enterprise can be excluded from the HELCOM's list of "hot spots", because its activities are related to production of heat and electric power. The enterprise's share in the total emissions is below 15%, and the share in the sewage water discharge is 10%, while the sewage water is not directly discharged, but is transferred for treatment to the LLC "Metakhim".

As a result of reorganisation, the hot spot "Volkhov Aluminium Plant" currently consists of three independent organisations. One from them - the Limited Liability Company "Parosilovoe hozyaystvo - Volkhov" should be excluded from the list of hot spots, as having a minor impact on the environment. The main source of emissions into the atmosphere is the Branch VAZ-SUAL of the OJSC "SUAL". The necessary complex of environmental measures for this enterprise may be developed only after making a decision concerning its restructuring or closing. The main source of the sewage water discharges is the Limited Liability Company "Metakhim", which combined all chemical industries of the plant. Significant increase of individual pollutants discharge evidenced the urgent necessity of the treatment plant construction. The construction of the treatment plant is scheduled to 2013-2014.

Hot spot № 24 "Large animal-breeding farms (sewage water treatment and sediment processing)"

Agriculture is one of the most serious sources of the Baltic Sea pollution with nitrogen and phosphorous. The main contribution to pollution is made by large livestock farms. Initially, the livestock farms with more than 50 000 heads of cattle was considered as the main thread to the Baltic Sea ecosystem safety. Within the framework of the JCP Program the following four large hog-breeding farms were referred to the hot spot №24 : SAE (State Agricultural Enterprise) "Sputnik", SAE "Novy Svet", SAE "Pashsky" and SAE "Vostochny" situated in the territory of the Leningrad Region.

The pig-breeding complex "Novy Svet" is situated in the Gatchina District of the Leningrad Region, in the settlement of Novy svet, at the distance of 10 km from the Gatchina Town. The complex was designed for fattening of 120 thousand heads of pigs at a time, and has been working for more than 30 years. The sewage water was discharged to the Suyda River (basin of the Neva River)

The pig-fattening complex "Vostochny" is located in the Nurma settlement of the Tosnensky District. The complex was put into operation in 1973. The maximum number of animals for fattening is 108 thousand heads. The sewage water is discharged into the Igolenka steam (the Neva basin).

The pig-fattening complex "Sputnik" is located in the territory of the Vsevolozhsk District near the Romanovka settlement, at the distance of 22 km from the Vsevolozhsk Town. The first two lines of the complex were constructed in 1980. The designed capacity of the complex was 250 thousand heads of pigs at a time. The water from irrigated fields is discharged through the drainage system and horizontal sewers into the Maurier River, and then to the Ladoga Lake.

The livestock complex of bull-calf fattening Pashsky is located in the territory of the Volkhov District in the Potanino settlement, at 132 km of the Murmansk highway. It was designed for fattening 30 thousand heads of cattle. The first stage for 10 thousand heads, designed on the basis of the Italian technology, was put into operation in 1975. Pashsky complex owned 8000 hectares of land with double water regulation (polder land), where the treated sewage water was discharged. The sewage water of the complex flowed to the Pasha River, and then to the Ladoga Lake.

Livestock farming in the Leningrad Region is the dynamically developed sector of economy with the growing share in the gross regional product for the recent years. Predominance of the large-scale commercial production sector, in combination with highly depreciated facilities for manure storage, stipulate the acuteness of the problem of excessive nutrients inputs from the agricultural sector. The results of numerous investigations, conducted within the framework of domestic and international projects, revealed low efficiency of approach to the problem solution by supporting environmental activities at individual farms. The necessity of institutional reforms in livestock waste management, both at the level of enterprises and at the level of authorities of different levels, is urgent in the sector.

Introduction of Technological Regulations in the field of handling manure and dung at all large livestock enterprises of the Leningrad Region will allow to decrease significantly nutrients load on the Baltic Sea and to exclude the agricultural sector of the Region from the HELCOM's list of "hot spots".

The Kaliningrad Region

Hot spot № 49 "Sovietsk PPM"

Sovietsk Pulp and Paper Mill, located in the town of Sovietsk on the left bank of the Neman River (Figure 16), was founded at the beginning of the 20th century. In 1946 it was restored and put into operation.

By the end of 1980s, the Mill produced annually about 130 thousand tons of sulphite cellulose and 35 thousand tons of different types of paper. Four paper machines at the Mill were mounted during its creation and were modernized in 1970-1980s. The Mill's production was delivered mainly to the domestic market of the Soviet Union.

In 1990s the water intake for production purposes from the Neman River amounted to about 35 mln. m3/year, while the water discharge to the Neman River constituted about 34 mln. m3/year.

The enterprise has a certain water treatment system, but its efficiency was low. That's why the enterprise was included into the HELCOM's list of "hot spots".

In the Soviet epoch the construction of the off-site treatment plant with the capacity of 169 thousand m^3/day (construction was began in 1983) was planned at the expense of the state investments.

However, the allocated funds and construction capacities available at that time in the Kaliningrad Region did not allow to carry out the construction in the scheduled period resulted in destruction of unfinished facilities. In 1992 the funding was ceased completely, and the construction of the treatment plant was suspended.

Understanding the inability to finish the construction of the off-site treatment plant and in view of the necessity to meet the HELCOM Requirements on the Baltic Sea water protection, as one of the ways to solve the environmental problems, faced by the Mill, the Board of Directors had made a decision to reorganize the existing enterprise with full liquidation of one of cellulose production facilities (pulp shop №1) in 1993. This measure would allow to reduce the water consumption and discharge, and consequently the discharge of pollutants by 50%.

To reduce the negative impact upon the environment, the technical policy aimed at promotion of environmentally safe technologies introduced at the Mill. From 1994 the Mill began to produce corrugated cardboard and corrugated cardboard boxes in the vacant areas. In 1998 the shop was put into operation.

In 2007 the complex project of Mill reconstruction with transition to the viscose cellulose output was developed. However, in June 2008 there was a fire at the Mill, which inflicted the irreparable damage to the production facilities. By the decision of the Board of Directors on

01.07.2008, the cellulose production at the Mill was suspended. Paper, corrugated cardboard and packaging were produced from the finished cellulose delivered from the Arkhangelsk Region. The accumulated paper mass and imported waste paper were used as a raw materials in production.

In June 2009, in view of significant account payable of the Mill and inability to pay it off at the expense of the current activities, the General Meeting of Shareholders of the company made the decision on voluntary liquidation of the legal entity "Sovietsk PPM". Liquidation proceeding has not been completed yet. The property of the Mill, including the territory, was sold or transferred to rent to a various legal entities.

Thus, the production capacities of the former Sovietsk PPM are owned now by the OJSC "Atlas-Market" in accordance with the agreement of 01.10.2010. OJSC "Atlas-Market" produces napkins from imported bleached paper, paper for production of corrugated products, paper-basis, cardboard from imported paper mass and corrugated cardboard from its own cardboard.

The production volumes, as well as the water consumption and discharge, have been significantly decreased (by about 10 times). Discharge of pollutants formed during paper production (tarry matters, lignin, methanol, phormaldegyde, chloroform, ions of acetic acid, acetone, phenols), was totally ceased. Only three outfalls to the Neman River remained instead of five: the main outfall (backwater) and outfalls of the energy shop and CHPP working currently on the fuel oil.

Calculations, carried out on the basis of the company's reports, indicate that the inflow of nutrients from the Sovietsk PPM's has been reduced so much, that the exclusion of this enterprise from the HELCOM's list of "hot spots" can be considered.

Hot spot № 50 "Neman PPM"

The enterprise is located at the border with Lithuania on the Neman River in 76 km upstream from the Curonian Lagoon of the Baltic Sea.

The Mill was founded on the basis of the German Paper Mill founded in 1912. During the Second World War the Mill was destroyed, and it was rebuilt in 1946, when pulp and paper production was started.

In the subsequent operation period, reconstruction and technical modernization of individual production facilities were implemented (replacing of cookers, individual bleaching towers; construction of evaporation station and some other facilities).

At the same time, these improvements did not considerably affect the existing technology of sulphite cellulose cooking and did not contribute to the improvement of environmental safety

of individual processes and production in general. For these reasons, the existing technology used at the enterprise did not correspond to the world development level of technology and equipment of pulp and paper industry.

1. In the field of applying the best available technologies:

1) Dry debarking is available. Sewage water discharge is absent.

2) Closed treatment system is absent, but is envisaged in the future plans of modernisation.

3) Neutralisation of weak liquors before evaporation with reuse of significant part of condensates in production is provided by the technology, which is the part of the project "Reconstruction of the pulp industry and transition to cellulose cooking on the magnesium base".

4) Systems to provide treatment of almost total organic matter, dissolved in the liquor (liquor regeneration up to 90%) are envisaged in the project "Reconstruction of the pulp industry and transition to cellulose cooking on the magnesium base with heat end chemicals regeneration".

5) Discharge during cooking on the magnesium base from the bleaching process is absent.

6) Two-stage bleaching of the discharged sewage water is presented in the investment project "Modernisation of paper and paper stationery production at the Neman PPM aimed at environmental sanitation of the Neman Town".

7) Partially closed bleaching process during cooking on sodium base is available.

8) Biodegradable chelate substances are not used during production.

2. Sewage water treatment (availability of the treatment plant with activated sludge treatment) is provided as a part of the investment project "Modernisation of paper and paper stationery production at the Neman PPM aimed at environmental sanitation of the Neman Town".

3. During the period from 2000 to 2003 the enterprise reduced sewage water discharges owing to the filters "Supratsell"in operation. The similar system is now in the process of installation in the paper shop № 1within the framework of the General plan of reconstruction of the Neman PPM, and then it will be installed in the sewage water line of the Mill. Reduction of emissions is envisaged in the project "Reconstruction of pulp production and transition to magnesium-bisulphate cooking". In particular, in October 2000 the Neman PPM switched from the sulphite method of cooking with ammonium base to the modified bisulphite method with the sodium base reducing the specific discharge of total nitrogen from 3.7 to 1.7 mg/l.

However, NWTC could not cope with the credit load, and the Mill again was transferred to another owner.

Currently, 400 employees are working at the LLC "Neman Pulp and Paper Mill". The Mill produces offset paper based on cellulose imported from Finland, however, it is in the state of bankruptcy.

The analysis of information on modern production activities of the LLC "Neman PPM" and its negative impact upon the environment leads to the conclusion that in the current state this enterprise does not present a serious threat for the environment and may be excluded from the HELCOM's list of "hot spots". However, the uncertain legal status of the enterprise cannot ensure that in the future it will retain the current level of impact upon the environment.

Hot spot № 67 "Waste water treatment facilities of the Kaliningrad City"

The sewage treatment facilities of Kaliningrad is intended for municipal sewage treatment of Kaliningrad. It is subordinated to the Municipal Unitary Enterprise (MUE) "Vodokanal" of the City of Kaliningrad".

The sewage treatment system of Kaliningrad includes the treatment plant of mechanical treatment, the main collector, sewerage network, sewerage pumping stations and sewerage pits.

The sewage water of Kaliningrad is collected by means of thirty collectors and the tributaries network and is supplied to the treatment facilities within of the city by means of the main collector and outside the city by means of the free-flow interceptor. The main collector of the sewerage system consists of the aqueduct, several pipe subways and two sand traps.

The domestic sewage water from the residential areas and industrial enterprises with the water discharge of 160 - 180 thousand of m3/day is collected by the main collector, situated along the Pregel River. Then the sewage water is supplied to the treatment plant of mechanical treatment, located at the distance of 1 km from Kaliningrad and at the distance of 1.8 km from the Kaliningrad Maritime Channel connected directly with the Vistula (Kaliningrad) Lagoon. The treatment plant of mechanical treatment was built in 1924 and was restored after the Second World War. The designed capacity of the treatment plant of mechanical treatment is 68 thousand m3/day. After mechanical treatment at the treatment plant the sewage water is drained through the discharge channel to Primorsk Bay of the Kaliningrad Lagoon almost untreated.

Implementation of environmental activities included putting the treatment plant into operation in 2013 in the framework of implementation of the Federal Target Program of Development of the Kaliningrad Region for the Period up to 2015

Application of the stepwise chemical-biological treatment of the sewage water at the treatment plant under construction will provide pollutants reduction in the discharged sewage

water, including BOD, total phosphorous, total nitrogen, suspended matter, and radically decrease the impact upon the environment.

For radical reduction of the negative impact on the environment, it is necessary to complete the construction and put into operation the new treatment plant. The ecological industrial monitoring program should include the assessment of the target indicators of the discharged sewage water quality, such as total phosphorous and total nitrogen.

Currently the enterprise has a significant negative impact upon the environment, since it continues to use the incomplete cycle of the sewage water treatment, which results in non-observance of the Russian legislation and HELCOM recommendations for sewage water treatment.

The analysis of the current state of the "hot spot" shows that, despite the fact that for the recent years a number of qualitative changes has occurred at the Plant (main collector overhaul, putting into operation the main pumping station at the east of the city, putting into operation the local pumping sewerage station), the negative impact level still remains high.

Despite the construction of the new treatment plant in Kaliningrad within the framework of implementation of the International Project and Federal Target Program shifting of the time of putting the Plant into operation provokes a concern.

Hot spot № 69 "Cepruss PPM"

Kaliningrad Pulp and Paper Mill №2 was reorganised in 1993 into the Closed Joint-Stock Company with foreign investments "Cepruss" (CJSC "Cepruss"). This enterprise started its commercial operation in 1906 as the North-German Pulp Mill.

CJSC "Cepruss" is located on the right bank of the Pregel River, in the mouth of the Kaliningrad Lagoon of the Baltic Sea.

Economic inefficiency of production of CJSC "Cepruss" has led to ceasing the production of pulp and paper, liquidation of water intake facilities on water bodies, as well as liquidation and suspension of the drainage facilities, intended for the sewage water treatment and discharge to surface water bodies. The thermal power station (TPS) of the CJSC "Cepruss" being the source of the negative impact upon the atmospheric air, has been transferred to the balance of the City of Kaliningrad.

Entering the the CJSC "Cepruss" into the HELCOM's list of "hot spots" the CJSC "Cepruss" on the basis of such negative impact as sewage water discharge and emissions of pollutants into the atmosphere, is now irrelevant due to the closure of production activities.

Hot spot № 70 "Landfill of Hazardous Wastes of Kaliningrad"

The Landfill of Hazardous Wastes of Kaliningrad designed for the storage and disposal of municipal solid wastes (MSW) of Kaliningrad, Svetlogorsk District and Zelenogradsk District and is operated by the Municipal Unitary Enterprise (MUE) "Chistota".

The Landfill of Hazardous Wastes of Kaliningrad is located in the forestry zone at the western end of Kaliningrad, the Pregel River flows at the eastern boundary of the Landfill. The Landfill is located on the marshland.

The distance from the Landfill to the nearest settlements is: 850 m to s. Kosmodemyanskiy, 1 km to the Kaliningrad Maritime Canal, 1.8 km to the portable water lakes (Figure8). There is the asphalt road, branching from the main road Kaliningrad – Baltiysk to the checkpoint of the Landfill and crossing the Kaliningrad by-pass channel.

The Landfill was created in 1978. Its area is 13.8 hectares. The disposal of waste at the Landfill is carried out in foundation pits with isolating material (sang, clay) (Figure 8). The waste storage is carried out by layers up to 2 m with constant compaction.

The enterprise has the license for implementation of collection, utilization, neutralisation, transportation and disposal of hazardous wastes, issued by the Department of Technological, Environmental and Nuclear Supervision (Rostechnadzor) of the Kaliningrad Region, valid until 11.07.2013. The current license allows to accept at the Landfill wastes of 338 names in accordance with the Federal Classification Catalogue of Wastes referred to IV-V classes of hazard.

In accordance with the decree of the City Administration of Kaliningrad №960 of 15.05.2008, the period of leasing the land allocated to the Landfill of MUE "Chistota", was extended up to 31.12.2014. Currently the lease period of this land for landfill purposes is extended to 25 years. This may become the basis for issuing the indefinite-term license for neutralisation and disposal of wastes of the I-IV class of hazard.

The main activities of the Landfill of Hazardous Wastes of Kaliningrad include the following:

1. Collection and transportation of municipal solid wastes to the landfill from the dwelling zones and enterprises of different forms of property in Kaliningrad.

2. Disposal of solid wastes at the landfill.

3. Ecological monitoring in the zone under the landfill's impact.

4. Development and implementation of ecologically safe technologies to minimise the negative impact on the environment.

The reasons of potential danger of the Landfill:

1. Inefficient treatment plant of the Landfill and proximity to the water body create the probability of the negative impact upon quality of the Lagoon water though existing hydrological network (Clause 2 paragraph 3 of the Convention for the Protection of the Marine Environment of the Baltic Sea, 1992)

2. Occasional inflammation of wastes disposed at the landfill leads to the air pollution.

3. Emission of the greenhouse gas as a result of solid wastes burial.

4. Contamination of soil and surface water with filtrate and sewage drainage water discharged after the biological treatment only.

5. Swamping of the surrounding areas due to input of the sewage water and filtrate from the landfill.

Currently the landfill participates in the regional target program "Handling the waste of production and consumption in Kaliningrad Region for the period from 2012 to 2016" and the international ecological project "The Pilot Project - Centre for Recycling the Wastes of Electrical and Electronic Equipment in Kaliningrad". The Landfill reclamation is planned after the construction of the new landfill and waste-treatment plant within the framework of implementation of the target program. Within the implementation of the third final phase of the international project, the construction of the Centre for recycling of the waste electrical and electronic equipment at the Landfill's territory is planned.

Hot spot № 71 Fuel and cargo complex FSUE "State Sea Fishing Port" (Port Oil Bunkering Station of the Kaliningrad City)

The FCC is located in the territory of the FSUE "KSFP" and directly on the bank of the Pregel River (Figure 33). It covers an area of 19.35 hectares, where the tank stock with the capacity of 36 000 m2 of oil products storage, two double-sided railroad overpasses for unloading and loading of black and white oil products as well as various oils, up to 24 tank wagons, technological pump stations for different oil products and other support services are located.

The FCC of the FSUE "KSFP" included in the list of the HELCOM's of "hot spots" due to the presence at the territory of the FCC of the following sources of environmental pollution formed during complex operation:

- oil-sludge accumulated in the earth storage;

- oil pollution of soil in the close proximity to the shore line leading to the penetration of oil products to the Pregel River. This creates the probability of influencing the quality of water of the Vistula (Kaliningrad) Lagoon though the existing hydrological network. (Clause 3 paragraph 2 of the Convention on Protection of Marine Environment of the Baltic Sea, 1992).

Currently, the FSUE "KSFP" takes the following measures for elimination of the above mentioned sources of pollution:

Under the contract of 27.02.2010 with the LLC "Ecoprom", in 2010 the treatment of residual oil sludge remained in the earth reservoir in the territory of the fuel and cargo complex of the FSUE "KSFP" was started. The LLC "Ecoprom" has the license for collection, usage, neutralization, transportation and disposal of wastes of I-IV class of hazard valid until 10.09.2015. The planned works include treatment of oil sludge in amount of 300 m3. In 2010, 147.07 m3 of oil sludge were transported for treatment. By March 2013, the volume of oil sludge in sludge collector at the enterprise constituted 650 tons.

The works are carried out with the special equipment of the contractor at the specially prepared and enclosed site (the former incineration station of FCC of FSUE "KSFP"), which is equipped with the metal caisson for accumulation of raw material, telfer, personal service rooms and tanks for reagents storage. During the process of oil sludge treatment, the utilization product of oil wastes (mineral powder "PUN") is produced.

The product of oil wastes utilization (mineral powder "PUN") consists of the finest particles of oil wastes uniform in color and composition, which are encapsulated in solid, hydrophobic, frostproof and calcareous capsules. The mineral powder includes the following components:

a) neutralized oil wastes – not more than 50% (including 0.05% of heavy metals) – the 4th class of hazard;

b) hydrated lime Ca(OH)2 GOST 9179-77 (the 3rd class of hazard) and chalk CaCO3 (the 4th class of hazard) – 45 – 47%;

c) technical fat (GOST 1045-73) – 3 – 5%.

The mineral powder "PUN" is intended for use in road construction as an additive or component for the road concrete mix or as a structural component of the road cover.

During the inspection by supervisory authorities in March 2011 the violations of requirements for the temporal storage of the formed product were revealed. The formed product should be stored in an enclosed site, bunkers and silo pits, and the powder packaged in paper bags should be kept in closed storehouses.

Under the contract with the LLC "Eco-partner" for collection, reception, transportation, temporal storage, neutralization and utilization of hazardous industrial (toxic) wastes, in 2011 the works on collection, transportation of emulsion wastes and mixture wastes of oil products from the FCC area were started. The emulsion wastes and mixed wastes of oil products are referred to the 3rd class of hazard and consist of more than 95% of oil products.

During 2011 – 2012, pumping-out of oil products penetrated into soil was carried out at 13 development wells located in the area of the 4th pier and railway lines. The productive capacity of wells depends on the funnel width and varies from 30 to 200 liters per day. Over the the 1st quarter of 2011, the volume of oil products pumped out from the wells reached 57.32 m3 (44.25 tons for the product density of 0.772). At the end of 2012, the volume of the pumped-out oil products was about 200 m^3 (168 tons for the product density of 0.84). During the period from 2011 to 2012, the pumped-out oil wastes were accumulated in the tanks located at the enterprise's territory where they remain up to now.

In 2005, the FSUE "KSFP" developed the draft plan of "FSUE "Oil Bunkering Station of Kaliningrad. Reconstruction of the Bank Protection System". The design provides construction of the bank protection system with the unanchored bulwark consisting of boxes and rabbets. To prevent penetration of oil products into the waters, the project envisages the drainage construction along the entire back-end line of the bank protection system and installation of underground tank and pumping house for pumping-out the oil-containing water.

Hot spot № 72 "Agriculture of Kaliningrad"

Inclusion of the agriculture sector of the Kaliningrad Region into the HELCOM's list of "hot spots" has been associated with the physical-geographical and economic features of the Kaliningrad Region up to the mid-1990s .

The agricultural area of the Kaliningrad Region is about 820 thousand hectares, 90% of which are reclaimed. The climatic conditions of the region are favourable for agricultural development. The long vegetation period (160-180 days), sufficient humidity and rich soils create a good basis for successful development of agriculture. Productivity of nature meadow-lands in the region was one of the highest in the Russian Federation. During 1980s, the main agricultural sectors in the Kaliningrad Region included dairy and meet livestock farming, poultry farming, vegetable growing, fishery and fur farming. Poor development of environmental management systems at agricultural enterprises and active use of organic and mineral fertilizers along with high land reclamation led to the significant discharge of nutrients into the Baltic Sea.

From 1990 in the livestock farming the trend to reduction of the milk production was observed. However, from 2008 the trend has changed. The gross milk yield in 2010 at farms of all categories in the region was 146.2 thousand tons and at agricultural enterprises – 62.2 thousand tons, exceeding the level of 2009 by 2.1% and 9.2% respectively.

Increase of the milk yield during the recent years was achieved due to construction and modernization of dairy farms (7 complexes were put into operation in 2006-2010 and 1 complex in 2011) , as well as owing to import of highly productive cattle.

Every year, the production of meat increases in the region, while pork production increases most rapidly.

The main producers of organic fertilizer in the region are: CJSC "Zalesskoe Milk" (manure), CJSC "Novoe Vysokovskoe" (liquid manure), CJSC "Pobedynskoe" (manure), CJSC Pradvinskoe Svinoproizvodstvo (unlittered liquid pig's manure), LLC "Pribaltiyskaya Myasnaya Kompaniya Tri" (unlettered liquid pig's manure), LLC "Baltptitseprom" (sawdust and dung compost), farms of the agricultural holding "Dolgov and C" (manure, liquid manure).

Currently, the agriculture in the Kaliningrad Region experiencing a period of rapid development. The Federal Government and regional authorities actively support the creation of modern livestock complexes, which would work subject to all national and international environmental requirements. And such complexes have already appeared.

However, enterprises created in the Soviet epoch, when the ecological requirements to their activities were not so strict, are still working in the Region. The regional authorities are developing mechanisms to stimulate the introduction of advanced technologies, including the ecologically safe management of manure, at these enterprises.

In general, the level of compliance with environmental requirements in the livestock sector of the Kaliningrad Region is still low and does not allow to exclude this sector from the HELCOM's list of "hot spots".

To assist the Ministry of Agriculture of the Kaliningrad Region in the implementation of the Russian National Plan of HELCOM's Baltic Sea Action Plan (BSAP) in the section "Agriculture", the new project BASE has been launched in January 2012. The project will be implemented up to March 2014. The main tasks of the project include:

a) Compilation of the database of agricultural enterprises of the Kaliningrad Region containing the actual information on manure/dung formation and organic fertilizers utilization .

b) Development of the draft long-term target program "Utilization of agricultural wastes produced in the enterprises of agricultural complex of the Kaliningrad Region in the form of organic fertilizers" or any other document to provide the economic stimulation of enterprises observing the environmental requirements.

c) Development of guidelines for applying the system of environmental and technological assessment criteria in evaluation of investment projects of the livestock sector development during planning of agricultural-industrial complex development in the Kaliningrad Region.

Implementation and practical adoption of the project will also contribute to the implementation of the adopted Target Program "The main ways of development of agricultural complex of the Kaliningrad Region during the period from 2007 to 2016" and the section "Ecology and environmental protection in the agricultural production of the Kaliningrad Region". This will allow, after a certain time period, to return to the problem of referring the agricultural sector of the Kaliningrad Region to the HELCOM's "hot spots" and possible exclusion of most farms from this list.

Proposals for excluding of Russian hot spots from the HELCOM list

The investigation results of materials on the current state of the Russian HELCOM's "hot spots" give opportunity to propose the following.

1) Hot spot № 18 (hot sub-spots 18.1-18.19). Municipal sewage water treatment in St. Petersburg.

Hot sub-spot № 18.1 – Sewage water treatment plant; collectors. To make application for closure of the hot sub-spot № 18.1 and submit it on the 19th meeting of the HELCOM LAND Group in May 2014.

To postpone the consideration on exclusion of the hot sub-spot **№ 18.11 - WWTP "Town of Kolpino"** and the hot sub-spot **№ 18.15 – WWTP "settl. of Metallostroy"** from the list of "hot spots" until commissioning the treatment plants in these settlements after 2015.

2) City dump Hot spot № 23 «Hazardous waste landfill State Unitary Nature conservation Enterprise (SUNE) "Krasny Bor landfill".

To postpone the consideration of excluding of the hot spot **City dump Hot spot № 23 «Hazardous waste landfill State Unitary Nature conservation Enterprise (SUNE) "Krasny Bor landfill"** from the list of "Hot Spots" until commissioning the plant of hazardous waste treatment after 2015.

3) Hot spot № 14 «Syaskiy Pulp and Paper Mill (PPM)".

To postpone the consideration of excluding of the hot spot **№ 14 «Syaskiy Pulp and Paper Mill (PPM)"** because solution of the enterprise ecological problems is associated with high financial costs. Taking into account the economic situation of the Mill, the problem of exclusion of the enterprise from the "hot spots" list cannot be quickly solved now without the investment support.

4) Hot spot № 15 "Volkhov aluminium plant (Limited Liability Company "Metankhim")".

The "Volkhov aluminium plant" was divided into three independent enterprises after re-organization. It is proposed to divide this hot spot into three hot sub-spots:

№ 15.1 Limited Liability Company "Parosilovoe Hozyaystvo - Volkhov" - should be excluded from the HELCOM's list of hot spots in view of the minor negative impact.

№ 15.2. VAZ-SUAL of OJSC "SUAL" is a serious source of emissions into the atmosphere.

№ 15.3 Limited Liability Company "Metakhim" is the source of sewage water discharge. The construction of the sewage water treatment plant is scheduled to 2013 – 2014.

5) Hot spot № 24 "Large livestock farms (sewage water treatment and sediment treatment)".

Introduction of the Technological regulations for handling manure and dung at all large livestock enterprises of the Leningrad Region will allow to reduce significantly the nutrients load on the Baltic Sea and to exclude the agricultural sector of the Region from the HELCOM's list of "hot spots"

6) Hot spot № 49 "Sovietsk PPM".

The input of nutrients from the former Sovietsk PPM operation has been reduced so considerably, that it is possible to request the exclusion of this enterprise from the HELCOM's list of "hot spots".

7) Hot spot № 50 "Neman PPM".

At present the LLC "Neman PPM" does not seriously endanger the environment and can be excluded from the HELCOM's list of "hot spots".

8) Hot spot № 67 "Sewage water treatment plant of the Kaliningrad City".

Construction of sewage water treatment plant of the Kaliningrad City will be finished during the period from the end of 2013 to beginning of 2014. That is why the consideration on exclusion this hot spot from the HELCOM's list of "hot spots" is proposed to postpone to 2015.

9) Hot spot № 69 "Cepruss PPM".

In view of the closure of paper and cellulose production at the Cepruss PPM, the water consumption and sewage water discharge to the Pregel River have been ceased. Therefore, the exclusion of this enterprise from the list of "Hot Spots" is proposed.

10) Hot spot № 70 "Landfill of hazardous wastes of the city of Kaliningrad".

The landfill of hazardous wastes of the Kaliningrad has a significant negative impact on the environment and couldn't be excluded from the list of "hot spots".

11) Hot spot № 71 Fuel and cargo complex of FSUE "State Sea Fishing Port (Port oil bunkering station of Kaliningrad)".

The enterprise continues to expose the environment to a considerable negative impact. The permanent discharge of oil products into the Pregel River is recorded. At the enterprise's territory the area contamination of soil by oil products is remained, the open sludge tank has not been liquidated and the reclamation of adjacent lands has not been conducted.

The comparative analysis of the hot spot for the previous period shows that, in spite of reconstruction of a certain part of the tank stock and putting into operation the modular plant for purification of oil, bilge and ballast waters the level of negative impact remains high.

Solution of environmental problems of the enterprise requires significant financial costs. Currently, the enterprise exclusion from the list of "hot spots" is not possible.

12) Hot spot № 72 "Agriculture of Kaliningrad"

Agriculture in the Kaliningrad Region is currently experiencing a period of rapid development.

However, the enterprises created in the Soviet epoch, when the requirements to environmental aspects of their activities were not so strict, continue to work in the Region. The regional authorities are developing mechanisms to stimulate the introduction of advanced technologies, including the ecologically safe management of manure, at these enterprises.

In general, the level of compliance with environmental requirements in livestock sector of the Kaliningrad Region is still low and does not allow to exclude this sector from the HELCOM's list of "hot spots".

1. St.-Petersburg, Kaliningrad and Leningrad Regions - survey of HELCOM "Hot spots"

1.1. St.-Petersburg

1.1.1. Hot spot № 18 (sub-hotspots 18.1-18.19). Municipal sewage water treatment in St.-Petersburg

1.1.1.1. State of affairs at the hot spots of St.-Petersburg (Sewerage treatment plant; collectors)

In the early 1970s both treatment plants and centralize sewerage system were actually absent in Leningrad (St.-Petersburg). Discharge of untreated sewage water into the water bodies of the city amounted to 3.2 mln. m^3 per day. The length of the sewerage network was 4440 km and that of tunnel collectors – 130 km.

Discharge of nitrogen with untreated sewage water constituted 21175 t per year, discharge of phosphorous was 3973 t per year. In that period, Leningrad was considered as the largest major source of pollution in the Baltic Sea catchment area.

In 1978 the first stage of the Central aeration station (CAS) – the biggest in Europe was put into operation, and in 1985 the start-up of the second stage took place, which allowed to increase the capacity to 1.5 mln. m^3/day.

In 1978 the Krasnoselskaya aeration station was put into operation, and in 1987 the first stage of the North aeration station and the number of treatment plants in the suburbs appeared.

Before the adoption of the Joint Comprehensive Program of Environmental Activities in the Baltic Sea Region (JCP) in 1992 in St. Petersburg and its suburbs, 18 sewage treatment plants (STP) of biological treatment of sewage water had already operated and on the STP of Repino settlement the mechanical treatment method was used.

In the early 1990s the wear of processing equipment, low efficiency of the sewage treatment, lack of nutrients removal technology existed in the aeration stations , while the problem of processing, storage and disposal of sludge of urban sewage water was not solved.

During those years, there sewage collectors were absent both in Petrograd district and the northern parts of the city, which led to the discharge of untreated sewage water through the direct outfalls (approx. 200 pcs.) into the watercourse of the city.

Discharge of untreated or insufficiently treated sewage water into the water bodies of St. Petersburg and the Neva Bay of the Gulf of Finland contributed to the huge anthropogenic load, worsening qualitative state of natural watercourses of the city and the Gulf of Finland.

The extremely unsatisfactory situation in the water disposal and sewage water treatment in the city of St.-Petersburg and its suburbs in the early 1990s gave an occasion to indicate the above mentioned problems as the following four "hot spots" of JCP:

- № 18 St.-Petersburg. Construction of new sewerage collectors;
- № 19 St-Petersburg. Treatment of the municipal and industrial sewage water;
- № 20 St.-Petersburg suburbs. Treatment of the municipal and industrial sewage water;
- № 21 St.-Petersburg. Removal of phosphorous from sewage water.

Since 2004, the State Unitary Enterprise (SUE) "Vodokanal of St.-Petersburg" has started to introduce the advanced biochemical technologies of sewage water treatment with profound removal of nutrients.

In September 2005 the South-West Treatment Plant (SWTP) was put into operation.

Fourteen different organizations from the countries of West Europe and Scandinavia took part in the implementation of SWTP construction project being the biggest ecological project in Europe. The state-private partnership scheme, which was used for the project implementation, was highly appraised by the European Community. Initiators of works and funding organizations have received the award "For achievements in the field of environment protection in the municipal infrastructure" annually awarded by the international journal "Project Finance" (London, the Great Britain).

Putting SWTP into operation allowed to increase the volume of treated sewage water of the city up to 85% and to close emergency outfalls of untreated sewage water at Krasnoselskaya aeration station and Rizhskaya pumping station.

From thedate of putting into operation of the first treatment plant in St. Petersburg the expanding and modernization of treatment facilities have been continuously proceeded.

Simultaneously with the treatment facilities modernization, SUE "Vodokanal of St.- Petersburg" had carried out a large amount of work on repairing, reconstruction and laying of sewerage networks. The advanced manufacturing technologies of trenchless repair of sewerage network without ripping-up of pavement were mastered, which is extremely important during repairing works in the historical part of the city.

This work was carried out with the financial and consultative support, especially of the Ministry of the Environment of Finland, the Swedish and the Danish Environmental Protection Agencies, a number of financial institutions (NEFCO, EBRD, NIB), as well as the leading foreign companies: VIATEK, Insituform Suomi Oy (Finland); Per Aarsleff (Denmark).

By 2006, the construction of new sewerage collectors allowed to connect more than 60 direct outfalls of untreated sewage water to the urban sewerage network with sewage water derivation to the treatment plants of the city (149 thousands m^3/day).

By 2006, St.-Petersburg not only have got sufficient capacities of treatment facilities, but also obtained the program of output increasing at several operating treatment plants, developed and adopted by the City Government, which took into account the development of housing and industries, as well as the planned increasing of population up to 5 millions.

By 2006, 85% of all sewage water of St.-Petersburg and 97.2% of sewage water of the suburbs were treated using advanced biological methods. At eight STPs of St.-Petersburg and its suburbs the indicators of treated sewage water complied with HELCOM recommendations concerning urban sewage water treatment. Ensuring treatment of the entire sewage water of the city and its suburbs was impeded by the lack of sewerage collectors and outfalls linked with treatment plants, but the problem of sewage water treatment of St.-Petersburg and its suburbs was not already "a hot spot".

Two problems still remain unsolved and need a special attention and consolidation of efforts for appropriate solution:

- completion of the construction of the main sewerage collector of the city and to connect the remaining direct sewage water outfalls to the sewerage system with pumping of untreated sewage water to the treatment plants for full biological treatment, including rain and melt water;

- improvement of the efficiency of nutrients removal from sewage water at individual treatment plants of the city and suburbs providing the sewage purification rate in compliance with HELCOM recommendations.

In 2006 the availability of two "hot spots" in JCP program, concerned to the sewage water treatment of St.-Petersburg and its suburbs, seemed to be improper. The territory, where the suburban treatment plant is located, is subordinate to the Government of St.-Petersburg, while all treatment plants of St.-Petersburg and its suburbs are subordinate to one agency – SUE "Vodokanal of St.-Petersburg", and operate under unified requirements.

The above considerations became the basis for preparation of applications to HELCOM by Russia requesting to review the list of four "hot spots", which are under the authority of SUE "Vodokanal of St.-Petersburg".

At the 11th meeting of HELCOM LAND Group (May, 16-18, 2006, Sopot, Poland) Russia submitted for consideration two Applications requesting to delete two "hot spots":

- № 19 St.-Petersburg. Treatment of the municipal and industrial sewage water;

- № 20 St.-Petersburg suburbs. Treatment of the municipal and industrial sewage water.

The Applications for deleting "hot spots" № 19 and 20 included a detailed description of the technological scheme of sewage water treatment for each aeration station and sewerage treatment plant, including the data of chemical and bacteriological parameters monitoring for treated sewage water discharge.

Also at the 11th meeting of the HELCOM LAND Group (May 16-18, 2006, Sopot, Poland) Russia submitted for consideration two Applications requesting modification of two "hot spots":

- №18 St.-Petersburg. Building of new sewerage collectors;

- № 21 St.-Petersburg. Removal of phosphorous from sewage water.

As the issues of treatment of the entire urban and suburb sewage water are closely related to the availability of the sewerage system and sewerage collectors for collection and pumping of sewage water to treatment plants, it was proposed to modify the "hot spot" №18 changing its title as following:

- Hot spot № 18 «St. -Petersburg sewage water disposal and treatment».

Taking in account the fact that at some treatment plants administered by SUE "Vodokanal of St.-Petersburg", the concentrations of nutrients (nitrogen and phosphorous) do not comply with HELCOM Recommendations, it was proposed to change the title of the "hot spot" № 21 as following:

- Hot spot № 21 «Removing of nutrients from sewage water».

The Russian proposal to revise the list of "hot spots" of SUE "Vodokanal of St. Petersburg" was accepted by the participants of the meeting with understanding. A significant progress achieved by SUE "Vodokanal of St.-Petersburg" in improving the situation with sewage water treatment was noted, in particular, putting into operation of the South-West Treatment Plant, and significant reduction of waste discharge with treated sewage water at individual treatment plants of the city and its suburbs.

In the course of the application discussion, it was acknowledged, that the sewage water treatment of St.-Petersburg and its suburbs is the subject of economic activities of the same organization, so all four existing "hot spots" are interrelated. The participants of the meeting, evaluating the activities of SUE "Vodokanal of St.-Petersburg" and the achieved progress, decided to delete three "hot spots" out of the four, combining the remaining problems of four "hot spots" in one, which included development of the sewerage network and all treatment plants of St.-Petersburg and its suburbs as the individual hot sub-spots.

It was also decided that the treatment plants already operating in full correspondence with HELCOM criteria, need to be excluded from the new joint "hot spot", and further each

sewage water treatment station (as the separate "hot sub-spot") may be excluded from the list of the new "hot spot", when it achieves standards of HELCOM recommendations,

HELCOM Secretariat prepared a description on the new "hot spot" № 18, writing down its title in the following wording: "Sewage water treatment in St.-Petersburg".

1.1.1.2. Description of the new "hot spot" № 18 – Sewage water treatment in St.-

This "hot spot" combines the "hot spots" №№ 18, 19, 20 and 21.

The problems of the "hot spot":

1. Construction of sewerage collectors in St.-Petersburg.

The reasons for the "hot spot" designation:

- insufficient capacity of the sewerage network for collection of the entire sewage water volume and further treatment at the municipal treatment plant;

- direct discharge of untreated sewage water into the water bodies of the city.

The activities required:

To complete the construction of sewerage collectors in order to provide the treatment of all sewage water in accordance with HELCOM Recommendation.

2. Treatment of municipal and industrial sewage water of St.-Petersburg and its suburbs.

Reasons for the "hot spot" designation:

From the existing 17 stations of sewage water treatment of St.-Petersburg and its suburbs, the treatment plants which do not meet the criteria of HELCOM for exclusion of "hot spots", should be considered as the "hot sub-spots":

- low processing efficiency of treatment plants;

- inadequate removal of nutrients;

- insufficient capacities for treatment of the total volume of sewage water.

The activities required:

Improvement of the sewage water treatment quality to meet the requirements of HELCOM criteria for subsequent exclusion of the hot sub-spot from the list. Each STP ("hot sub-spot") for the particular "hot spot" may be deleted from the list after meeting the the requirements of respective criteria indicated in the table below.

It was proposed to delete the treatment plants, where the quality of treated sewage water corresponds to HELCOM criteria of hot spots deleting from the list (indicated in bold, see the table) and to submit the proposal for approval at the 19th meeting of the Heads of HELCOM Delegation (Table 1).

Table 1 – Corresponding of water treatment quality to the HELCOM criteria

№	Name	State
18.1	Sewerage collectors	Insufficiency of canalisation collectors and as a result direct waste water outlets into water flows
18.2	Central aeration station	Exceeding of phosphorous discharge
18.3	**North aeration station**	**Corresponds to the HELCOM Recommendations criteria**
18.4	South-west treatment plant	Exceeding of phosphorous discharge
18.5	**STP "Pargolovo"**	**Corresponds to the HELCOM Recommendations criteria**
18.6	**STP "Prigorodnye"**	**Corresponds to the HELCOM Recommendations criteria**
18.7	**STP "Torfyanoe"**	**Corresponds to the HELCOM Recommendations criteria**
18.8	**STP "Zavodskie"**	**Corresponds to the HELCOM Recommendations criteria**
18.9	**STP "Pushkina"**	**Corresponds to the HELCOM Recommendations criteria**
18.10	STP "town of Petrodvorets'	Exceeding of nitrogen and phosphorous discharge
18.11	STP 'town of Kolpino"	Exceeding of phosphorous discharge
18.12	STP "town of Kronstadt"	Exceeding of phosphorous discharge
18.13	**STP "town of Sestroretsk"**	**Corresponds to the HELCOM Recommendations criteria**
18.14	STP "settl. of Pontonny"	Exceeding of nitrogen discharge
18.15	STP "settl. of Metallostroy"	Exceeding of phosphorous discharge
18.16	STP "settl. of Repino"	Exceeding of the requirements for BOD5 (biochemical oxygen demand)
18.17	**STP "town of Zelenogorsk"**	**Corresponds to the HELCOM Recommendations criteria**
18.18	STP "settl. of Pesochny 1"	It is supposed to decommissioning in the coming years
18.19	STP "settl. of Pesochny 2"	It is supposed to decommissioning in the coming years

The decisions of the 11th meeting of the HELCOM LAND Group were approved at the 19th meeting of the Heads of the HELCOM Delegations.

In the subsequent years the SUE "Vodokanal of St.-Petersburg" continued reconstruction of STP replacing of obsolete equipment, modernization of aeration tanks sections introducing technologies of deep removal of nitrogen and phosphorous in the sewage treatment plants; modernization of sewage sludge removal system and sludge preparation for dehydration.

In 2008 the new modern facilities of biological treatment in Repino settlement were put into operation.

In 2009 three hot sub-spots were deleted from the list of HELCOM:

- 18.4 South-West Treatment Plant (SWTP);
- 18.12 STP "Town of Kronstadt";
- 18.16 STP "Settl. of Repino".

In 2010 the hot sub-spot No.18.2 "Central Aeration Station" (CAS) was deleted from the list.

In 2011 the reconstruction of STP "Town of Petrodvorets" was finished with the extension of the design capacity from 50 to 65 thousands m^3/day.

At STP "Town of Petrodvorets" not only technology of chemical and biological removal of nitrogen and phosphorous was introduced, but also the post-treatment of sewage water by thin-layer sedimentation and disinfection of treated sewage water with ultraviolet irradiation was implemented.

The completion of the 3rd stage of construction of the sewerage collector at the northern part of the city in 2011 allowed to close 7 small inefficient STPs: settl. of Pesochny 1; settl. of Pesochny 2; settl. of Osinovaya Roscha; Torfyanoe; Zavodskie; Pargolovo; Prigorodnye, with switching sewage water to the Northern Aeration Station in the amount of 2100 m^3/day.

In 2012 three hot sub-spots were deleted:

- 18.10 STP "Town of Petrodvorets";
- 18.18 STP "Settl. of Pesochny 1"
- 18.19 STP "Settl. of Pesochny 2".

At all treatment plants of the city the internal control of the treated sewage water discharge by chemical and biological parameters is carried out. The control is implemented by chemical and bacteriological laboratories of SUE "Vodokanal of St.-Petersburg", accredited in the Accreditation System of Analytical Laboratories for the technical competence in compliance with the international standard ISO/IEC 17025.

At all major treatment plants the daily round-the-clock sampling of sewage water was organized at all treatment stages (delivered for treatment, during the treatment process and after the treatment). The online control of processing indicators of the treatment facilities with arrangement of sensors and analysers at the key technological points was implemented, which provides an efficient management of the sewage water treatment process . In the nearest future online control will be used at all treatment plants of SUE "Vodokanal of St.-Petersburg".

SUE "Vodokanal of St.-Petersburg" has successfully solved the problem of 100% disposal of dehydrated sewage water sludge by the construction of three plants of sludge incineration that allowed to cease the dehydrated sludge transportation to the special polygons and to start their recultivation. Putting into operation the plants for sludge incineration led to the reduction of the dry sediments weight by 10 times.

At all sludge incineration plants the online control equipment is used for analysis of the composition of waste flue gases. Additionally monitoring of air and noise state is carried out at the borders of the sanitary-protection zones and in the nearest settlement within the area of sludge incineration plants impact.

In addition, at the sludge incineration plant of the South-West Treatments Plant (SWTP) the unique system of biomonitoring was implemented, when the flue gases composition is controlled by the giant African snails able to react not only to the occasional emissions, but also to accumulation of harmful substances in the minor amounts as well as the synergistic effect of various contaminants.

To prevent the danger of the toxic substances penetration into the drinking water in St. Petersburg the unique biomonitoring technology using crayfish to control the quality of the water coming to water intakes from the Neva River – the main water-supply source of the city, was implemented.

Simultaneously with the existing system of water quality biomonitoring coming to the water intake structures, the biomonitoring system using crayfish to control the quality of the treated sewage water discharging in the Neva Bay of the Gulf of Finland, was implemented at NWTP. The organism of the bio indicator animal provides simultaneous evaluation of an entire set of the treated sewage water qualitative characteristics.

In order to access the impact of discharged sewage water upon the water quality of water bodies-receivers, the quality control of the natural water at points of discharging the sewage water is carried out.

The SUE "Vodokanal of St.-Petersburg" is actively engaged in educational work, paying special attention to education of ecological responsibility among the younger generation.

Since 2002 the unique Children's Ecological Center is operating in St.-Petersburg . Hundred thousands of children took part in programs and projects of the Center in recent years Up-to-date approaches, interesting forms and relevant content allows to implement projects in the partnership with different Russian and international organisations.

SUE "Vodokanal of St.-Petersburg" has a museum complex "The Universe of the Water" which includes three unique exhibitions describing different properties of the water. In the museum the new interactive forms of work with visitors of different ages including pre-school children, schoolchildren, students and adults, are used.

Currently three hot sub-spots remains uncovered:

- 18.1 Sewerage collectors;
- 18.11 STP "Town of Kolpino";
- 18.15 STP "Settl. of Metallostroy"

Conclusion

1) Sub-spot No.18.1

During the period from 2006 to 2012 SUE "Vodokanal of St.-Petersburg" had done a great job to finish the construction of the main sewerage collector in the northern part of the city with liquidation of direct untreated sewage water outfalls.

The main sewerage collector is a complex of engineering structures having no analogues in the world. The collector includes two tunnels of deep bedding 232.17 km long, with a diameter of 1.5÷4.9 m, laid at the depth from 4 to 90 meters; the network of micro-tunnels 5.5 km in total length; dozens of receiving and distributive shafts, in one of which (90 m in the depth and 26 m in the diameter) the regulation unit of sewage water is located.

In 2008 putting the first starting complex of the Northern collector into operation allowed to remove 12 direct outfalls with the total amount of sewage water of 90 thousand m^3/day and to achieve 88% of urban sewage water treatment. Putting the second starting complex of the collector into operation allowed to liquidate another 32 direct outfalls and to reduce discharge of the untreated sewage water by 42 thousand m^3/day (91% of urban sewage water treatment).

The third starting complex was finished and 12 direct outfalls with the total discharge of 56.7 thousand m^3/day were liquidated providing treatment of 93% of urban sewage water.

In 2011 the next construction stage of the Main sewerage collector was finished and another 6 direct outfalls were closed with reducing discharges of untreated sewage water in amount of 30 thousand m^3/day, that provides treatment of 94% of urban sewage water.

Full completion of this project is scheduled to October 2013 which will provide treatment of 98,4% of urban sewage water.

St.-Petersburg is the first city in the world, which provides such a high percentage of urban sewage water treatment.

The application for deleting the hot sub-spot No.18.1 will be prepared and submitted at the 19th meeting of the HELCOM LAND Group in May 2014.

2) Sub-spot No.18.11 STP "Town of Kolpino"

It is planned to reconstruct treatment plants to increase the capacity up to 150 thousand m^3/day and to put into operation the sludge incineration shop. The time of the works completion is scheduled to 2014-2015.

3) Sub-spot No. 18.15 STP "Settl. of Metallostroy"

Decommissioning of STP is tentatively scheduled to 2014-2015 and the total amount of untreated sewage water will be transferred to the Central aeration station.

1.1.2. City dump Hot spot No. 23 «Hazardous waste landfill State Unitary Nature Conservation Enterprise (SUNE) "Krasny Bor Landfill"

1.1.2.1. General characteristic of the Hot spot No. 23

The location of the toxic wastes processing plant of SUNE "Krasny Bor Landfill" (handling hazardous wastes) of St.-Petersburg is indicated on Figure 1.

The State Unitary Nature Conservation Enterprise "Krasny Bor Landfill" is intended for receiving, disposal and burial of toxic industrial wastes from enterprises of St.-Petersburg and the Leningrad Region. It is subordinated to the Administration Committee of Natural Resources, Environmental Protection and Ecologial Safety of St.-Petersburg.

The Landfill area is 67.8 hectares. It is located at the distance of 30 km from St.-Petersburg and in 6.5 km to the north-east from Kolpino within the territory of the Tosnensky District of the Leningrad Region between the Tosna and Izhora Rivers. The working site area is 52 hectares. The distance from the Landfill to the nearest settlements: Nikolskoye – 2.5 km to the east, Krasny Bor – 1.5 km to the south-east, Feklistovo and Myshkino – 1.2 km to the south. The relief depressions are observed to the north-east towards the Tosno River and to the north-west towards the Bolshaya Izhorka River.

Figure 3 - Krasny Bor landfill location

Along the Landfill external perimeter the gutter for capture of the surface water from the surrounding area is provided. It is connected to the main channel which flows into the Bolshaya Izorka River.

The basic activities of SUNE "Krasny Bor Landfill":

1. Collection and transportation of industrial wastes from the enterprises of the city and the region to the Landfill .

2. Neutralization, utilization and burial of industrial toxic wastes.

3. Laboratory analysis of accepted industrial wastes from enterprises and organizations of St.-Petersburg and the Leningrad Region. Ecological monitoring of the sanitary-protection zone of the Landfill.

4. Construction of the plant for industrial wastes treatment – the customer's function.

5. Development and implementation of nature conservation technologies aimed at reduction of the negative impact upon the environment.

6. Collection and demercurization of exhausted fluorescent lamps (meets HELCOM Recommendation 18/5).

The potential danger of the Landfill is caused by:

- the Landfill location above the water intake of St.-Petersburg and probable impact upon the water quality of the Neva River through the existing hydro-network (Clause 3 paragraph 2 of the Convention on Protection of Marine Environment of the Baltic Sea, 1992);

- the placement of more than 1.5 mln. tons of industrial toxic wastes on on the Landfill,while 600 thousand tons of wastes remains non-neutralized in 6 foundation pits by 2003.

Basic possible impact of the Landfill upon the environment:

- in the case of extreme weather conditions (continuously showers and sudden floods) both overflow of open foundation pits and dyke breach with the following water pollution of the Neva River may occur.

- probability of draining from the Landfill territory.

- atmospheric pollution. The main sources are the thermal neutralization facilities (TNF) processing without gas purification and open foundation pits with wastes (6 pcs.).

1.1.2.2. Environment protection activities for improvement of the hot spot state, performed from 1992 to 2003

During this period the first start-up complex of the first phase of construction of the enterprise for processing and burial industrial toxic wastes was at the final stage. The completion of the first start-up complex construction was planned in 2004.

Closing of foundation pits № 39, 50, 52, 56, 62 with total open surface area of 26000 m^2 and volume of 209000 m^3 was carried out. was also Besides, the foundation pit № 70 was also in the process of closing. Its surface was decreased by 50% and equal to 6800 m^2.

The pilot production shop for reclamation of the territory of the "Krasny Bor Landfill" was constructed presenting a model for reclamation of all closed foundation pits of the Landfill in the future.

1.1.2.3. The situation at the Landfill by the end of 2002

Technology of waste processing and burial became hopelessly outdated, and the enterprise's impact on the environment does not comply with the environmental legislation. Wastes are accepted into foundation pits dug in the layer of waterproof Cambrian clay. The atmospheric precipitations also fall into them becoming wastes. Neutralization of liquid wastes was carried out in the thermal neutralization facilities (TNF) which has an obsolete design and insufficient capacity. As a result the foundation pits contain about 700 thousand tons of toxic liquid wastes . The foundation pits were overfilled. The territory allotted to the Landfill was fully utilized. In the case of extreme weather conditions (continuously showers and sudden floods) both the dyke breach and water pollution of the Neva River may occur. However, as the result of implementation of environment protection measures the impact upon all environmental components was reduced. The amount of accepted wastes was significantly decreased (Table 2).

Table 2 – Changes of "hot spot" status indicators

Status indicators/year	1992	2002
Emissions, t	408.931	52.0
Discharges, t	-	-
Waste acceptance, т	54773	14 20
Number of open foundation pits, m^2	10	6 (area was decreased on 29800 m^2)
Number of processed wastes, t	890000	600000

1.1.2.4. Current state of the "Krasny Bor Landfill"

The "Krasny Bor Landfill" is the only enterprise in the north-west federal district which provides the reception, disposal and burial of industrial toxic wastes. Its current state is shown in Figure 2.

Figure 4 – The appearance of the "Krasny Bor" Landfill

The Landfill accepts the following types of wastes:

- inorganic liquid wastes (wastes of galvanic production, etc.);
- organic liquid wastes (emulsion, residual oil, tar, solvents, oil products, etc.);
- organic and inorganic solid and pasty wastes (sludge of galvanic production, soil polluted with oil products, etc.);
- especially harmful wastes including hazard class 1 (waste containing mercury, cyanide, arsenic, cadmium and other highly potent toxins).

The volume of received wastes is shown in Table 3 and Figure 3.

Table 3 – The volumes of annually received wastes by the "Krasny Bor" Landfill

Years	Total amount, tons	Solid	Liquid organic	Liquid inorganic	Especially harmful (hazard class 1)
2001	18620	10312	6760	867	681
2002	14521	6613	6844	868	196
2003	21518	17297	3344	722	155
2004	12059	8070	3132	447	410
2005	78455	74548	3432	437	38

Years	Total amount, tons	Solid	Liquid organic	Liquid inorganic	Especially harmful (hazard class 1)
2006	23407	18665	3695	986	61
2007	30446	22821	6275	1179	169
2008	8547	4904	2647	977	18,6
2009	10145	4644	4162	1245	41
2010	14719	5303	8453	794	169
2011	14470	5481	7955	972	60

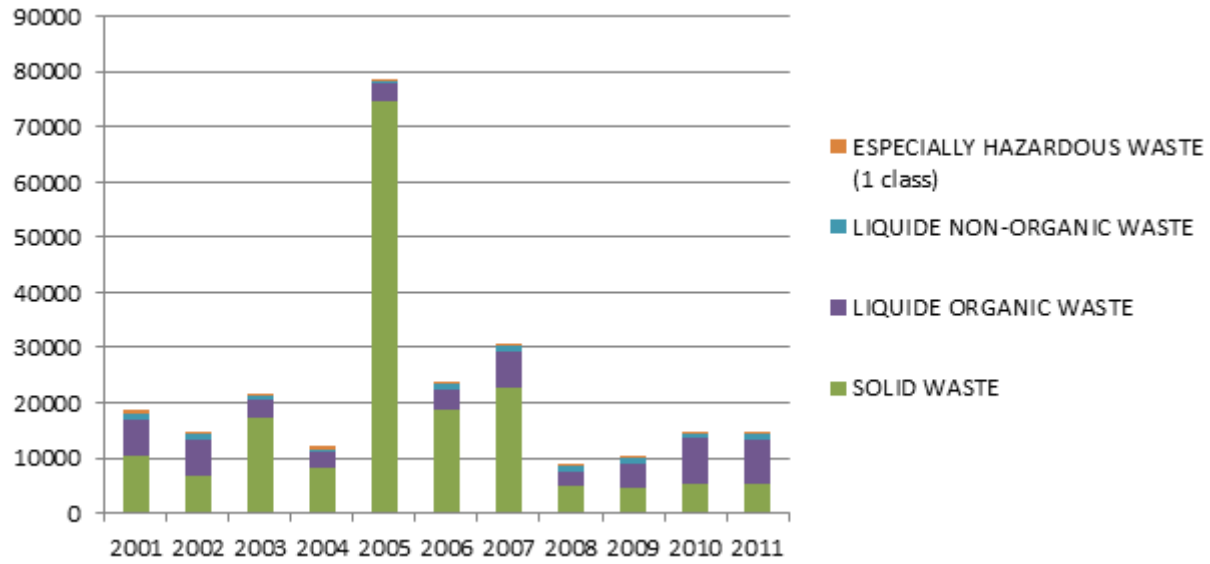


Figure 5 – Dynamics of waste acceptance at the "Krasny Bor" Landfill in 2001-2011, tons/year

Currently, more than 350 industrial enterprises of St.-Petersburg and the Leningrad Region have contractual relationships with the company for disposal of industrial toxic wastes. Despite the fact that the capacity of the Landfill is restricted and recently has been utilized in total, specialists of the company developed the program of efficient use of the "Krasny Bor Landfill"available potential. For further development of the Landfill, it is planned to introduce the new technologies of toxic wastes treatment. To solve this problem, specialists of the company works in several directions, including reduction of the toxic level of liquid organic wastes accumulated in foundation pits, conversion of thermal neutralization facilities from fuel oil to a natural gas, introduction of technology of pyrolysis, tires and oil sludge recycling.

Currently, a part of wastes containing oil products with water content below 15% is recycled at the Landfill. Installation of equipment for processing of rubber wastes and exhausted tires is at the final stage.

Wastes not subject to recycling, are transported for storage in the open foundation pits of the Landfill until the pilot plant for processing and burial of industrial toxic wastes of St.-

Petersburg and the Leningrad Region will be put into operation. The hydraulic structures are used to store industrial toxic wastes at the Landfill (foundation pits No. 59, 64, 66, 67 and 68) in compliance with the Safety Declaration № 09-09/00/43411-22-GTS of 11.01.2010.

By the end of 2012, the filling volume of opened foundation pits constituted (mln, m^3):

Foundation pit № 59 – 0.0100884;

Foundation pit №64 – 0.533958;

Foundation pit №66 – 0.011041;

Foundation pit №67 – 0.0279674;

Foundation pit №68 – 0.11669.

Thus, the total volume of non-neutralized wastes amounted to 700 thousand m^3.

In 2010 the operation plan of hydraulic structures of the Landfill was developed. It determined constructions and equipment structure, order and operating mode of them ensuring uninterrupted and safety waste disposal taking into account the actual state of existing constructions and planned productivity and operating mode of the company for the period of the developed project validity. In 2010-2011, the following works to ensure safe operation of hydraulic structures were implemented:

- during the spring flood in 2010 the drainage works of atmospheric precipitation from the territory into internal water bodies (control-regulating pond and fire pond) of the Landfill were carried out that allowed to avoid the overflow of internal canals of the Landfill;

- more than 32 thousand t. of foundation pits watered content of the hazard class 2-3 were processed at thermal neutralization facilities ;

- maintenance of flood-wall of foundation pit № 68 was carried out (Figure 4);

- cleaning of internal canals of the Landfill from sludge of hazard class 2-3 was made. The canals are designed to collect atmospheric precipitation.

Figure 6 – The results of maintenance of flood-wall of foundation pit № 68

In 2010-2011 the Landfill in cooperation with specialists of the OJSC "Research Institute of Atmosphere" developed and obtained approval by the Chief Sanitary Doctor of the Leningrad Region the size of sanitary protection zone up to 1 km. Currently, the Landfill's laboratory together with the accredited laboratories is completing a two-year air monitoring at the estimated boundary of the sanitary protection zone.

To fulfil the requirements of the license for subsoil use issued by the Department of Subsoil Use of the North-West Federal District, the enterprise obtained the documents defining precise borders of the mining lease in 2011 .

To ensure the environmental safety, improvement of efficiency of innovation technologies introduction in collection, storage, treatment and utilization of industrial and municipal wastes in accordance with the decree of the Committee of Natural Resources, Environmental Protection and Ecological Safety of St.-Petersburg № 165-r of 07.12.2011, the Regional Scientific and Technical Ecological Centre was established on the basis of SUNE "Krasny Bor Landfill". The establishment of the Centre will combine science and technical potential of the Russian Academy of Natural Sciences (RANS), educational institutions of St.-Petersburg and organizations working in the field of environment protection.

The prospects of the company development are related to the construction and putting into operation of the plant for recycling and burial of industrial toxic wastes from St.-Petersburg and the Leningrad Region. Currently the first construction stage of the enterprise has been finished. It included treatment facilities, pumping stations, control-regulating ponds, electricity and heating facilities, car wash building and hazardous wastes storage. The preparatory works for putting objects of the first stage into operation are implemented. The construction of the building for treatment of organic wastes, containing oil, as well as the construction of storehouse for organic wastes are completing. They are assigned to the second stage of the enterprise construction. The date of putting into operation is scheduled in 2013. During the period from 2013 to 2014, the construction of buildings for treatment of organic wastes and wastes from the opened foundation pits of the "Krasny Bor Landfill' will be completed.

1.1.2.5. The main parameters of the environmental impact

1) Emissions to the atmosphere

The thermal facilities for waste neutralization are the main sources of air emissions at the enterprise. More than 20 standardized chemical substances and compounds are fixed in the enterprise's emissions. The annual emissions of the enterprise are shown in Table 4.

Table 4 – Gross emissions of "Krasny Bor" landfill into the atmosphere in 2011

Substance	Emissions, t/year
Divanadium pentoxide	0.001821
Diiron trioxide	0.003055
Manganese and its derivatives	0.000117
Nitrogen dioxide	10.253716
Ammonia	0.000301
Nitrogen oxide	1.668088
Hydrochloric acid	3.274830
Sulphuric acid	0.362476
Soot	3.965596
Sulphur dioxide	97.749711
Dihydrosulphite	0.748347
Carbon monoxide	44.024427
Gaseous fluorides	0.096876
Poorly soluble fluoride	0.000421
Hexane	7.305544
Benzene	0.122592
Xylene	0.287295
Methylbenzene	0.165023
Benzo (a) pyrene	0.000039
Chlorobenzene	0.009930
Butanol	0.040050

Substance	Emissions, t/year
Hydroxybenzene	0.172791
Ethynylacetate	0.017902
Ethyl acetate	0.091930
Formaldehyde	0.051548
Propane-2-one	0.130176
Ethane acid	1.535577
Gasoline	0.014830
Kerosene	0.042771
Saturated hydrocarbons S12-S19	0.031420
Inorganic dust 70-20% SiO2	0.002380
Inorganic dust less than 20% SiO2	0.005038
Abrasive dust (corundum)	0.000187
Dioxins	0.0000000167
Coal ash	3.828000

The total gross emissions amounts to 176 tons per year.

For the reporting period three fires occurred at the enterprise. In June 2006, a serious fire was caused by the collision of the barrels with toxic wastes of hazard classes 3 and 4. In May 2008, the wastes were burning on the area of 1.8 thousand m^2 . In June 2011, a part of the Land-fill with organic wastes (oils, greases) was burning on the area of more than 5000 m^2. The volley emission of pollutants during the fire constituted 18.6 tons according to the data of the supervisory agencies.

2) Sewage water discharge

The enterprise does not discharge the sewage water. The water from liquid wastes is removed using the evaporation method. The sewage water from the drainage canal is drained to internal gathering ponds of the Landfill (Table 5).

Table 5 – Comparative indicators of hot spot condition in 1992, 2002 and 2011

Condition indicators / year	1992	2002	2011
Emissions, t	408.931	52.0	1176
Discharges, t	-	-	-
Waste acceptance, t	54773	14 520	14 470
Number of opened foundation pits, m^2	10	6 (area decreased on 29800 m^2)	5
Number of processed wastes, t	890000	600000	700000 m^3

1.1.2.6. Results of the environmental components monitoring

Monitoring of the sanitary protection zone of the enterprise and surrounding territories is carried out in accordance with the "Program of Ecological Control" of the SUNE "Krasny Bor Landfill", which includes the following:

- industrial ecological control of the sources of water pollution;

- industrial ecological control of emissions into the atmosphere;

- control of atmospheric air analysis at the boundary of the sanitary protection zone and within it;

- air control of working area on the territory of SUNE "Krasny Bor Landfill";

- industrial and ecological monitoring of soils and plants.

Water quality monitoring program includes monitoring of 39 parameters of groundwater (background and control pits of the SUNE "Krasny Bor Landfill") and drain control (control points of ring and main canals). During 2012, 100 water samples were collected and 3900 quantitative chemical analysis were made (Table 6).

Table 6 – The results of the surface water monitoring in 2012 (Main canal, the point № 6 – between the bicameral outlet and the mouth of the stream, falling into the main canal)

Controlled ingredients	Unit of measurement	The average annual concentration of pollutants	Number of registered excess of MPC (from 9 monthly measurements from April to December)
Aluminium	mg/dm^3	0.107	–
Ammonium ions (on nitrogen)	mg/dm^3	more than 0.522	5
Anionactive surfactant species	mg/dm^3	more than 0.218	–
BOD_5 (biochemical oxygen demand)	mgO/dm^3	101.8	5
Chlorides	mg/dm^3	more than 31.778	–
Solid residual	mg/dm^3	495	–
COD (chemical oxygen demand)	mgO/dm^3	284	9
Total iron	mg/dm^3	3.153	9
Manganese	mg/dm^3	0.583	7
Nickel	mg/dm^3	less than 0.003	–
Lead	mg/dm^3	less than 0.004	–
Copper	mg/dm^3	0.005	–
Zinc	mg/dm^3	0.262	–
Cobalt	mg/dm^3	less than 0.005	–
Silver	mg/dm^3	less than 0.020	–
Mercury	mg/dm^3	0.000207	–
Pexachlorobenzene	mg/dm^3	less than 0.0001	–
4,4′ - DDD	mg/dm^3	less than 0.00001	–
4,4′ - DDE	mg/dm^3	less than 0.00001	–
4,4′ - DDT	mg/dm^3	less than 0.00001	–
Trichloromethane (chloroform)	mg/dm^3	less than 0.002	–
Tetrachloromethane (carbon tetrachloride)	mg/dm^3	less than 0.002	–
Tetrachloroethylene	mg/dm^3	less than 0.002	–
Benzene	mg/dm^3	less than 0.005	1 (single)
Methylbenzene (toluene)	mg/dm^3	less than 0.005	–
Xylene	mg/dm^3	less than 0.005	–
Propan-2-one (acetone)	mg/dm^3	less than 0.005	–
PCB (polychlorinated biphenyl) -1	mg/dm^3	less than 0.0005	–
PCB-11	mg/dm^3	less than 0.0005	–
PCB-29	mg/dm^3	less than 0.00003	–

Controlled ingredients	Unit of measurement	The average annual concentration of pollutants	Number of registered excess of MPC (from 9 monthly measurements from April to December)
PCB-47	mg/dm^3	less than 0.0007	–
PCB-121	mg/dm^3	less than 0.00002	–
PCB-185	mg/dm^3	less than 0.00002	–
PCB-194	mg/dm^3	less than 0.00001	–
PCB-206	mg/dm^3	less than 0.0005	–
PCB-209	mg/dm^3	less than 0.0005	–

Control of pollutants content (nitrogen dioxide, hydrochloric acid, sulphuric acid, sulphur dioxide, hydrogen sulphide, benzene, xylene, hydroxybenzene, formaldehyde, 3,4-benzo(a)pyrene) in the atmospheric air of the sanitary protection zone of the enterprise was carried out at 4 control points by 4 bearings (North, South, West, East) at the distance of 1000 m from the enterprise boundary. During 2012, 100 atmospheric air samples were collected and 32 measurements of the noise impact level were made. According to the researches results nither exceeding of MPC (Maximum Permissible Concentration) of controlled substances was revealed in the atmospheric air.. In addition, the field measurements of levels of noise impact upon the atmospheric air at the boundary of the sanitary protection zone in the daytime and at night were carried out. According to the measurement results the maximum sound level and the sound pressure levels in the daytime as well as at night do not exceed the maximum allowable levels according to the SC (Sanitary Code) 2.2.4/2.1.8.562-96 for areas directly adjoined to dwelling houses.

To determine the content of heavy metals (mercury, arsenic, cadmium, lead, chromium, cooper, nickel and zinc) the control of soil and vegetation in the sanitary protection zone of the enterprise are carried out. Samples are taken at 4 points by the 4 bearings (North, South, West, East) at the distance of 25 m from the Landfill. During 2012, 24 soil samples and four vegetation samples were collected. The obtained results evidence the absence of MPC exceeding.

1.1.2.7. Planned environment protection activities

Construction of the plant for toxic waste disposal in St.-Petersburg and the Leningrad Region on the basis of SUNE "Krasny Bor Landfill" was included in Russian Federation State Programme "Environment protection" (2012-2020).

In the period from 1997 to 2011 the amount of 2801845.7 thousand rubles was invested by St.-Petersburg Government into construction of the plant for toxic waste disposal.

In 2012 the amount of 42400 thousand rubles was invested from the Federal Budget and 119927 thousand rubles from the budget of St.-Petersburg's into construction of the plant for toxic waste disposal.

The plant construction is planned to be completed in 2015.

The company plans to implement the following activities which can significantly reduce the environmental load:

1. Putting into operation the first stage of plant construction for waste treatment (2013).

2. Completion of construction of buildings for oily waste treatment and organic waste storage (2013).

3. Completion of construction of buildings for organic waste treatment and treatment of wastes from existing foundation pits (2014).

4. Selection of optimal technologies for treatment of different types of wastes.

5. Implementation of the approved project of hydraulic structures operation.

1.1.2.8. Activities required to exclude the company from HELCOM's list of "hot spots"

To reduce radically the impact upon the environment it is necessary to complete the construction of the modern plant for hazardous waste treatment in full.

Conclusion

The company has a significant negative impact upon the environment as continues to use obsolete technologies of toxic wastes treatment. The comparative analysis of hot spot for the past period shows that despite the reduction of wastes acceptance volumes and closing of some foundation pits the negative impact level continues to rise. A special concern provokes more frequent occurrence of emergency situations at the facility. Safety operation of the Landfill is not possible without construction of the designed plant for hazardous wastes treatment which had to be been launched in 2005. Currently, putting into operation of the plant with the capacity of 40 000 tons of waste per year is planned at 2015. Funding for construction is provided by the federal and regional budgets.

Table 7 – Analysis of compliance of activity of the Landfill for waste disposal with HELCOM Recommendations

HELCOM Recommendation	Targets	Standard	The situation at the enterprise	Conclusion about conformity of the target	Comments
RECOMMENDATION 24/5 Proper handling of waste/landfill	Compliance with the national legislation in the field of waste management	Full compliance	The company has a full set of environmental documentation developed in accordance with the Russian legislation in the field of handling with waste. Violations in the field of handling with wastes were detected in 2011 due to the fire.	+/-	
	Reduction of waste landfilling at the expense of their pre-separation and treatment		Wastes when accepted by the landfill are separated by the hazard class, physical and chemical properties	+	
RECOMMENDATION 27/1 Limitation of emissions into atmosphere and discharges into water from incineration of waste	The use of best available technologies	Waste separation (full control of composition of incinerated wastes)	Wastes in the enterprise are separated by types and classes of hazard	+	Used at the landfill TNF is not a facility for waste incineration, they only evaporates liquid fraction, however, its operating principle allows to extend to them the requirements for incineration facilities
		Exclusion of burning on the air	Evaporation spring from foundation pits	-	
		Heat and steam regeneration	Is absent	-	
		Incineration gas temperature not less than 850^0C (not less than 1100^0C for hazardous wastes, containing more than 1% of organic halogen compounds)	600^0C	-	
		Controlled air delivery	No	-	
		Constant monitoring of incineration process (C, CO, NO_x,O_2, SO_2, HCI, HF, dust, incineration temperature)	No	-	
		Effective cooling of exhaust gases and blowing	No	-	
		Effective systems to hold dust in the flue gases	Is absent	-	
		Effective systems for holding acids, organic substances and organic halogens	Is absent	-	
		Treatment of condensate and liquid residues from installations for cleaning of outgoing gases, using chemical precipitation, filtration	Is absent	-	

HELCOM Recommendation	Targets	Standard	The situation at the enterprise	Conclusion about conformity of the target	Comments
		Treatment of slag and soot in closed or wet systems. Soot placement on dry landfills	Filled and dehydrated foundation pits are hermetically closed	+	
	Emissions into the atmosphere from incineration installations shall not exceed the following level at 11% O_2, mg/m^3:		Data is absent. Gas cleaning systems are absent	-	
	Dust	10			
	CO	50			
	HCI	10			
	HF	1			
	SO_2	50			
	NO_x (in the form of NO_2)	400			
	Cd + TI	0.05			
	Hg	0.05			
	Sb+As+Pb+Cr+Co+Cu+Mn +Ni+V	0.5			
	Dioxins and furans	0.1 ng			
	Sewage water discharges from installations for cleaning of output gases shall not exceed, mg/l:		Gas cleaning systems are absent	-	
	General suspended solids	30			
	Hg	0.03			
	Cd	0.05			
	TI	0.05			
	As	0.15			
	Pb	0.2			
	Cr	0.5			
	Cu	0.5			
	Ni	0.5			
	Zn	1.5			
	Dioxins and furans	0.3 ng/l			

1.2. The Leningrad Region

1.2.1. Hot spot № 14 «Syaskiy Pulp and Paper Mill (PPM)»

The location of the Syaskiy Pulp and Paper Mill (sewage water treatment, air pollution control) of the Leningrad Region is shown on Figure 5.

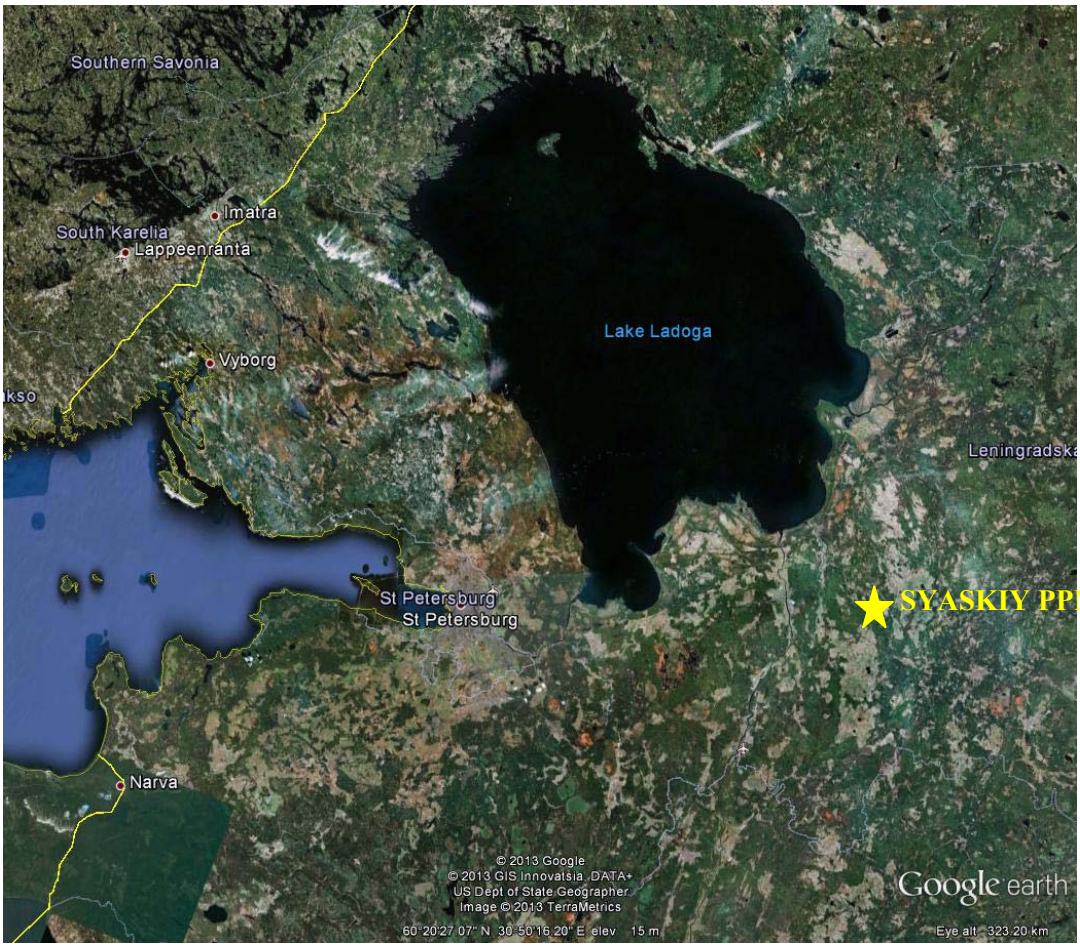


Figure 7 – Syaskiy PPM location

Open Joint-Stock Company (OJSC) "Syaskiy Pulp and Paper Mill" is located at the distance of 140 km from St.-Petersburg. The enterprise is located on the right bank of the Syas River at the distance of 2.5 km from the Ladoga Lake. The Mill was founded in 1928. Today Syaskiy PPM, converted into the joint-stock company in 1993, is one of the multifunctional modern pulp and paper mills of the North-West Region of the Russian Federation.

The Mill discharges the sewage water into the Valgoma River and Volkhov Bay of the Ladoga Lake. It was included into the HELCOM's list of "hot spots" as one of the major polluters of the Ladoga Lake with nitrogen and phosphorous and the atmospheric air with sulphur compounds and nitrogen oxide.

1.2.1.1. The enterprise stste in 2002

Ten shops operated at the Syaskiy PPM by the end of the reporting period of 2002:

- acid and cooking shop;
- drying and paper shop;
- bleaching shop;
- alcohol and yeast shop;
- shop of sanitary and household paper;
- shop of sanitary and household products;
- typography;
- wood preparation shop;
- timber preparation shop;
- ground wood shop.

Syaskiy PPM in 2000 had the following parameters of production output:

- sulphite cellulose cooking: 73641 t/year;
- commercial cellulose production: 42691 t;
- wrapping paper of sort «A»: 5128 t;
- sanitary and hygienic paper: 28272 t;
- wood pulp: 14708 t;
- fodder yeast: 2851 t;
- insulating plates: 79 t. m^2.

In 2000 the facilities for biological treatment of industrial sewage water accepted on average 115500 m^3/day of industrial sewage water. The efficiency of the sewage water treatment was 91.3% for BOD_5 (concentration in the treated water constituted 12.4 mgO_2/dm^3), 87.5% for suspended matter (concentration in the treated water was 26.2 mg/l). The load of the facilities was 28.4 t/day for BOD_5 and 24.1 t/day for suspended matter.

The technology of sulphite cellulose cooking has remained practically unchanged. The emissions of air pollutants from the enterprise in 2000 constituted:

- suspended matters – 10.69 t/year;
- SO_2 - 79.93 t/year;
- NOx - 146 t/year.

About 54138.3 t. of dry substances were discharged into the Ladoga Lake with the sewage water after biological treatment .

Gasification of power-generating boilers that allowed to comply with HELCOM Recommendation 16/4 on sulphur emissions became the greatest achievement of the enterprise in the period from 1993 to 2003. Actual sulphur emissions constituted 1.08 kg per ton of cellulose as compared to the target value of 1.5 kg per ton.

In the future, the enterprise planned to implement the following environment protection activities:

1. Modernization of the sulphite cellulose cooking process:

- replacement of the cooking liquor with cold diluted liquor;

- modernization of the washing process;

- putting into operation the sector for cellulose bleaching with use of oxygen, hydrogen peroxide, sodium hydroxide and hypochlorite.

2. Switching to the natural gas.

3. Construction of two cookers for solid biowaste incineration and the site for production of building panels.

4. Post-treatment of sewage water in sand filters.

1.2.1.2. Current state of the enterprise

The current state of the Syaskiy PPM is showed on Figure 6.

Figure 8 – View of Syaskiy PPM

Today the Mill includes the following:

1. Timber preparation sector for receiving, storage and processing of timber in the following volumes:

- softwood up to 700 thousand m^3/year;

- hardwood up to 300thousand m^3/year.

2. Sulphite and cellulose production with the capacity of 120 thousand tons of cooked cellulose per year .

3. Ground-wood shop producing chemical-mechanical wood pulp from the aspen wood in the volume of 100 thousand tons per year.

4. Manufacturing sanitary and hygienic paper and products from it:

- toilet paper – 63 mln. rolls per year;

- paper napkins – 4,100 thousand bundles per year;

- roll towels – 1,500 thousand rolls per year;

- marketable sanitary-hygyenic paperbase – 27 thousand tons per year.

5. Processing of biochemical treated sulphite liquors into fodder yeasts and technical lignosulfonates.

Dynamics of production of marketable products of the enterprise is shown on Figure 7.

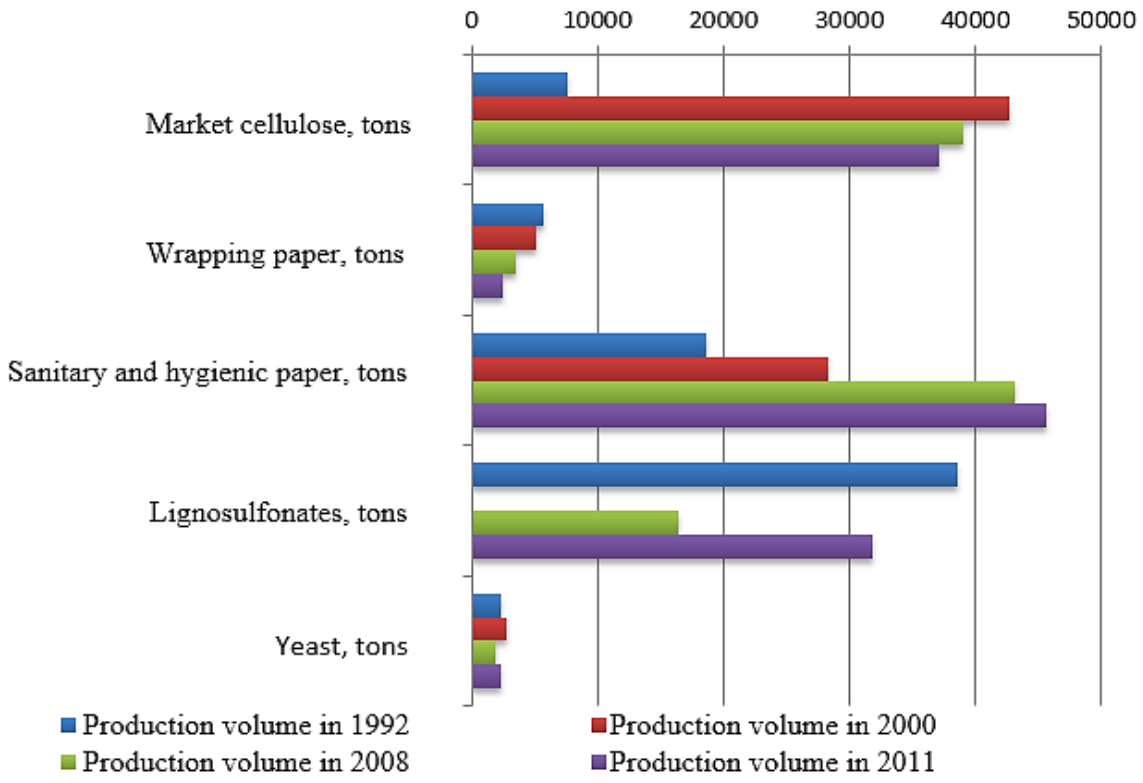


Figure 9 – Marketable products production volumes of Syaskiy PPM from 1992 to 2011

The data shows that since 2000 the volume of production of marketable cellulose was decreasing slightly and in 2011 reached 37100 tons. Cooked cellulose output amounted to 66158 tons. In 2012, 71911 tons of unbleached cellulose were produced (cooked cellulose output). Bleached cellulose was produced only for enterprise's needs. In 2012, bleached cellulose output was 25829 tons, base paper output – 63172 tons per year.

The technology of sulphite cellulose cooking has remained actually unchanged. In 2011, the new cooker was constructed and put into operation. The measures aimed at modernization of the cooking technology planned in the previous reporting period had not been implemented. Cellulose bleaching is performed using chlorine, consumption of which amounts to 66 kg per ton of cellulose. Introduction of new cellulose bleaching technology is at the stage of laboratory samples testing and developing the optimal bleaching technological regimes. The costs of technology introduction are calculated.

The water intake is implemented from the surface water body (the Syas River) under the contract of the water consumption № 3D of 28 March 2008, reg. № 47-00.00.00.000 – R – DZIH – S 2008 – 0091/00 dated 15.04.2008, concluded with the Committee of Natural Resources and Environmental Protection of the Leningrad Region (Table 8).

Table 8 – Annual volume of water intake by the Syaskiy PPM from 2008 to 2012

Source of water supply	Water intake volume, thousand m^3 per year				
	2008	2009	2010	2011	2012
The Syas River	20470.00	18470.00	18266.65	20129.21	19950.00

Specific water consumption in the process of cellulose production is shown in Table 9.

Table 9 – Dynamics of the specific water consumption when producing cellulose

Production	Specific water consumption, m^3/production unit				
	2008	2009	2010	2011	2012
Unbleached cellulose	97.4	95.3	92.2	92.8	90.2
Bleached cellulose	134.7	134.6	132.6	131.7	130.2

In 1992, a specific water consumption exceeded 500 m^3/year. Enterprise managed to reduce the water consumption by gradual replacement of depreciated water pipes as well as by using closed water cycles in the area of cleaning and sorting of cellulose and bleaching (partially closed water cycle).

The production of sanitary-hygienic paper and products from it was actually doubled. Sanitary-hygienic paper output is increased mainly due to the use of imported cellulose. Lignosulfonates output decreased as compared to 2000 as a result of transition from liquid lignosulfonates production to dry (in 2011, dry lignosulfonates constituted 23% of the products sold). In

June 2009, the installation and putting into operation of the spray-type dryer were completed. The equipment is designed for drying technological lignosulfonates that allows to reduce considerably the load of the shop of of industrial sewage water biological treatment as well as to stabilize the evaporation shop operation, and as a consequence, to improve considerably the ecological situation of the Neva-Ladoga Basin.

During the reporting period, the enterprise had completely switched to the use of the natural gas as a fuel for power-generating boilers giving up the use of peat.

In addition, for the period from 2009 to 2011 the following environment protection measures were implemented on the self-support basis:

- purchase and installation of equipment for the local sewage treatment of paper-making machine №5;

- in August 2009 in accordance with the plan of modernization of biological treatment shop, two units of mechanical dehydration of sludge were installed and put into operation. It will allow the enterprise to avoid the expensive operation of sludge collectors and to fulfill reclamation of the land under them;

- development and implementation of the projects for construction of the system at outfalls 2, 3, 4 to pump the rain and melt water to the existing treatment facilities the of the Valgoma River. The outfalls 2 and 3 were closed on 10 June 2011 and the outfall 4 – on 1 November 2011.

- implementation of the project of reclamation of sludge collector №2 is continued.

- automation of stop valves of facilities for mechanical treatment of industrial sewage water and replacement of mechanical rake MG 12 for the automatic hydraulic screen.

The planned construction of cookers for solid wastes burning was not implemented because the detailed investigations have revealed neither economic nor ecological benefit to the enterprise. The project of post-treatment of sewage water using sand filters was not implemented either.

1.2.1.3. The main parameters of the environmental impact

1) Sewage water discharge

During the reporting period, the sewage water was discharged through four outfalls:

- outfall №1 into Volkhov Bay of the Ladoga Lake,

- outfalls №2, №3 and №4 into the Valgoma River (Table 10).

Table 10 – Discharge of sewage water of the Syaskiy PPM from 2008 to 2012

Outfall №	Sewage water discharge volume, thousand m^3 per year				
	2008	2009	2010	2011	2012
№1	17311.820	15552.520	15223.29	17341.290	17034.020
№2	102.448	118.158	51.889	-	-
№3	34.960	40.321	17.707	-	-
№4	140.958	21.831	22.989	16.633	-

The operation efficiency of the sewage treatment plant of OJSC "Syaskiy PPM" during the reporting period is characterized with the following parameters (Table 11).

Table 11 – Operation efficiency of the sewage treatment plant of Syaskiy PPM from 2008 to 2012

Pollutant	Operation efficiencyof the sewage treatment plant, %				
	2008	2009	2010	2011	2012
BOD_5	93.3	93.6	92.8	92.6	92.6
COD	32.5	39.4	41.9	44.7	40.9
Ntot	21.5	23.1	16.7	19.7	17.2
Ptot	57.9	41.3	21.5	36.3	42.8

Heavy metals approved for discharge in accordance with the developed standards for permissible discharges of pollutants and microorganisms (SPD) are absent.

The weightof pollutants discharged in water bodies is shown in Tables 12 и 13. (The weight of pollutants discharged in Volkhov Bay includes pollutants of municipal sewage water discharged from the treatment facilities of the Municipal Unitary Enterprise "SKS" because the enterprises use a single outfall for sewage water discharge, and, therefore, obtain a single project of SPD and license for discharge).

Table 12 – Weightof pollutants discharged by the enterprise in Volkhov Bay of the Ladoga Lake from 2008 to 2012, t/year

Pollutant	Weight of pollutant discharhed into the Volkhov Bay of the Ladoga Lake				
	2008	2009	2010	2011	2012
BOD_5	292.85	176.51	172.78	187.81	174.76
COD	14618.71	7831.72	8576.66	8896.09	8499.69
Ntot	114.94	79.31	85.25	95.38	93.69
Ptot	11.60	9.95	9.74	10.75	10.26

Table 13 – Weightof pollutants discharged by the enterprise into the Valgoma River of the Ladoga Lake from 2008 to 2012, t/year (rain and snow waters)

Pollutant	Weight of pollutant discharged into the Valgoma River				
	2008	2009	2010	2011	2012
BOD_5	0.78	0.47	0.28	0.05	-
COD	7.68	9.49	5.39	0.77	-

Heavy metals and hazardous substances approved for discharge in accordance with the developed standards for permissible discharges of pollutants and microorganisms (SPD) are absent. Dynamics of discharges into the Volkhov Bay is shown in Figure 8.

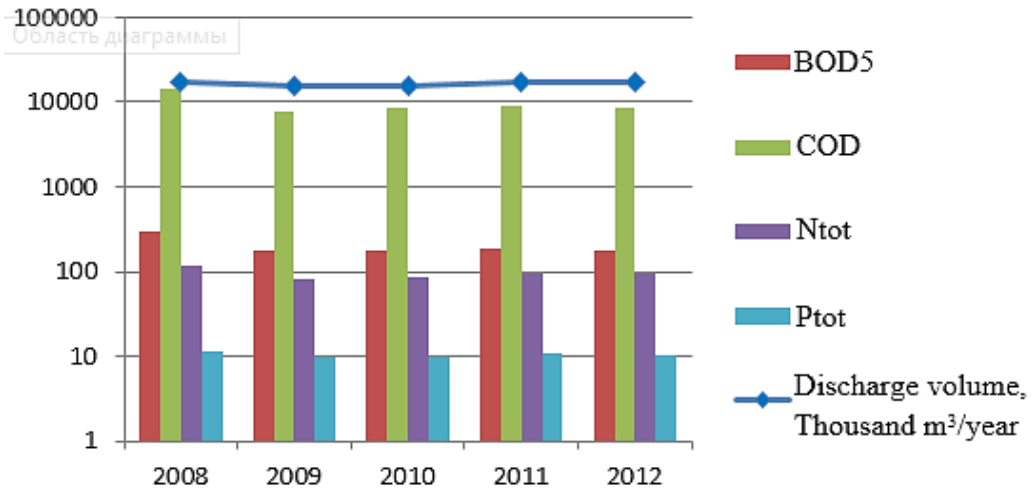


Figure 10 – Dynamics of discharge of pollutants in Volkhov Bay, tons/year

Presented data shows a slight dynamics of pollutants ingress. Attention is drawn to some reduction of pollutants discharges in 2009 that can be attributed to the environmental effect from modernization of the biological treatment shop and launching a line for lignosulfonates drying.

Discharge dynamics in the Valgoma River is shown on Figure 9.

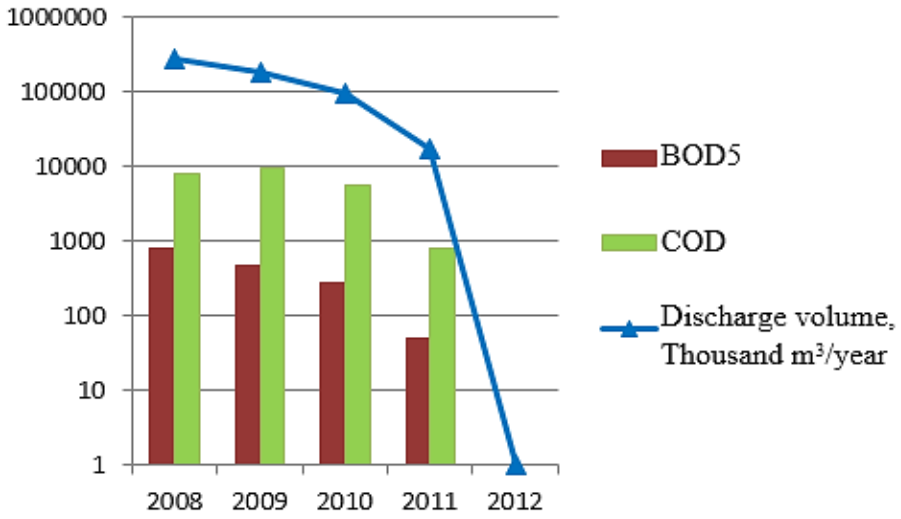


Figure 11 – Discharge dynamics of pollutants in the Valgoma River, kg/year

Thus, by 2012, the discharge of pollutants into the Valgoma River was totally ceased.

2) Emissions to the atmosphere

Main indicators of gross emissions are shown in Table 14.

Table 14 – Gross emissions to the atmosphere from 2008 to 2012

Pollutant	Emissions to the atmosphere, t/year				
	2008	2009	2010	2011	2012
SO_2	55.737	51.345	57.344	50.264	48.601
NO	81.096	79.596	86.594	61.252	60.253
NO_2	472.424	487.424	542.417	367.326	367.326

Heavy metals and hazardous substances approved for discharge in accordance with the developed standards of the maximum permissible emissions (MPE) are absent.

3) Handling the production wastes

Currently, Syaskiy PPM is handling the production and consumption wastes in compliance with the license for the right to wastes handling № ОТ-19-000109 (78) of 21 May 2009. Volumes of wastes formation are shown in Table 15.

Table 15 – Volumes of wastes formation for the period from 2008 to 2012, tons

2008	2009	2010	2011	2012
3209.914	1539.942	993.667	779.253	780.500

The Syaskiy PPM disposes own production and consumption wastes of hazard classes 4 and 5 in the sludge collector №2. The land area for the collector amounted to 29.7557 hectares being the property of the OJSC "Syaskiy PPM". The volumes of disposed wastes are shown in Table 16.

Table 16 – Volumes of disposed wastes for the period from 2008 to 2012, tons

2008	2009	2010	2011	2012
1961.900	844.300	420.771	287.620	349.400

The dynamics of volumes of waste formation and disposal is shown in Figure 10.

The difference in volumes of waste formation and disposal is explained by the fact that a part of wastes is used as a secondary product and as an insulating layer for reclamation of the sludge collector. A significant reduction of waste formation volumes is explained by the fact that the Mill has moved to cellulose cooking from imported chips.

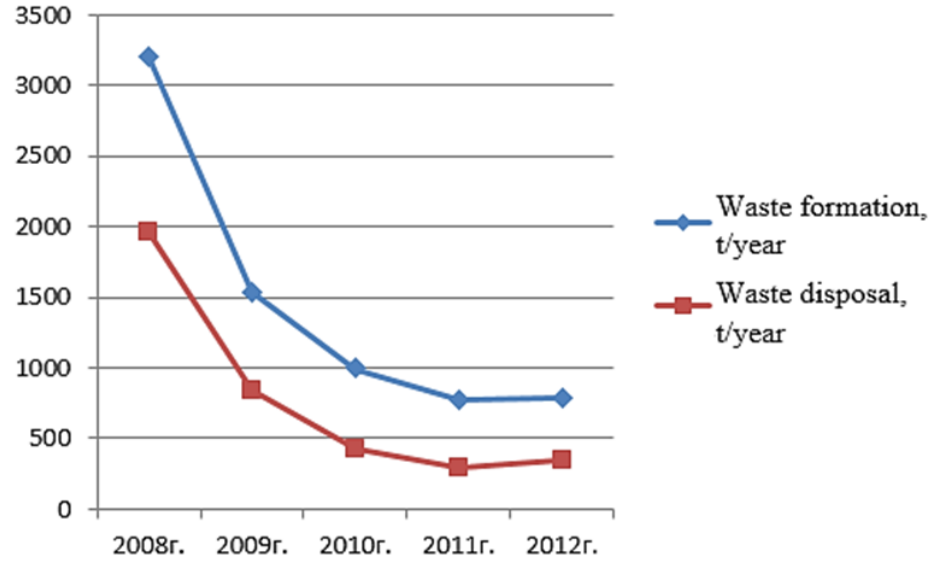


Figure 12 – Dynamics of volumes of waste formation and disposal

1.2.1.4. Results of the environmental components monitoring

According to the program of production control the air monitoring was carried out in the sanitary protection zone (SPZ) during the reporting period (Table 17).

Table 17 – Results of industrial ecological air monitoring in SPZ of OJSC "Syaskiy PPM", mg/m^3

Ingredients	2008	2009	2010	2011	2012
Suspended matters	less than 0.26	less than 0.26	less than 0.26	less than 0.26	less than 0.26
NO_2	less than 0.02	less than 0.02	less than 0.02	less than 0.02	less than 0.02
SO_2	less than 0.04	less than 0.04	less than 0.04	less than 0.04	less than 0.04

Thus, the concentration of pollutants in the air does not exceed MPC for dwelling zones.

The industrial ecological monitoring of the water body (the Ladoga Lake) was carried out in accordance with the Program of regular observations of the water body and water protection zone approved by the Neva-Ladoga Basin Water Authority (NLBWA) at three points (Table 18):

- point № 1 – the Volkhov Bay of the Ladoga Lake (500 m to the left from the sewage water outfall) once per month;

- point № 2 – the Volkhov Bay of the Ladoga Lake (500 m to the right from the sewage water outfall) once per month;

- point № 3 – the Volkhov Bay of the Ladoga Lake (at the depth of 2 km in the sewage water outfall) once per month.

Table 18 – Results of the industrial ecological monitoring of the water (average annual concentrations at the control points)

Ingredients	Unit of measurement	2008	2009	2010	2011	2012
The Volkhov Bay of the Ladoga Lake (500 m to the left from the sewage water outfall)						
BOD_5	mgO_2/dm^3	5.5	3.7	3.5	2.9	3.2
Suspended matter	mg/dm^3	9.8	6.6	5.6	5.2	5.3
COD	mg/dm^3	225	107	81	63	58
Ptot	mg/dm^3	0.13	0.13	0.08	0.07	0.06
Ntot	mg/dm^3	4.3	2.2	1.5	1.4	1.5
The Volkhov Bay of the Ladoga Lake (500 m to the right from the sewage water outfall)						
BOD_5	mgO_2/dm^3	4.7	3.8	3.4	2.8	3.4
Suspended matter	mg/dm^3	9.2	5.9	5.5	5.6	5.4
COD	mg/dm^3	205	94	80	60	58
Ptot	mg/dm^3	0.16	0.10	0.08	0.06	0.06
Ntot	mg/dm^3	3.6	2.3	1.5	1.4	1.5
The Volkhov Bay of the Ladoga Lake (at the depth of 2 km in the sewage water outfall)						
BOD_5	mgO_2/dm^3	2.9	3.0	3.5	2.7	2.6
Suspended matter	mg/dm^3	5.5	4.7	3.9	3.2	2.7
COD	mg/dm^3	121	70	59	31	34
Ptot	mg/dm^3	0.10	0.09	0.07	0.05	0.05
Ntot	mg/dm^3	3.6	2.3	1.2	1.2	1.2

Thus, the observation results demonstrate a stable reduction of pollutants concentration in the water bodies-recipients during the reporting period.

To reveal significant shifts in the environmental activity, the comparative analysis of anthropogenic impact of the enterprise upon the environment as comparison to the previous reporting periods was made (Table 19).

Table 19 – Comparative analysis of anthropogenic impact of the OJSC "Syaskiy PPM"upon the environment in 1992, 2000, 2012

Receipt per year	1992	2000	2012
Discharge volume, thousand m^3	46600	41100	17034
Discharge, t/year			
COD	29871	38132	8499.69
BOD	1131.8	1247.7	174.8
Ptot	21.2	30.2	10.3
Ntot	286.5	265.3	93.7
Emissions, t/year			
SO2	5420	79.93	48.60
NO[x]	561	146.6	427.6
Wastes, t/year	30000	29420	780.5

The above data show that during the reporting period the significant amount of environmental activities were done by the enterprise, which allowed to decrease the water consumption and sewage water discharge more than by two times. The waste formation was decreased more than by 3.5 times.

1.2.1.5. Planned environmental activities

To improve the ecological situation and reduce the risk of environmental pollution the enterprise is planning a number of environmental activities (Table 20).

Table 20 – Environmental activities planned for 2013-2015

№ i/o	Activity	Deadline	Amount of financing, thousands of rubbles.	Funding source
1.	Construction of new pumping station for empting of secondary precipitation tanks	4th quarter 2013	2700.00	PC "Syaskiy PPM"
2	Reconstruction of new treatment facilities: - precipitation tanks overhaul; - replacement of air supply lines in the second tunnel of aeration tank №2; - automating the process of biological treatment of industrial sewage water of the enterprise; - replacement of control and measuring equipment on blowers, having type 361-21-1; - replacement of the aeration system in the aeration tank №3	 4th quarter 2013 4th quarter 2014 4th quarter 2014 3rd quarter 2015 4th quarter 2015	 2600.00 1500.00 4200.00 1200.00 3500.00	 PC "Syaskiy PPM" PC "Syaskiy PPM" PC "Syaskiy PPM" PC "Syaskiy PPM" PC "Syaskiy PPM"
3	Overhaul of equipment of pumping station for pumping of storm sewage (rainwater) and melt sewage water of outfalls №5, №6 with full replacement of all equipment of the station by the KNS system of the Grundfos company	1st quarter 2015	1800.00	PC "Syaskiy PPM"
	TOTAL		17500.00	

In future it is planned:

- to introduce the system of post-treatment sewage water after the biological treatment shop;

- to modernize aeration system of aeration tanks in the shop of biological treatment of industrial sewage water.

The deadline of these activities is preliminarily in 2020. At present the required amount of financing has not been estimated. The possibility of these activities implementation depends on the economic condition of the enterprise, which is not stable yet.

The enterprise is not participated in international environmental projects.

Implementation of environmental activities in the frameworks of the federal target programs is not planned.

1.2.1.6. Activities necessary for excluding the company from the HELCOM's list of hot spots

1. Modernization of the cellulose cooking process;

2. Switching to less harmful cellulose bleaching technology with complete rejection of molecular chloride for bleaching;

3. Reconstruction of the treatment facilities.

Conclusion

In the recent years, a number of works on reconstruction of production shops as well as reconstruction of treatment facilities have been implemented. The measures undertaken allowed to reduce emissions to the atmosphere and significantly reduce a water consumption volume. Discharge of untreated storm water from industrial areas in the Valgoma River also was completely ceased. Significant discharge of pollutants in the Volkhov Bay occurred mainly not due to improving the quality of sewage water treatment, but due reducing sewage water volumes. The further modernisation of technological processes of cellulose cooking and bleaching as well as modernisation of treatment facilities is necessary.

Environmental problem solving is associated with the high financial costs. Taking into account the current economic situation of the Mill, any prompt solution of the problem of the enterprise exclusion from the"hot spots" list seems not possible without a investment support.

Table 21 - Analysis of compliance of the enterprise activities with HELCOM Recommendations

HELCOM Recommendation	Targets	Standard	The situation at the enterprise	Conclusion about conformity of the target	Comments
RECOMMENDATION 17/9 Reduction of discharges from the sulphite pulp industry	The use of best available technologies	1. Dry rossing with minimum discharge of sewage water. 2. Closed cleaning. 3. Neutralization of weak liquor before evaporation with the subsequent reuse of significant part of condensates during production. 4. Systems which allows to utilize almost all organic substances dissolved in the liquor (U ***) – liquor regeneration should reach 98%. 5. The absence of discharge during cooking from the bleaching process on the sodium base. 6. At least, two-stage treating of discharged sewage water.	1. Dry rossing is not used. The enterprise reduces paper wood, sent for rossing, at the expense of purchasing of pulpchips from timber industry enterprises. 2. Sorting and cleaning of cellulose is made in a closed loop of water circulation with a partial feeding with a ratio of circulating water/fresh water – 86% / 14%. 3. Is not applicable for sulphite cooking technology 4. Is not applicable for sulphite cooking technology 5. Is not applicable for sulphite cooking technology 6. Treatment of industrial sewage water is conducted in two steps on the facilities of mechanical and biological treatment with the subsequent neutralization of treated sewage water before discharging into the water object. Sludge from the primary precipitation tanks and	-	From all best available technologies the enterprise successfully implements only closed and partially closed water circulations when sorting, cleaning and bleaching cellulose.

HELCOM Recommendation	Targets	Standard	The situation at the enterprise	Conclusion about conformity of the target	Comments
		7. During cooking on a sodium base is partially closed bleaching processing. 8. Use in production, where possible, chemicals that are harmless for the environment, for example, biodegradable chelating agents.	surplus sludge are dehydrated on the 7 and are token out for disposal to the own landfill. 7. Cellulose bleaching is conducted in partially closed water consumption with a ratio of circulating water/fresh water – 30% / 70% 8. For bleaching a molecular chloride is used.		
	Discharges kg/ ton of air-dried cellulose (bleached/unbleached):				
	COD	70/45	118.2	-	
	Adsorbable Organic Halogen (AOH)	0,5/-	Not applicable	No data	
	P_{tot}	0.08/0.06	0.14	-	
	N_{tot}	0.7/0.6	1.3	-	
	Use for cellulose bleaching of molecular chloride	Not applicable	Applicable	-	
RECOMMENDATION 16/4 Reduction of emissions into the atmosphere from the pulp-and-paper industry	NOx emissions from regeneration cookers	120 mg/MJ or 0.40 g/m^3	Regeneration cookers on the enterprise are absent. Emissions of power-generating cookers – 67.1 mg/MJ	+	
	NOx emissions from lime regeneration kilns	300 mg/MJ or 0,60 g/m^3	Lime regeneration kilns on the enterprise are absent. Emissions of power-		

HELCOM Recommenda-tion	Targets	Standard	The situation at the enter-prise	Conclusion about conformity of the target	Comments
			generating cookers – 67.1 mg/MJ		
	Sulphur emissions kg/ton of cellulose	1.5	0.76		

1.2.2. Hot spot № 15 "Volkhov aluminium plant ("Metahim Ltd.")"

The location of the Volkhov aluminium plant of the Leningrad Region is shown in Figure 11.

The Volkhov aluminium plant is one of the largest industrial facilities of Volkhov Town. The plant site is located on the right bank of the Volkhov River at the distance of 120 km from St.- Petersburg, in the northern part of Volkhov Town and at the distance of 20 km from the Ladoga Lake. The Volkhov River is a source of industrial water supply of the plant, and industrial sewage water of the plant is discharged there.

In 1992, the OJSC "Volkhov aluminium plant" was operated at the industrial site producing aluminium, argil, soda and potash, Portland cement, double superphosphate, fluorides, sulphuric acid, diammonium phosphate and generating heat energy.

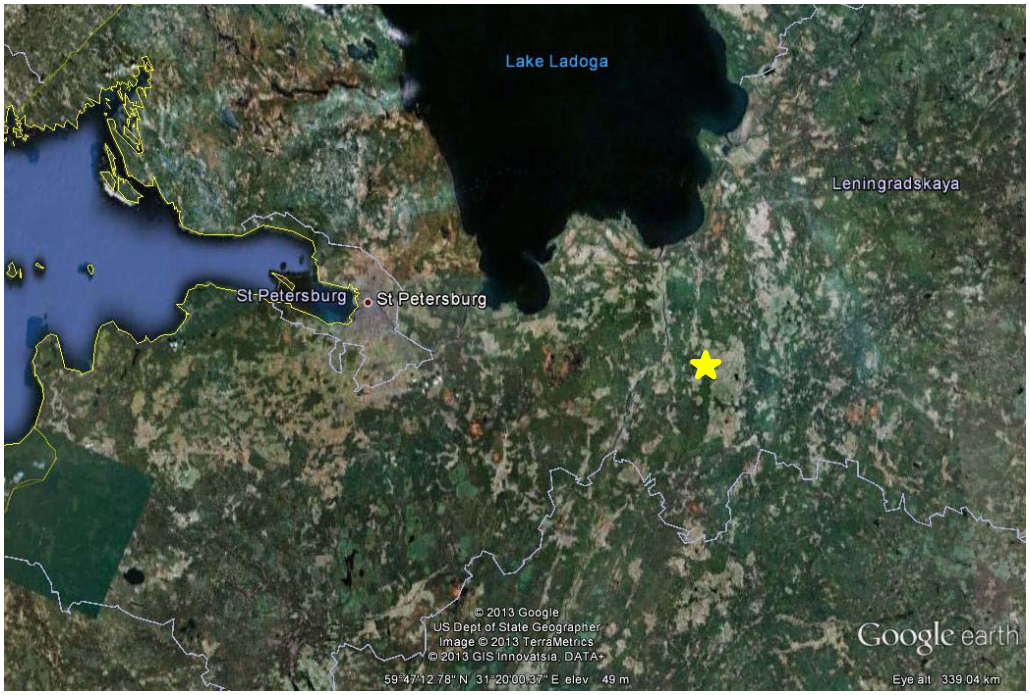


Figure 13 – Location of the Volkhov aluminium plant

Three sewage water outfalls, sewerage treatment facilities, sludge collector of aluminous shop and gypsum collectors were on the balance sheet of the plant. The sewage water discharge was 3609 thousand m^3/year, the mass of discharged pollutants was more than 6000 tons. The annual volume of emissions constituted 7735.7 tons. The main reasons for the plant enter into the HELCOM's list of "hot spots" as the one of the largest pollutants of the Ladoga Basin are indicated below.

1. Water

1) Absence of treatment facilities for treatment of industrial and storm sewage water.

2) High accident rate of the equipment used (obsolete equipment of sulphuric and acid production, unreliable performance of gypsum pipelines in production of double superphosphate)

3) Unstable work of double superphosphate production lines, failures in aluminous production technology.

2. Atmosphere

1) Physical and intellectual depreciation of the gas cleaning equipment of the cement mill as well as the electrical precipitator behind kilns of argil calcination.

2) Absence of the gas cleaning process in the aluminium refining shop.

3) Technological problems during production of double superphosphate and arhythmic work of the sulphuric acid shop.

1.2.2.1. Characteristics of the enterprise in 2003

The branch "Volkhov aluminium" produces raw aluminium, polyphosphates, sulphuric acid, fluxed agglomerated phosphate, potassium sulphate, soda, fluxes, aluminium sulphite and produces heat.

One outfall of industrial sewage water, gypsum collectors (the first one is operational, the second is used as the sewage water storage), sludge collector (idle) were on the balance of the plant.

The all-plant water circulation is used including water circulation of the casting sector of the electrolysis shop, compressor house, silicon-converter substation, sulphuric acid shop.

The sewage water from gypsum collector is not discharged and is returned to production of polyphosphates.

Treatment facilities are absent (Tables 22 and 23).

Table 22 – Emissions of pollutants (1992-2002), tons/year

Year	1992	2002	Reduced in relation to 1992
Emissions of pollutants	7735.7	4984.336*	1.55 times
including			
solid substances	2855.8	2308.433	1.2
gaseous substances	4879.9	2675.903	1.8
including			
fluorine	252.6	15.609	16.2
sulphurous anhydride	2387.5	937.926	2.5
carbon monoxide	1644.5	1370.575	1.2
* Increasing of emissions in 2002 in comparison with 2001 is connected with the growth of production and increasing of the list of controlled parameters			

Table 23 – Discharge of pollutants with sewage water (1992-2002), tons/year

Year	1992	2001	2002	Reduced in relation to 1992
Suspended matters	3180.5	178.030	198.7*	16 times
Oil products	9.0	0.971	1.8	5
Total nitrogen	157.6	9.922	12.33	12.8
Total Phosphorous	820.2	16.707	16.03	51.16
Fluorine	77.9	2.943	2.262	34.3
Sulphates	2049.3	288.826	315.7	6.5
Aluminium	58.3	1.622	2.158	27.0
Iron	4.0	1.267	1.563	2.6
* Increase of pollutants discharge in 2002 as compared to 2001 is related to increase of sewage water volume				

The enterprise significantly exceeds phosphorus concentrations in sewage water indicated in HELCOM Recommendation.

The following problems are remained unsolved:

- absence of sewage water treatment;
- inefficient operation of electrical precipitator behind kilns in flux production;
- obsolete equipment in sulphuric acid production.

1.2.2.2. Current state of the enterprise

In 2003, within the framework of reorganisation, the producing capacities of the Volkhov aluminium plant were distributed among three autonomous companies:

1. The branch VAZ-SUAL of OJSC "SUAL" "Volkhov aluminium" – aluminium production facilities

2. Limited Liability Company "Metahim" – chemical production

3. Limited Liability Company "Parosilovoe hozyaystvo – Volkhov" – heat and energy generating capacities.

The information related to each of the companies is provided below.

Branch VAZ-SUAL of the OJSC "SUAL""Volkhov aluminium".

In 2006 the Volkhov aluminium plant joint the RUSAL holding company. At present, the enterprise produces only primary aluminium for automobile and construction industry. The enterprise capacity is 24000 tons of aluminium per year. In 2011, the plant produced 11109 t of the large-size T-shaped ingot and 4797 t. of small ingot.

The production complex consists of two lines of electrolysis and foundry sections. The enterprise uses technology of electrolysis with burned anodes.

In 2011, the reconstruction of foundry was started to produce aluminium alloys.

In the early 2013, the completion of individual units before putting into the operation was carried out.

The planned constriction of dry gas cleaning facilities was suspended in 2009 due to the lack of funding. The existing gas cleaning equipment provides emissions of pollutants within the permissible limits.

Currently, the probable termination of the primary aluminium production is considered in view of a high cost of production.

The enterprise is certified according to ISO 14001 in 2007.

1) Emissions to the atmosphere

The enterprise has 21 air emission sources, including 16 organized sources. The data on emissions amount are presented in Table 24:

Table 24 – Gross emissions to the atmosphere of the branch VAZ-SUAL of the OJSC "SUAL"

Substance	2008 t/year	2009 t/year	2010 t/year	2011 t/year	2012 t/year
0101 Aluminium oxide	105.672	86.805	68.955	70.956	76.590
0123 Iron oxide	0.385	0.386	0.762	0.0698	0.796
0143 Manganese and its compounds	0.013	0.013	0.024	0.021	0.025
0150 Sodium hydroxide	0.002	0.001	0.001	0.001	0.001
0301 Nitrogen (IV) oxide (Nitrogen dioxide)	1.800	1.503	0.451	0.429	0.410
0304 Nitrogen (II) oxide (Nitrogen oxide)	0.277	0.240	0.075	0.071	0.073
0322 Sulphuric acid (by molecule H_2SO_4)	0.001	0.001	0.001	0.001	0.001
0328 Black carbon (soot)	3.735	0.818	1.510	1.028	1.187
0330 Sulphur dioxide	75.338	34.813	68.290	67.954	68.065
0337 Carbon monoxide	3011.649	3522.260	3526.709	3077.716	2579.410
0342 Gaseous fluorides	19.888	12.165	19.769	19.191	17.396
0344 Poorly soluble fluorides	2.633	5.476	6.172	6.086	6.108
0416 Mixture of saturated hydrocarbons C6-C10	0.003	0.003	-	-	-
0415 Mixture of saturated hydrocarbons C1-C5	0.001	0.001	-	-	-
0703 Benz(a)pyren (3,4 – Benzpyrene)	0.00000	0.00000	0.00003	0.00003	0.00002
1071 Phenol	0.00032	0.00032	-	-	-
1301 Acrolein	0.056	0.762	2.749	2.867	1.783
2704 Benzine (oil, low-sulphur)	0.049	0.049	0.031	0.031	0.029
2732 Kerosene	0.492	0.492	0.150	0.150	0.150
2754 Saturated hydrocarbons C12-C19	0.008	0.008	-	-	-
2908 Inorganic dust: 70-20% of SiO_2	3.914	3.932	6.180	6.336	6.249
2909 Inorganic dust: up to 20% of SiO_2	208.035	220.382	266.595	289.974	341.683
2930 Abrasive dust	0.012	0.012	0.006	0.006	0.006
TOTAL:	**3433.964**	**3890.122**	**3698.428**	**3543.517**	**3099.963**

2) Sewage water discharges

Discharges to water bodies are absent. The industrial sewage water in the volume of 55-60 thousand m^3/year are transferred for treatment to the Limited Liability Company "Metahim".

3) Environmental components monitoring

The air quality monitoring is carried out at the stationary station of Volkhov. Neither MPC exceeding has been revealed during the observation period.

4) Planned environmental activities

In 2013, the enterprise plans to complete the reconstruction of foundry. Switching to the modern technology allows to reduce the impact upon the environment.

A long-term program of environmental activities implementation at the enterprise is not available in view of the fact that now the replacement of the primary aluminium production for another industrial production or closing the plant is considered. The decision concerning closing or changing the line of business of the enterprise is expected not earlier than 2015.

Limited Liability Company (LLC) "Metahim"

LLC "Metahim" is the branch of the LLC "FosAgro AG". It produces mineral fertilizers, polyphosphates, sulphuric acid and cement. The enterprise uses production capacities belonging previously to the Volkhov aluminium plant. The LLC "Metahim" was founded in 2004 as a result of reorganisation of the OJSC "Volkhov aluminium", when all chemical productions facilities of the plant were transferred to this enterprise.. The production volume in 2012 was:

- production of polyphosphates and fertilizers – 145 580.5 tons/year
- production of sulphuric acid – 195 513 tons/year
- production of mineral fertilizers (potassium sulphate) – 143 726 tons/year
- production of cement – 733 800 tons/year

The enterprise is located within the same industrial zone together with the branch VAZSUAL of LLC "Parosilovoe hozyaystvo". The sanitary-protection zone of the enterprise is approximately 1 km.

The enterprise inherited all ecological problems of the Volkhov aluminium plant together with the production capacities. The financial state of the LLC "Metahim" did not allow to change the situation radically, however, a number of measures aimed at improvement of the environmental impact were implemented:

- in 2005 sulphuric acid production line was fully reconstructed;
- technical upgrading of polyphosphates and fertilizers production was provided;
- gas treatment equipment in the cement production site was installed;
- in 2008 the facilities for mechanical treatment of sewage water were constructed resulting in reduction of suspended matter discharge;
- project of facilities for sewage water deep treatment was developed.

1) Discharges of pollutants

The sewage water of the enterprise consists of own industrial and industrial-storm sewage water as well as of the sewage water from a number of enterprises, which is accepted for treatment. Distribution of volumes of sewage water in 2012 is given in Table 25.

Table 25 – Distribution of sewage water volumes incoming to the treatment plant of the LLC "Metahim"

Enterprise	Sewage water volume, m^3/year	Share in total volume of sewage water, %
Limited Liability Company "Parosilovoe hozyaystvo"	188 571	11.7
Branch "VAZ-SUAL"	57 115	3.5
Limited Liability Company "Metakhim"	1 361 292	84.2
Municipal Unitary Enterprise "PATP" of the Volkhov municipality	9 754	0.6
TOTAL	1 616 732	-

The above-mentioned enterprises has significantly different composition of sewage water. The characteristics of accepted sewage water are given in Table 26.

Table 26 – Chemical composition of the sewage water accepted from third-party organisations, mg/m^3

Pollutant	Limited Liability Company "Parosilovoe hozyaystvo"	Branch "VAZ-SUAL"	Municipal Unitary Enterprise "PATP" of the Volkhov municipality
Suspended matters	601.59	135.4	19.99
Solid residual	296	386.0	-
Ammonium nitrogen	1.24	2.09	-
Nitrate nitrogen	0.28	1.55	-
Nitrite nitrogen	0.034	0.2	-
Phosphate phosphorous	0.16	3.40	-
Sulphate-ion	60.32	66.42	-
Oil products	1.71	1.94	1.98
Total iron	11.78	2.46	-
Aluminium	20.27	8.01	-
Cooper	0.013	0.008	-
Chlorides	34.85	28.47	-
Manganese	0.112	0.08	-
Fluoride	0.131	2.27	-

The sewage water treatment is carried out using the treatment facilities of mechanical cleaning. To improve the quality of sewage water treatment the following reagents are additionally used:

- Aluminium sulphate;

- Nalko 8190;

- Nalko 71601.

The efficiency of the treatment plant for suspended matters is shown in Table 27:

Table 27 – The efficiency of the treatment plant of the Limited Liability Company "Metahim" from 2008 to2012, %

Year	The efficiency of the treatment plant
2008	81
2009	77
2010	58
2011	87
2012	78

After treatment the sewage water is discharged into the Volkhov River through the first outfall. The sewage water discharge is carried out within the framework of the licence № 17-08-87-S-10/14. The amount of pollutants entering the water body with the sewage water is given in Table 28.

Table 28 – Discharge of pollutants in the Volkhov River, tons/year

Pollutant	2009	2010	2011	2012
Suspended maters	102.359	116.598	144.259	153.142
Solid residual	893.626	948.694	1605.007	1726.766
COD	-	74.103	86.94	95.746
BOD_5	4.945	3.845	6.447	7.375
Total nitrogen	-	5.392	8.034	9.154
Ammonium nitrogen	4.507	4.572	9.569	11.539
Nitrate nitrogen	5.622	4.566	8.45	10.373
Nitrite nitrogen	0.629	0.573	1.342	1.521
Total phosphorous	-	23.081	45.898	57.853
Phosphate phosphorous	4.422	4.12	26.242	37.676
Sulphate-ion	-	118.867	274.439	300.697
Chloride-ion	73.363	57.862	74.717	90.123
Oil products	0.602	0.987	3.446	2.287
Total iron	2.926	1.824	2.908	3.742
Aluminium	0.819	0.87	1.972	2.157
Cooper	0.029	0.021	0.016	0.022
Nickel	-	0	0.072	0.055
Manganese	0.246	0.222	0.317	0.415
Sodium	144.22	134.279	242.438	356.735
Fluorine	-	2.06	7.534	31.967

2) Emissions to the atmosphere

Limited Liability Company "Metahim" has 83 sources of emissions including: 47 organ-ised sources and 36 unorganized sources.

The main sources of emissions include the production shops of sulphuric acid, polyphos-phates (including extraction of phosphoric acid), mineral fertilizers, cement (Table 29).

Table 29 – Gross emissions to the atmosphere of the Limited Liability Company "Metahim"

Substance	2009	2010	2011	2012
Iron oxide	0.98	0.983	0.969	0.58
Calcium oxide	0.027	0.025	0.025	0
Magnesium oxide	0.029	0.029	0.029	0
Manganese and its compounds	0.072	0.073	0.073	0.008
Sodium carbonate	7.026	7.389	5.841	9.023
Nitrogen (IV) dioxide	109.686	123.258	108.172	269.377
Nitrogen (II) oxide	18.456	18.591	15.624	22.321
Hydrocyanide (hydrogen cyanide)	0.006	0.006	0.006	0
Sulphuric acid	16.892	22.637	16.443	34.755
Black carbon (soot)	2.516	2.515	2.516	1.117
Sulphur dioxide (sulphurous anhydride)	408.23	457.301	458.263	610.092
Hydrogen sulphide	0	0	0	0
Carbon monoxide	49.341	47.773	40.232	47.532
Gaseous fluorides	1.366	1.45	1.27	1.41
Poorly soluble fluorides.	0.004	0.003	0.004	0.0025
Hydrocarbons C1-C5	0.224	0.214	0.214	0.236
Hydrocarbons C6-C10	0.061	0.06	0.06	0.06
Benzene	0.007	0.006	0.006	0.01
Dimethylbenzene (xylene)	0	0	0	0.001
Methylbenzene (toluene)	0.0048	0.004	0.005	0.0088
Ethylbenzene	0	0	0	0
Benz(a)pyrene	0	0	0	0
Benzene (oil, low-sulphur)	0.035	0.035	0.035	0.0492
Kerosene	11.864	11.864	11.14	18.554
Hydrocarbons	0.266	0.265	0.265	0.0381
Inorganic dust (70-20% SiO_2)	1539.832	221.682	258.4	238.729
Wood dust	0.492	0.548	0.46	0.423
Diphosphorous pentaoxide	14.649	15.359	15.394	9.351
Diesel fuel	522.966	588.513	524.987	449.578
Petrol	133.138	141.955	153.981	117.843

Thus, the enterprise annually released into the air more than 1800 tons of pollutants, one third of which is sulphur dioxide.

3) Waste formation and disposal

In 2012, the amount of wastes of the enterprise was 2692 tons. Mercury-containing wastes of the first class of hazard in amount of 0.256 tons were transferred for neutralization to the specialized organisation, 2009 tons of wastes of hazard classes 4-5 (mainly scrap as well as paper wastes and polypropylene) were transferred to the third-party organisations for reutilization, 683 tons of wastes were disposed at the landfill for solid wastes under the contract with the authorized organisation.

4) Environmental components monitoring

The air quality monitoring is carried out at the stationary station of Volkhov Town. No exceeding of MPC has been revealed during the observation period.

The water quality monitoring in control points of the Volkhov River is carried out. The control points are located at the distance of 300 m upstream and at the distance of 50 m downstream of the sewage water outfall. Sampling is carried out once a month. Oil products, ammoni-

um nitrogen, nitrate nitrogen, nitrite nitrogen, total nitrogen, phosphate phosphorous, total phosphorous, fluoride, total iron, cooper, zinc, nickel, aluminium, sodium, magnesium, manganese, phenols as well as pH, soluble oxygen and temperature are determined. The data of the Neva-Ladoga Basin Water Authority indicated that the Volkhov River both above and below the sewage outfall is characterised by the steady contamination with cooper, manganese and iron, however, the total pollution index increased to the lower river station from 2.54 to 2.99. In addition, individual exceeding of MPCs for lead and cadmium were observed at the river monitoring station located downstream the outfall.

5) Planned environmental activities

The most important environmental activity is the construction of the treatment plant. The construction is planned to be started in 2013. Putting into operation is scheduled to June 2014. Putting into operation of the treatment plant will dramatically reduce sewage water impact on the ecosystem of the Volkhov River.

Limited Liability Company "Parosilovoe hozyaystvo - Volkhov"

The main activities of the enterprise include production of:

- steam for technological needs of the plant and third-party organisations;

- hot water for heating and hot water supply of the town (Volkhov-2) as well as for plant and other organisations;

- electricity for the plant needs.

Four steam generators were installed in the boiler-turbine shop of the steam-power enterprise in the building of the boiler-room, 3 steam generators able to work for steam turbines were installed in the building of the cogeneration plant (CHP). The equipment use the natural gas as the main fuel and black oil as the reserve fuel.

The steam-power enterprise (SPE) has two steam turbo-generators with total nominal capacity of 12 MW. The electric power produced by the turbo-generators is used for own needs (energy-consuming equipment of boiler-room and CHP) and for power supply of the primary and ancillary equipment of the branch "Volkhov aluminium". The average annual electric output of turbo-generators of SPE is 32000-35000 thousand Kwh. The waste steam from the turbo-generators has the following parameters: pressure – 6 kg/sm^2, temperature – 250°C and is used by consumers.

1) Emissions to the atmosphere

The enterprise did not provide the data on emissions. However, given the fact that CHP operates on the natural gas and heat production does not exceed 500000 Gcal/year, the enter-

prise's emissions, according to the expert estimations, do not exceed 800 t/year, while nitrogen oxides constitute 97% of this amount.

2) Sewage water discharges

Sewage water discharges are absent. The household and industrial-storm sewage water are transferred for treatment to the LLC "Metahim". The volume of transferred sewage water amonted to 349336 m^3 in 2011 and 199363 m^3 in 2012.

3) Environmental components monitoring

The air quality monitoring is carried out at the stationary station of Volkhov Town No MPC exceeding was revealed during the observation period.

4) Planned environmental activities

Information on the planned environmental activities is absent. Taking into account non-profitability of the production and its low environmental hazard, no significant investments into environmental activities should be expected.

1.2.2.3. Comparison of the current negative impact on the environment and the impact for the previous reporting periods

For the past reporting period the air emissions volumes are not considerably changed. While 4984 tons of pollutants were emitted to the air in 2002, in 2012 the emission was approximately 5500 tons. The increase of emissions volume resulted from the production growth, especially in the sector of chemical production (LLC "Metahim").

Changes in sewage water discharge volumes are shown in Table 30.

Table 30 – Discharges of pollutants with sewage water (1992-2012), tons

Year	1992	2002	2012	Reduced by relation to 1992	Reduced by relation to 2002
Suspended matters	3180.5	198.7	153.142	16.01	1.30
Oil products	9.0	1.8	2.287	5.00	0.79
Total nitrogen	157.6	12.33	9.154	12.78	1.35
Total phosphorous	820.2	16.03	57.853	51.17	0.28
Fluorine	77.9	2.262	31.967	34.44	0.07
Sulphates	2049.3	315.7	300.697	6.49	1.05
Aluminium	58.3	2.158	2.157	27.02	1.00
Iron	4.0	1.563	3.742	2.56	0.42

As can be seen from the data, significant reduction of suspended matter discharge occurred due to putting into operation of the treatment plant of mechanical cleaning. The nitrogen discharges was also reduced. Besides, the phosphorous discharge increased by more than three times, discharge of iron increased by 2 times and fluoride - by 14 times. In spite of the fact that increase of discharge resulted from the increase of production volumes, such a sharp negative trend indicates the urgent need of a treatment plant construction.

1.2.2.4. Activities necessary for excluding the company from the HELCOM's list of hot spots

Taking into account the division of the enterprise into three independent organisations, it is reasonable to consider the required activities for each of them:

1. Branch VAZ-SUAL of the OJSC "SUAL"

- The proposal of recommendations for improvement of environmental management at the enterprise can be implemented only after adoption of the final decision concerning the enterprise restructuring or closing;

- as far as the share of the enterprise in the total volume of waste water is about 3% and the sewage water is not discharged but is transferred for treatment to the LLC "Metahim", the planned environmental activities should be aimed at additional treatment of industrial emissions.

The enterprise is still the HELCOM's "hot spot" only owing to the parameter of impact upon the atmospheric air.

2) Limited Liability Company "Metahim"

- the Limited Liability Company "Metahim" is the major source of impact on the environment. The construction of a treatment plant is to become the main and most important measure required for exclusion of the enterprise from the "hot spots" list.

- to reduce emissions to the atmosphere, the improvement of the gas cleaning efficiency, especially in reconstructed sections for production of phosphoric acid and polymineral fertilizers is required.

3) Limited Liability Company "Parosilovoe Hozyaystvo - Volkhov"

- the enterprise can be excluded from the HELCOM's list of hot spots, because its activities are directed to the production of heat and electric power. The enterprise's emissions share of the total volume does not exceed 15%, and the sewage water volume amounted to 1%, while the sewage water is not discharged but is transferred for treatment to the LLC "Metahim".

Conclusion

As a result of reorganisation the "hot spot" "Volkhov aluminium plant" currently consists of three independent organisations. One from them – the Limited Liability Company "Parosilovoe Hozyaystvo - Volkhov" should be excluded from the "hot spots"list as having a minor impact upon the environment. The main source of emissions into the atmosphere is the Branch VAZ-SUAL of the OJSC "SUAL". It is not possible to develop the necessary complex of environmental activities for this enterprise before making a decision concerning its reorganization or closing. The only source of sewage water discharges is the Limited Liability Company "Metahim", which accepted all chemical industries of the plant. Significant increase of individual

pollutants discharge indicates the necessity of the urgent construction of a treatment plant. The treatment plant construction is scheduled to 2013-2014.

Table 31 – Analysis of implementation of HELCOM Recommendations by the enterprises being the part of the "hot spot" № 15

HELCOM Recommendation	Targets	Standard	The situation at the enterprise			Conclusion about conformity of the target
			Branch VAZ-SUAL of OJSC "SUAL"	LLC "Metakhim"	LLC "Parosilovoe hozyaystvo - Volkhov"	
RECOMMENDATION 17/6. Reduction of pollution from discharges into water, emissions into atmosphere and phosphogypsum out of the production of fertilizers	Discharges of phosphogypsum	Do not discharge	Fertilizers are not produced	Is not discharged	Fertilizers are not produced	+
	The impurity content in the raw material	Low		Average		-
	Using of secondary (contaminated) sulphuric acid for cooking of phosphate charge	Do not use		Is not used		+
	Re-use of industrial water	Yes		Yes		+
	Recirculation of vapours, condensates and industrial water	Yes. Mainly in gas scrubbers		No		-
	Using of storm water	Yes		No		-
	Using of "dry" processes	Maximally		Partially		+/-
	Direct cooling/damping	Avoid		No		+
	Using of modern technologies of sewage water treatment including chemical, physical-chemical and biological treatment	Yes		No. Only mechanical treatment of sewage water is carried out		–
	Content of chemical substances in production					-
	Total nitrogen (kg/t)	-		-		
	Fluorides (kg/t)	0.3		No data		
	Cadmium (g/t)	0.05		<0.2		
	Mercury (g/t)	0.01		<0.2		
	Zinc (g/t)	1		1.3		
	Phosphorus -P (kg/t)	0.05		Produced only potash fertilizers		
RECOMMENDATION 23/11 Requirements for discharging of waste water from the chemical industry	Reducing of sewage water load at the expense of using of best available technologies	Industrial cooling water separation	Yes	Yes	Chemical industries are absent; enterprise produce only heat and electricity. Sewage water are passed to the	-
		Sewage water pretreatment. Joint sewage water treatment only in the case of high treat-	No	Partially		

HELCOM Recommendation	Targets	Standard	The situation at the enterprise			Conclusion about conformity of the target
			Branch VAZ-SUAL of OJSC "SUAL"	LLC "Metakhim"	LLC "Parosilovoe hozyaystvo - Volkhov"	
		ment efficiency			LLC "Metakhim"	
		Water re-use, use of water-saving technologies	Yes	Yes		
		Indirect cooling systems	No data	No data		
		Use of vacuum processes	No	No		
		Mother liquor treatment	No	Yes		
		Switching to less harmful reagents	No	No		
		Permanent monitoring of sewage water parameters	No	Measurements of sewage water parameters coming from other consumers is 1 time per month		
	Reducing of sewage water discharge	COD – treatment efficiency not less than 80%, concentration – not more than 40 mg/l	Sewage water are passed to the LLC "Metakhim"	53.222		-
		Phosphorous – not more than 2 mg/l		29.784		-
		Nitrogen – not more than 50 mg/l (or not more than 75 mg/l when efficiency is not less than 75%)		4.862		+
		Adsorbable Organic Halogen – treatment efficiency – not less than 80%, concentration – not more than		Is not determined		No data

HELCOM Recommen-dation	Targets	Standard	The situation at the enterprise			Conclusion about conformity of the target
			Branch VAZ-SUAL of OJSC "SUAL"	LLC "Metakhim"	LLC "Parosilovoe hozyaystvo - Volkhov"	
		1 mg/l				
		Mercury – not more than 0.05 mg/l		Is not determined		No data
		Cadmium - mot more than 0.2 mg/l		Is not determined		No data
		Cooper – not more than 0.5 mg/l		0.01		+
		Nickel – not more than 1.0 mg/l		0.034		+
		Lead – not more than 0.5 mg/l		Is not determined		No data
		Chromium – not more than 0.5 mg/l		Is not determined		No data
		Chromium -VI – not more than 0.1 mg/l		Is not determined		No data
		Zinc - 2.0 mg/l		Is not determined		No data
	Sewage water toxicity					No data
	Toxicity for fish	TU (fish, 96 h) 2		Is not determined		No data
	Toxicity for daphnia	TU (daphnia, 48 h) 8		Is not determined		No data
	Toxicity for algae	TU (algae, 72 h) 16		Is not determined		No data
	Toxicity for bacteria	TU (Fish vibrio, 0.5 h) 8		Is not determined		No data

1.2.3. Hot spot № 24 "Large livestock farms (sewage water and sludge treatment)"

1.2.3.1. General characteristic

Agriculture is one of the major sources of pollution of the Baltic Sea with nitrogen and phosphorous. The main contribution to pollution is made by large livestock farms. Initially, the livestock farms with more than 50 000 heads of cattle was considered as a threat to safety of the Baltic Sea ecosystem . Within the framework of the JCP Program four large hog-breeding farms were referred to the 'hot spot" №24: SAE (State Agricultural Enterprise) "Sputnik", SAE "Novy Svet", SAE "Pashsky" and SAE "Vostochny" situated in the territory of the Leningrad Region.

The pig-breeding complex "Novy Svet" is situated in the Gatchina District of the Leningrad Region, in the settlement of Novy Svet, at the distance of 10 km from Gatchina Town. The complex was designed for fattening of 120 thousand heads of pigs at a time. It worked for more than 30 years. Sewage water was discharged into the Suyda River (basin of the Neva River).

The pig-fattening complex "Vostochny" is located in the Nurma settlement of the Tosnensky District. The complex was put into operation in 1973. The maximum number of animals for fattening amounts to 108 thousand heads. Sewage water is discharged to the Igolenka Steam (the Neva basin).

The pig-fattening complex "Sputnik" is located in the territory of the Vsevolozhsk District near Romanovka settlement, at the distance of 22 km from Vsevolozhsk Town. The first two lines of the complex were constructed in 1980. The designed capacity of the complex is 250 thousand heads of pigs at a time. The water from irrigated fields runs through the drainage system and horizontal sewers to the Maurier River and then to the Ladoga Lake.

The livestock complex for bull-calf fattening Pashsky is located in the territory of the Volkhov District in Potanino settlement, at 132 km of the Murmansk highway. It was designed for fattening of 30 thousand heads of cattle. The first stage for 10 thousand heads, designed using the Italian technology, was put into operation in 1975. Pashsky complex owned 8000 hectares of land with double water regulation (polder land), where the treated sewage water was discharged. The sewage water of the complex are discharged to the Pasha River, and then to the Ladoga Lake.

1.2.3.2. State of the "hot spot" in 2003

Due to the economic changes happened in Russia, the cattle-breeding complexes "Sputnik" and "Novy Svet" are currently almost out of business. The livestock of the complex "Pashsky" was decreased to 360 heads and that of "Vostochny" – to 39 097 heads.

SAE "Novy Svet". Due to the lack of production, the complex is not hazardous for the environment. The new project developed by the Northwest Research Institute of Mechanization and Electrification of Agriculture of the Russian Academy of Agricultural Sciences, in the case of it successful implementation, is quite ecological and should not lead to pollution of the surrounding area. Resumption of production is planned for 2004. The condition of gathering ponds gives the concern as far as the removal of solid fractions settled to the ponds bottom during 30 years was not carried out. Serious anxiety was caused by the bog condition, where large stocks of peat-manure compost were remained.

SAE "Vostochny". Livestock of pigs was gradually reducing, and constituted 36 000 heads on 01.10.2003. In 2002, the enterprise changed the form of property becoming the limited liability company "Vostochny". In 2002, the attempt to reconstruct the treatment plant was done, however, owing to the change of the property form, the project had not been funded. Currently, the treatment facilities operated for more than 30 years are in an emergency condition. They do not provide an adequate level of sewage water treatment. The discharged sewage water exceeds MPCs of nitrogen, phosphorous, potassium, organic matters, and sometime, phenols. The treatment plant was also used for treatment of sewage water of the Nurma settlement causing the increase of the load. The overhaul of the treatment plant was not fulfilled. Exploitation of the treatment plant in the current condition could lead to the serious ecological disaster.

Silt gathering ponds containing huge stocks of the solid fraction (silt) was not cleaned that leads to the significant reduction of its useful volume. Urgent cleaning is required.

In order to improve the environmental situation it was planned:

- to reconstruct the treatment plant;
- to clean the silt gathering ponds with silt transportation to agricultural fields as the fertilizer;
- to purchase equipment for reconstruction of air cleaning system;
- to construct the plant for processing and producing the meat-bone meal from the waste of pigs.

SAE "Sputnik". At the end of the reported period the pig complex was removed from operation. The construction of treatment facilities was suspended. The enterprise was managed by the committee of bankruptcy. The existing project of production rehabilitation was not realised due to the lack of funding.

SAE "Pashsky". At the end of 2003 there were 360 heads of cattle, including 135 cows. The enterprise was divided on two parts – the Joint-Stock Company "Kyselna" obtaining 4 000 hectares of land, and "Pashsky" being at the stage of bankruptcy. All livestock-breeding premises were located in its territory. The resumption of livestock was not planned in the territory of these two enterprises. A large amount of unused manure, which is now well-decomposed compost and is the valuable organic fertilizer, is accumulated in the territory of the former complex Pashsky. However, since the area manure storage is not protected from the storm sewage water, the solid fraction of compost and its decomposition products are permanently penetrating into the drainage network and the Pasha River, and further to the Ladoga Lake.

1.2.3.3. Current state of the "hot spot"

By the early 2009, four selected enterprises had the following characteristics.

SAE "Novy Svet". OJSC "Novy Svet" has been founded. It is the largest pork producer in the Leningrad Region. The number of cattle at the beginning of 2009 amounted to 26 000 pigs. The bog with peat and manure compost was not subjected to reclamation. At the beginning of 2012 the "Novy Svet" had problems with the inspecting authorities in view of non-compliance with the rules on waste disposal. Therefore, the enterprise had to invest about 36 million rubles into launching of the new shop for manure treatment. However, in January 2013 the bankruptcy procedure at the enterprise was announced again.

Limited Liability Company "Vostochny". The company "Rurik-Agro" owned by the Danish group of enterprises Idavang A/S had purchased the industrial complex of the former SAE "Vostochy". By the end of 2011 the number of sows was brought up to 6 850 heads. Today, after reconstruction and installation of the modern processing equipment, the annual production capacity of the complete cycle is estimated as 180 000 commercial pigs.

Using NEFCO credit, "Rurik Agro" constructed sealed lagoons with a membrane covering in 2010 . Due to such modernization, the farm is now meeting not only Russian, but also European environmental standards.

According to the NEFCO estimates, the new lagoons allow to save about 230 thousand m^3 of water annually .

To reduce the nutrients load on the environment of the region in March 2011 the station of post-treatment of manure liquid fraction was launched. It's main task is the production of high-quality organic fertilizers. During the production process the manure is separated into a solid and a liquid fractions in two decanter centrifuges. The solid fraction is transported to the storage area and then is used as the fertilizer. From the liquid fraction ammonium nitrogen is removed using special evaporated unit. In the process the ammonium water is produced, which is used as the fertilizer, and the light fraction, which is used for irrigation and fertilization of crops.

The enterprise carries out the regular measurements of pollutant concentrations discharged by the livestock enterprise at the border of the sanitary protection zone. Besides, the control of soil quality and surface and ground waters is provided.

SAE "Sputnik". On the site of the enterprise the Closed Joint Stock Company "Romanovka" was established. By the end of 2008 the enterprise had 4 700 pigs. At present the bankruptcy procdure is started at the enterprise.

State corporation "Pashsky". According to the data of 2008, the number of livestock at the enterprise was reduced to 165 heads, including 96 cows. Further enterprise development prospects are negative.

As the analysis results show, the livestock production at three farms from four previously selected farms is in depression. At the same time, the total increase of livestock and poultry production is recorded in the Leningrad Region as a whole. As a result, the load on the environment increases also.

Therefore, the choice of the above farms as the main sources of pollution is not representative.

1.2.3.4. Current state of the livestock sector in the Leningrad Region

Agricultural complex of the Leningrad Region is one of the most dynamic sectors of the regional economy and during the last 9 years it has demonstrated stability and progressive development of all sectors of agricultural production. The agricultural specialization of the Leningrad Region is livestock sector which accounts for 69% of gross production (Figure 12).

The Leningrad Region is one of the few regions of Russia, which preserved during the period of reforms a large commodity sector of agricultural production constituting 76% of all livestock sector produc-

tion is produces in large agricultural enterprises. The share of agricultural enterprises production amounted to 97% of meat, 92% of milk and 99% of eggs.

Such centralization of agriculture on the one hand allows to achieve the best results in the management of the sector, including introduction of innovations, technical and technological modernisation of production, and on the other hand this situation considerably exacerbates the environmental consequences of ineffective treatment of animal wastes.

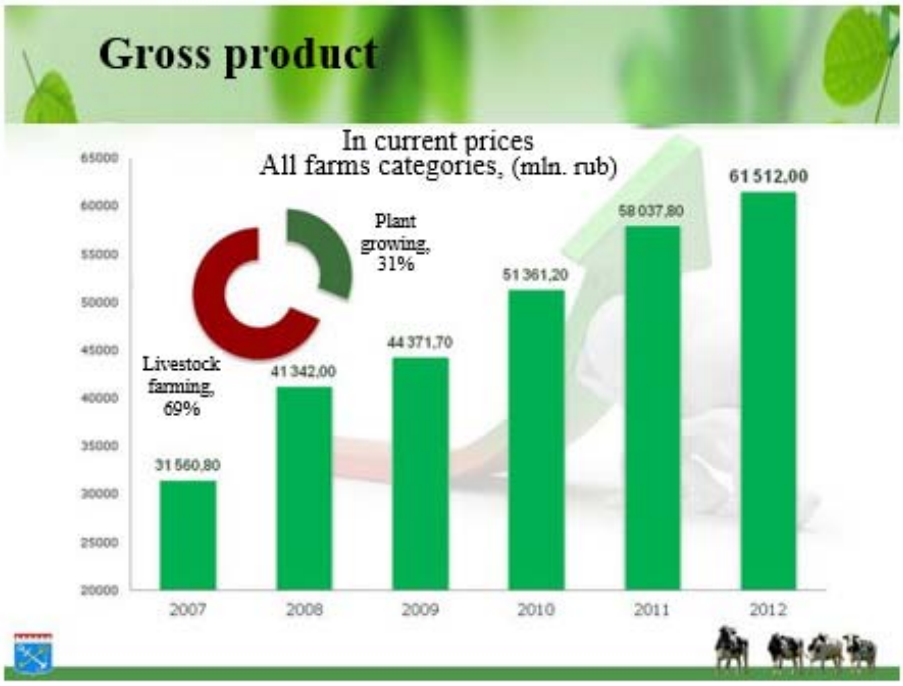


Figure 14 – Agricultural production volumes in the Leningrad Region from 2007 to 2012 (according to data of the official portal of the Committee on agriculture and fishery complex of the Leningrad Region)

In accordance with the assessment carried out within the framework of the Balthazar project by the end of 2008, the Leningrad Region had 136 enterprises breeding cattle, an average number of animals per one farm constituted 1 266 heads. The total number of cattle in farms amounted to 172 220 heads. In the recent years, the number of livestock remains fairly stable (Figure 13).

The overwhelming majority of enterprises is specialised in dairy livestock production (133 enterprises).

As a result of pig-farms inventory within the framework of the Balthazar project, in the Leningrad Region by the end of 2008, nine enterprises were operating, while the average number of pigs in these farms constituted 17 444 heads per farm. The total number of pigs was 47 700 heads. Today the number of pigs in

the region is growing steadily and the number of pig farms has increased to 13 (Figure 14). In 2011, 265 112 heads of pigs were produced to the slaughter.

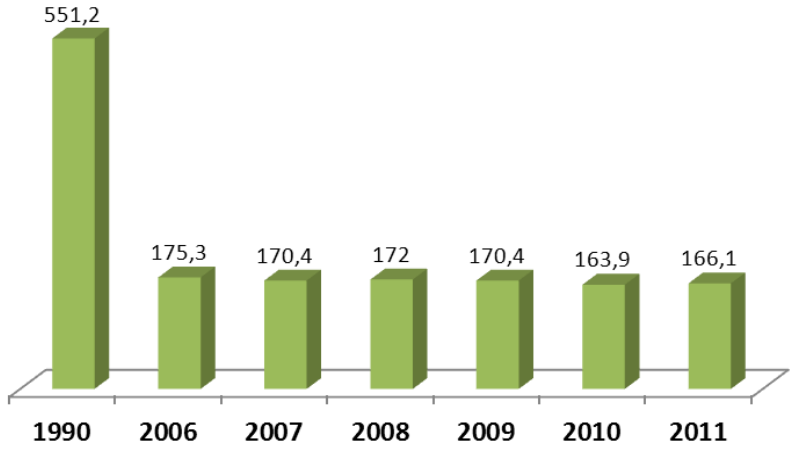


Figure 15 – Dynamics of the number of cattle at the enterprises of the Leningrad Region, thousands of heads

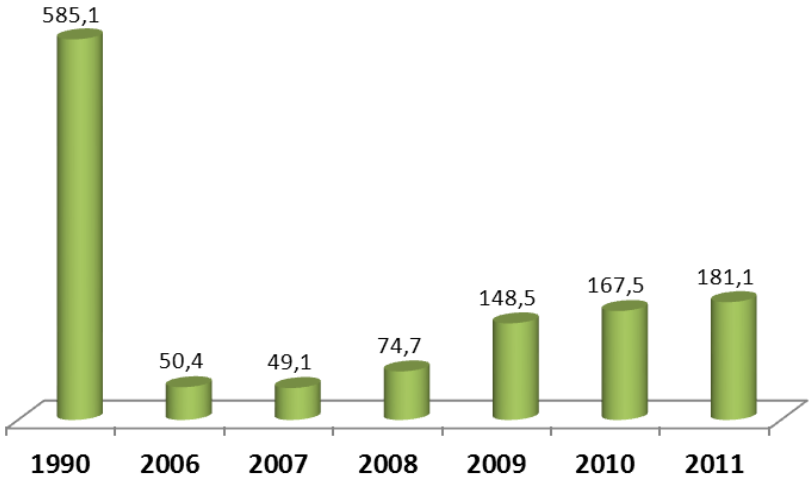


Figure 16 – Dynamics of the livestock of pigs at the enterprises of the Leningrad Region, thousands of heads

Poultry farming in the Leningrad Region is represented by 13 poultry farms, including:

- 7 poultry farms producing eggs (CJSC "PF Nevskaya", LLC "Lenoblptitseprom", CJSC "Agro-komplex Oredezh", CJSC "PF Lagolovo", CJSC "PF Sinyavinskaya", Pig Production Complex "PF Udar-nik", OJSC "PF Primorskaya"),

- 3 poultry farms specialising in broiler meat production (OJSC "PF Severnaya", LLC "PF Russko-Vysockaya", OJSC "Nagornoe"),

- 1 poultry farm specialising both in production commercial eggs and broiler meat – CJSC "PF Roskar".

At the same time, by the end of 2008 there were 16 poultry farms (the data of the Balthazar and Primer projects) with the average number of heads of poultry 1 275 997 per one farm. The total number of poultry was 20 415 950. Through the end of 2011 the production of poultry products was increased by more than 25% (Figure 15).

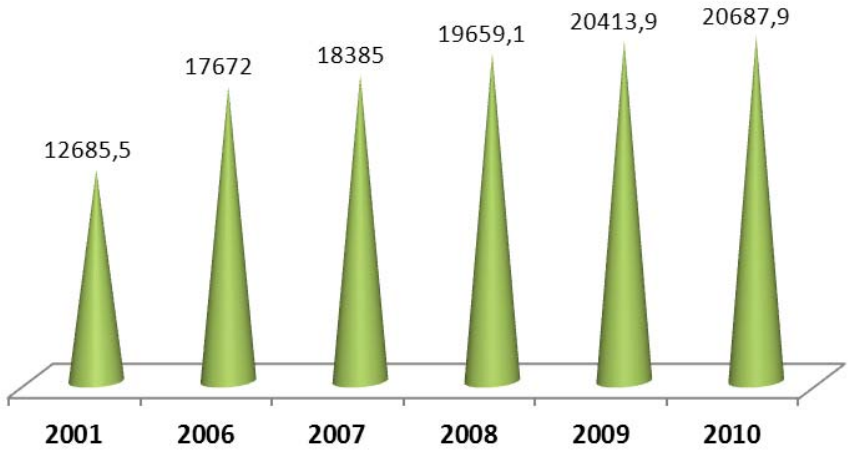


Figure 17 – Dynamics of the number of poultry at the enterprises of the Leningrad Region, thousand heads

As an additional industry sector in the Region the dairy goat breeding is developing. In the CJSC Pedigree Plant "Privnevskoe" and CJSC Pedigree Plant "Krasnoozerskoe" breeding of the dairy goats of Saanen and Alpine races is carried out. The total number of goats in these farms amounts to 2 236 heads, including 1 253 dairy goats.

Fur farming in the Leningrad Region is represented by almost all kinds of fur-bearing animals bred in captivity and is concentrated in two pedigree reproducers: LLC "Sever" of the Vyborgsk District and LLC "Severnaya Pushnina" with branches in several areas of the region. During 2011 about 100 thousand of minks, 5 thousand of blue foxes, 5 thousand of fox fells, thousands of raccoon dog fells were produced.

1.2.3.5. Manure and dung disposal

Agricultural enterprises of the Leningrad Region annually produces 0.3 mln. tons of pig manure, 2 mln. tons of chicken dung and 2.5 mln. tons of cattle manure. This amount of manure contains 44 thousand tons of nitrogen and 25 thousand tons of phosphorous being the source of excessive inputs of nutrients into water bodies and leading to eutrophication.

According to the results of the inventory of agricultural enterprises implemented within the framework of the Balthazar and Primer projects, the following main features of the existing system of manure disposal in the Region were revealed:

- predominance of large commodity sector in livestock farming of the Region leads to the accumulation of very large amounts of manure and dung within one zone that forms the areas of extremely high load of nitrogen and phosphorous on water bodies. The highest loads are found in the Vsevolozhsk, Vyborg, Kirov, Lomonosov and Tosnensky Districts.

- the vast majority of farms was built 30-50 years ago, facilities for manure storage and treatment are highly depreciated and do not meet the current requirements of safety disposal of livestock farming wastes. The process of reconstruction of manure storage systems is very slow in view of the lack of own funds at the farms for of such projects implementation . The new enterprises (often with the foreign capital) are the exception, but their share in the total agricultural production is still small.

- due to the lack of capacity and poor state of manure storages, many companies are forced to applying manure to the fields during the whole year. Leakage from manure storages and other places of temporary storage are the main sources of nitrogen and phosphorous penetration into the surface water.

- until now only few examples of operation of manure and dung deep processing systems in the Region are available.

- by the end of 2008 all farms breeding cattle and pigs have enough own arable lands for manure disposal. The situation at poultry farms is quite different: this sector has a sharp deficit of own areas for manure disposal, while any stable demand for chicken manure from third-party organisations has not formed yet.

- the system of state subsidies for bring mineral fertilizers into land for land fertility saving, formed at the federal level, negatively affects the manure utilization as a fertilizer (especially in terms of attracting third-party consumers)

- the most enterprises are operating without the required environmental documentation package, including appropriate licences for wastes discharge and disposal, and, therefore, avoid charges for the negative impact upon the environment.

- the state control system for livestock farming wastes disposal is inefficient. The most violations have been detected only when the environment suffered a serious damage. However, currently considerable efforts are undertaken at the regional level to improve the effectiveness of ecological control.

Within the framework of the Balthazar project the list of agricultural enterprises, most seriously affecting the environment, has been revised. The new list included 20 livestock farms most seriously contributing the load of nitrogen and phosphorous to the water bodies of the Baltic Sea basin. (Table 32).

Table 32 – The list of large livestock farms of the Leningrad Region forming maximal loads on the environment of nitrogen and phosphorous (in accordance with the data of the Balthazar project)

Enterprise name	Enterprise specialisation	Livestock, thousands of heads (by 2008)	Location	Production, t/year	
				of nitrogen	of phosphorous
Poultry farm "Lomonosovskaya"	Meat poultry	4090	Settl. Gorbunki, Lomonosov District	3680	1227
Poultry farm "Severnaya"	Meat poultry	3860	Urban settlem. 1 Sinyavino, Kirov District	3564	1188
Poultry farm "Roskar"	Egg and meat poultry	3410	Settl. Pervomayskoe, Vyborg District	3069	852
Poultry farm "Synyavinskaya"	Egg poultry	2800	Urban settl. Praladozhskit, Kirov District	2534	563
Agroholding "Pulkovsky"	Pig-breeding	56	Vil. Tarasovo, Tosnensk District	1307	316
Poultry farm "Russko-Vysotskaya"	Meat poultry	830	Vil. Russko-Vysotskaya, Lomonosov District	748	249
Poultry farm "Voiskovitsy"	Pedigree poultry	720	Settl. Voiskovitsy, Gatchina District	644	215
Poultry farm "Lenoblptitseprom"	Egg poultry	1010	Settl. Tervolovo and Skvoritsy, Gatchina District	911	202
Open Joint-stock Company "Rurik-Agro"	Pig-breeding	35	Settl. Nurma, Tosnensk District	817	198
Poultry farm «Primorskaya"	Egg and meat poultry	720	Settl. Krasnaya Dolina, Vyborgsk District	650	181
Poultry farm "Nevskaya"	Egg and meat poultry	660	Settl. Leskolovo, Vsevolozhsk District	590	164
Poultry farm "Udarnik"	Egg and meat poultry	640	Settl. Pobeda, Vyborgsk District	577	160
Agrocomplex "Oredezh"	Egg poultry	700	Vil. Batovo-1, Gatchina District	661	147
Pig-breeding complex "Novy Svet"	Pig-breeding	26	Settl. Novy Svet, Gatchina District	607	147

Enterprise name	Enterprise specialisation	Livestock, thousands of heads (by 2008)	Location	Production, t/year	
				of nitrogen	of phosphorous
Poultry farm "Lagolovo"	Egg poultry	490	п. Лаголово, Ломоносовский район	441	98
Livestock complex "Bor"	Pig-breeding	15	Vil. Romashki, Priozersk District	350	84
Livestock complex "Rassvet"	Cattle	10.3	Vil. Retun, Luzhsk District	509	72
Livestock complex "AgroBalt"	Cattle	3.2	Vil. Bolshaya Pustomerzha, Kingiseppsk District район	263	40
Livestock complex "Plamya"	Pig-breeding	7	Vil. Syasskelevo, Gatchina District	164	40
Livestock complex "Detskoselsky"	cattle, pig-breeding	5 – pigs, 3.2 – cattle	St. Petersburg	257	39

The above mentioned enterprises produce above 50% of biogenic load from the livestock-breeding of the Leningrad Region to the Baltic basin.

1.2.3.6. Participation of the Leningrad Region in state programs and international projects for environment protection in the process of agricultural activities

The Leningrad Region Government pays a great attention to the development of agriculture, and livestock farming in particular, as well as to the environmental aspects of agricultural land usage. Currently in the Leningrad Region the target program "Agriculture development in the Leningrad Region from 2013 to 2020" is implemented. The subprogram "Technical and technological modernisation, innovation development" includes activities for implementation of innovation technologies in the field of organic waste utilisation.

The Region stakes on high-tech livestock waste disposal. According to the program proportion of agricultural wastes treated with biotechnological methods should reach 10%. In particular, the Region plans to support innovation projects of energy production from alternative sources, including bio-fuel production from agricultural wastes. In order to implement this major activity, the expenditures of payment of interest on credits for construction, reconstruction and modernisation of bio-energy units, facilities for the production of bio-energy production will be compensated.

In 2011 the Council of experts of the Committee on agriculture and fishery complex of the Leningrad Region, in cooperation with experts from the Northwest Research Institute of Mechanization and Electrification of Agriculture of the Russian Academy of Agricultural sciences developed and adopted the Concept of agricultural enterprises waste disposal of the Leningrad Region for the

period from 2012 to 2015 and for the period up to 2020. In 2012, the following documents were developed upon the request by the Agency for Economic Development and the Committee of Agricultural sector of the Leningrad Region:

- The Guidelines on the application of ecological and technological evaluation criteria in evaluation of investment projects of the livestock industry development and in planning of the agricultural sector development of the Region.

- The draft of the long-term target program "Processing of agricultural waste from agricultural enterprises of the Region into organic fertilizers".

Investigations showed that the practical implementation of the developed guidelines and the program will allow to reduce by 50% the emission of nitrogen and phosphorous to the atmosphere by 2020. Such result may be achieved primarily due to step-by-step implementation of the best available technologies of wastes treatment and implementation of the industrial ecological monitoring system (technological regulations of manure/dung treatment).

Moreover, during the reporting period, 12 international projects devoted to environmental safety of livestock of the Leningrad Region was implemented. The list of projects is presented in Table 33.

Table 33- The list of international projects of ecologization of livestock sector implemented in the Leningrad Region during the reporting period (in accordance with the data of the Committee of Agriculture and Fishery complex of the Leningrad Region

№ i.o.	Country	Sponsoring agency	Project executor	Project name	Results
1	Finland	Environment Ministry	Pro-agriya South Karelia	"The principles of proper agriculture practices" (2005-2006)	Publication of booklets "A set of rules of environmentally friendly agricultural practices in livestock, fodder production and poultry"
2	Finland	Agriculture and forestry Ministry	Pro-agriya South Karelia	"Strengthening of cooperation with the authorities and frontier organizations in the field of agriculture" (2004-2006)	Organised and conducted two study tours to Finland by topics: "Environmental problems in agriculture" (2004) and "Poultry manure removal" (2006)
3	Finland	European Union, INTERREG Program	University of Applied Sciences in Mikkeli	"Decrease the environmental impact of livestock production at the North-West of Russia" (January 2008-2009)	The analysis of the current state of environmental safety in livestock sector in the pilot farms of the Leningrad Region was conducted – "Plamya", "Novy Svet", poultry farm "Primorskaya"

№ i.o.	Country	Sponsoring agency	Project executor	Project name	Results
4	Finland	Environment Ministry	Ramboll company	"Activities to struggle with menaces to Baltic Sea from growing agriculture industry of the Leningrad Region" – final report 2008)	The investigation of loads of pollutions was carried out. Summary of previous projects in agro-ecology field was done
5	Finland	Environment Ministry	Environmental institute	Project PRIMER "Identification of priority activities to reduce eutrophication process from North-West of Russia to the Gulf of Finland" (2008)	Investigation of sources of nutrient loading into the Gulf of Finland: point and diffuse, the identification of existing and future sources of pollution
6	Sweden	Swedish International Development and Cooperation Agency SIDA	University of Agricultural Sciences in Uppsala	"Agriculture, environment and ecosystem of the Leningrad Region" (2003 – 2009)	Technology solutions of agricultural waste removal and treatment of CJSC "Rapti" and CJSC "Krasnoozernoe" productions were suggested; seminars and trips to Sweden for the safe use of pesticides, ecosystem health; implementation of water monitoring
7	Finland	Financial Corporation "Nefco", Environmental Partnership "Northern Dimension", poultry farm "Roskar"	Poultry farm "Roskar"m "Biolan" company	Project of incineration of poultry manure at the poultry farm "Roskar" (2007 – 2009)	Preparation of investment plans for the installations of manure incineration at four poultry farms. Joint enterprise was not established. At the beginning of 2009 "Biolan" company said that their installation does not passed the tests
8	Finland	Helcom	Finland organisation MTT, Environmental Institute, "Proagriya" of South Karelia	"Towards enhanced protection of the Baltic Sea from main land-based threats: BALTHAZAR" (2009 - 2012)	Sampling and analysis of water samples from water sources flowing near agricultural enterprises were done. The list of agricultural "hot spots" was updated. In 2011-2012 the work "Modernisation of treatment of poultry manure into organic fertilizers" was done, model design estimates of construction of modular cell- fermenters for manure treatment was developed. Such technology was introduced by LLC "BIOZEM" to CJSC "Agrocomplex "Oredezh". Technological regulations for the pilot farms of the Region were developed
9	Finland	Financial Corporation "Nefco"	"Peyuri" company	2010. "Preparation of business plans to improve the treatment of wastes from poultry farming at poultry farms of the Leningrad Region"	50% of poultry farms were investigated. It was concluded that biogas production and manure incineration are very expensive. The best approach – treatment of manure into fertilizer, compost production. Establishment of new joint enterprise was discussed.

№ i.o.	Country	Sponsoring agency	Project executor	Project name	Results
10	Finland	Financial Corporation "Nefco", Environmental Partnership "Northern Dimension", Environmental Ministry of Finland, Agriculture Ministry of Finland	"Maxwell Stamp" (Great Britain)	"Sustainable treatment of manure/dung at the farms of the Leningrad Region" (from 2011)	Feasibility studies for the pilot farms: "Pervomayskoe", "Bor", poultry farm "Primosrkaya" and poultry farm "Udarnik". Two seminars of environmental safety when implementing various methods of livestock and poultry waste treatment were conducted. Business plans of waste products management for farms were made
11	Finland	Agriculture and forestry Ministry. Environment Ministry	Joint Russian-Finland consulting company "Proagriya", South Karelia	Within the framework of the Program of join cooperation the project "Development of ecology and environmental protection in agricultural sector of the Leningrad Region". Subproject: "Ecological solutions of sustainable livestock waste management at OJSC "Pedigree plant Novoladozhskiy"	Since 2009 investigations of cattle waste treatment were carried out. Biogas installation was recommended, project of collection and storage of manure in lagoons was prepared

The data show that the authorities of the Leningrad Region are paying considerable attention to environmental safety in agriculture. International projects aimed at detailed investigation of situation with the nutrients discharge from agricultural enterprises into the Baltic Sea as well as exploring the possibilities of implementing the advanced technologies for manure treatment are constantly implemented in the Region (Table 34).

Table 34 – Analysis of compliance of agriculture activities in the Leningrad Region of HELCOM Recommendations 24/3 and 28E/4

Indicator	Standard	Agriculture situation in the Leningrad Region	Conclusion about conformity of activity to standard
Evaporation of ammonium from livestock farms. Handling with manure	It is necessary to watch that excess of nitrogen was not formed in manure using the correct diet to suit the needs of a particular animal	Analysis of the diet of animals in terms of nitrogen content in the manure in most farms is not carried out	-
	In poultry emissions the moisture content in the manure should be reduced by decreasing or its removal as soon as possible to the stores located outside the hen houses	Most poultry farms implements activities for reducing the moisture content of manure and optimisation of its removal	+
	Programs included strategies and activities for reducing of ammonium vaporing	Most enterprises do not implement programs to reduce	-

Indicator	Standard	Agriculture situation in the Leningrad Region	Conclusion about conformity of activity to standard
	from livestock farms are developed	emissions. Most enterprises do not pay for emissions of mainline production	
	Solid manure should be placed in dung-yards with sealed floor and side walls	Cases of manure clamping on earth grounds are widely spread	-
	Liquid manure should be drained though the outlet pipes and stored in dung-yards for liquid manure	Farms use different systems for disposal of liquid waste	+
	Tanks for storage of liquid manure and wastes from farms should be made from a stable waterproof material and should not break during operations with the manure	At many farms manure stores are untighten due to the high percentage of wear	-
	Manure storage capacity should ensure the storage of the manure produced at least for 6 months	At enterprises having manure storages their capacity is sufficient. Manure storage overflow was fixed at poultry farms only due to the poor sales of the manure	+
	Animal manure should be used so as to achieve the maximum efficiency of its use	Manure usage efficiency is low. Manure transmission capabilities to third-party organisation are limited	-
	The maximum amount of manure that is entered each year, including the excrements of the animals, coming to soil while pasturing, is calculated on the content of nitrogen and phosphorous in it. With it to soil should come not more than 170 kg/hectare of nitrogen and not more than 25 kg/hectare of phosphorous	Entering of organic fertilizers to the soil in most cases is significantly below standards	+
	The balance between the number of animals on the farm and the area of land on which the manure is entered should be calculated and represented as the density of animals. Maximum number of animals should be determined taking into account the balance between the amount of phosphorous and nitrogen in the manure and the requirements for the organisation of plant nutrition	Most farms has its own areas for manure disposal. The exception is poultry farms	-
	Farmers should be encouraged when they use manure	The legislative barriers complicate manure transfer to third-party organisations. Government stimulates plant growing enterprises to use mineral, but not organic fertilizers	-
	It is necessary to encourage researches on the content of biogenic substances in an-	In the Leningrad Region a significant amount of re-	+

Indicator	Standard	Agriculture situation in the Leningrad Region	Conclusion about conformity of activity to standard
	imal manure as well as calculations of the appropriate conversion coefficients per unit of livestock	searches of nutrient content in manure are carried out	
	It is necessary to develop national guidelines with recommendations on the use of fertilizers and they should take into account: - soil properties, the content of nutrients, soil type and relief; - climatic conditions and water regime; - the form of land use agricultural practice including crop rotation systems; - all external potential sources of nutrients	At the national level there is no normative guidelines for the use of organic fertilizers	-
Handling with agricultural sewage water	Cowshed or similar structures for livestock is designed in such way that the ground and surface water is not contaminated	When designing, activities for exclusion of pollution of ground and surface water are obligatory	+
	Programs including strategies and activities to reduce discharges from agriculture as of household sewage water as of sewage water formed after washing equipment are developed	Specialized programs of sewage water reduction from agriculture has not developed	-
Reducing soil erosion	In order to reduce the soil erosion, it is necessary to encourage technologies of transition to other forms of tillage	Stimulation of the transition to the new ways of tillage is absent	-
Permission for nature use	Large livestock enterprises must obtain permission for nature use with taking into account environmental aspects and farm's impact on the environment	Normative base provides the need to obtain permission for discharges, emissions and waste disposal for all types of enterprises. In practice only very large farms has such permissions.	+
Activities to protect water bodies and areas intended for interception of nutrients flows	If necessary, buffer water protection areas, areas for interception of nutrients or sedimentation ponds are created.	Water protection zones are established for all water bodies of the Russian Federation. Placement of manure storages, pasturing within protection zones are prohibited.	+
	Specialized water protection zones for ground water protection are created. Should be put in place such activities as reducing the dose of used fertilizers, establishment of zones where use of manure is prohibited, creating meadows of many years use	Restrictions on economic activities in zones of sanitary protection of drinkable water intakes on the basis of the ground water are established	+
	Is necessary to maintain and, where possible, to restore water-logged grounds in order to have possibility to reduce leaching of nutrients and maintain biological diversity	Drainage and reclamation of swamps currently are stopped. Activities to restore some water-logged grounds are provided for	+

1.2.3.7. Planned activities to improve the situation

Analysis of changes in the situation of livestock farming wastes treatment clearly shows that focusing attention at individual large farms does not provide the required reduction of nutrients load for the Baltic Sea. The most enterprises identified as the critical points of nutrients load were closed or changed their status, however, new large enterprises-pollutants have appeared. The probability of appearance of new sources of extremely high nutrients load in the agricultural sector is related primarily to the institutional imperfection of the ecological safety ensuring system in Russia. The applied measures of administrative and economical influence do not stimulate the companies to use the best technologies and to reduce the negative impact on the environment, therefore, the planned activities are mostly related to the improvement of the management and control system of agricultural wastes treatment both at the federal-regional level and at the level of individual enterprises.

In accordance with the "Principles of the State Policy in the field of environmental development of the Russian Federation for the period up to 2030" approved on 30.04.2012, a number of normative documents of the federal level is planned to adopt. They have to ensure:

- improvement of efficiency of state environmental supervision at the federal and regional levels;
- environmental regulation on the basis of the technological standards subject to acceptable risk for the environment and public health;
- reduction of specific indices of pollutants emission and discharge to the environment, as well as the waste formation for different economic activities, to the level compatible to that achieved in developed countries;
- creation and development of the infrastructure of ecologically safe waste treatment, neutralisation and disposal;
- encouraging enterprises implementing programs of ecological modernisation of production;
- implementation of international ecological standards, systems of proving the observance of ecological standards and putting these systems into line with the international systems.

The adoption of these legal acts will provide quality improvement of environmental safety level when handling wastes from livestock sector of the Leningrad Region

Before the adoption of above mentioned changes in the federal environmental legislation by the State Duma and taking into account problems relevant to the treatment of wastes of livestock and poultry sectors (manure and dung) in the Leningrad Region, it is reasonable to apply the local

legal act – the Standard of the enterprise (Technological Regulations of manure treatment and disposal).

The procedure and the order of introduction of the document "Standard of the enterprise. Technological Regulations of manure treatment and disposal as an organic fertilizer" have been already worked out at the number of enterprises of the Leningrad Region (CJSC "Pedigree farm "Pervomayskoe", CJSC "Agrokomplex "Oredezh", LLC "Livestock Complex "Bor", CJSC "Pedigree plant "Agro-Balt", CJSC "Pedigree Plant "Krasnoarmeyskiy", etc.). The introduction of the Technological regulations allows to create the efficient system of production control of manure and dung treatment into fertilizers at the enterprise. In compliance with the Russian Federation legisl ation, the Technological Regulations have the status of the local legal document developed taking into account all HELCOM requirements relevant to the environmental safety. The Technological Regulations of manure (dung) treatment and disposal should be developed individually for each farm taking into consideration the volume and parameters of the feedstock, the availability and structure of agricultural land, the current crop rotation, availability and type of agricultural machinery. As practice shows, introduction of the Technological Regulations at a particular enterprise leads to reduction of nitrogen and phosphorous losses by 30% and more.

For the complete coverage of large agricultural farms of the Region by the system of the Technological Regulation of manure treatment it is necessary to adopt the regional normative legal act stimulating owners to develop these documents.

Conclusion

Livestock farming in the Leningrad Region is a dynamically developed sector of economy , the share of which in the gross regional product has increased in the recent years. The predominance of large-scale commercial production sector coupled with a high degree of depreciation of constructions for manure storing stipulates the urgency of the problem of excessive nutrients input from the agricultural sector. The results of numerous investigations conducted within the framework of national and international projects showed the low efficiency of the approach to the problem solution by means pf supporting environmental activities at individual farms. The necessity of implementation of institutional reforms in the field of livestock waste management both at the enterprise level as at the level of authorities of different levels is imminent in the sector.

Introduction of the Technological Regulation of manure and dung treatment at all large livestock enterprises of the Leningrad Region allows to decrease considerably the nutrients load on the

Baltic Sea and to exclude the agricultural sector of the Region from the HELCOM's list of "hot spots".

1.3. Kaliningrad Region

1.3.1. Hot spot № 49 "Sovietsk PPM"

1.3.1.1. History of the enterprise development

The Sovietsk Pulp and Paper Mill is located in the town of Sovietsk on the left bank of the Neman River (Figure 16). It was founded at the beginning of the 20th century. In 1946 it was restored and put into operation.

By the late 1980s, the Mill produced annually about 130 thousand tons of sulphite cellulose and 35 thousand tons of different types of paper. Four paper machines at the Mill were installed at the moment of its creation and were modernised in 1970s-1980s. The Mill's production came mainly into the domestic market of the Soviet Union.

In 1990s the water for production purposes was supplied from the Neman River in amount of about 35 mln. m^3/year, the used water in amount of about 34 mln. m^3/year was discharged into the Neman River.

The enterprise had a certain water treatment system, but its efficiency was low. Therefore, the enterprise was included into the HELCOM's list of "hot spots".

In Soviet times the construction of off-site treatment plant with the capacity of 169 thousand m^3/day (the construction was began in 1983) was planned on the basis of the state investments.

However, the allocated funds and construction capacities available in the Kaliningrad Region at that time did not allow to finish the construction in the planned period that led to destruction of unfinished facilities. In 1992 the funding was completely ceased and construction of the treatment plant was suspended.

Understanding the inability of prompt solution of the problem of finishing the construction of the sewage treatment plant and the necessity to meet the HELCOM Requirements on the Baltic Sea water protection, as one of the ways of solution of the environmental problems faced by the Mill, the Board of Directors made a decision to reorganize the existing enterprise with full liquidation of one of cellulose production unit (pulp shop №1) that would reduce the water supply, water discharge and discharge of pollutants by 50%.

To reduce the negative impact on the environment, the technical policy was implemented at the Mill to promote the ecologically safe technologies. From 1994 the production of corrugated cardboard and corrugation boxes was started on the vacated areas of the Mill. In 1998 the shop was put into operation.

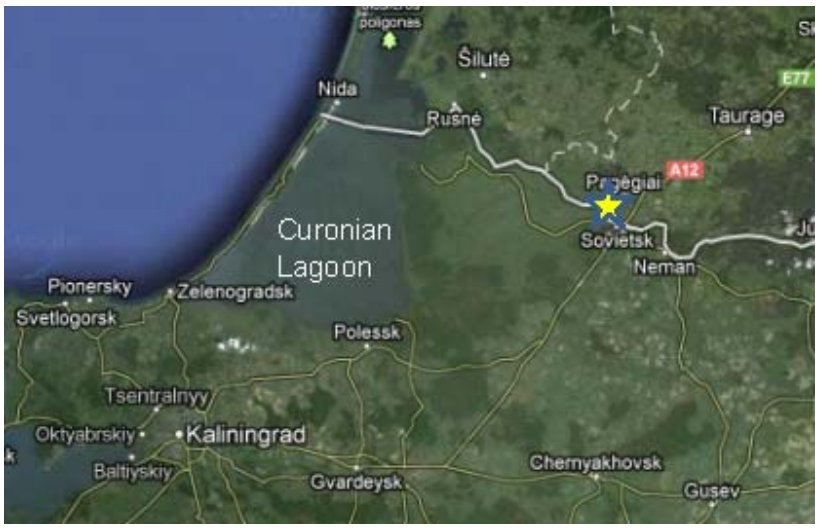


Figure 18 – Location of the Sovietsk PPMn

In 2000-2001 the modernisation of paper-making machine №2 (one of 3 available machines) was done with its realigning to paper production for corrugating and cardboard for plane layers of corrugated cardboard. The costs for modernisation of paper-making machine amounted to 17.410 mln. rubles.

Figure 19 – Paper-making machine of the Sovietsk PPM (photo is dated 2006)

The combined heat and power plant (CHPP) was the most significant stationary source of air pollution in Sovietsk. The zone of influence of hazardous substances emission with flue gases spreads over the whole territory of the town and the neighbouring Republic of Lithuania.

Originally the combined heat and power station was operated on coal (steam boilers № 1-4) and fuel oil (steam boilers № 5-8), from January 2002 the coal burning was ceased and CHPP conversion into gas fuel and oil as a reserved fuel was started. Currently, CHPP is leased by the municipal enterprise of Sovietsk.

After the conversion of boilers №7 and №8 to a natural gas, the amount of sulphurous anhydride, nitrogen oxides and oil ash emitted with the flue gases has reduced.

However, the problem of the ash dump formed in previous years (Figure 18), which is located in the north-western part of the Mill's area at the distance of 850 m from the wood-preparation shop, remained unsolved. From 1970 it was used by the Mill as a precipitation tank of hydraulic ash removal (mechanical treatment of ash slurry of CHPP) and occupied the area of 10 hectares banked with the dyke along the perimeter and equipped with wells for discharge of ash clarified after precipitation.

The main part of the ash dump consists of ash formed from the combustion of coals of Lvovsk-Volynsk origin.

From 1999 to 2001 Vorkutinsk coal was used. The volume of ash accumulation amounted to 563 024 tones.

In 2002, due to CHPP transfer of to the fuel oil, the discharge of ash pulp into the precipitation tank was stopped and the discharging wells were liquidated.

Figure 20 – Ash dump of the Sovietsk PPM (photo is dated by 2006)

At the end of the precipitation tank operation, the natural reclamation of the ash dump occurred. The area had covered with grass and bushes, typical for natural biotopes of the coastal zone of the Neman River.

The Mill administration considered several ways of ash utilization as a raw material for cement production. The nearest potential ash consumer was the cement plant in the Leningrad Region. However, the delivery of ash there by the railway with the existing tariffs would be unprofitable for the Mill.

A serious work has been done to solve the problem of the local treatment of sewage water from the Mill sectors and shops with its subsequent transfer to the biological treatment plant and bringing up the water quality to the standards required for fishery water bodies of the highest category (e.g. the Neman River).

The Mill implemented a number of technical measures of environmental direction:

- transition from ammonia to 100% sodium base for production of sulphite cooking acid that allowed to reduce nitrogen concentration in sewage water by 86 t/year;

- preparation of sodium hypochlorite for cellulose bleaching instead of calcium hypochlorite to eliminate sludge formation;

- installation of the unit for capture of sulphurous anhydride during the process of desulphitation of cooking liquor before feeding for further processed. Recycled sulphur anhydride was used to make the acid liquor used in the bleaching process at the last stage (acid treatment);

- survey of water consumption and water discharge of OJSC "Sovietsk PPM" and development of measures to reduce the water consumption, water discharge and amount of pollutants discharged from the industrial area of the Mill to the Neman River;

- water recycling and reuse in the technological process were increased.

During the cellulose bleaching process, a great attention was paid to increasing the water use in recycling. Thus, for pulp washing and dilution the warm water from the fourth turbogenerator of CHPP was used (in amount of 500 m^3/hour).

In 2004, the scheme of reuse of recycled water from the vacuum-filter №7 (in amount of 175 m^3/hour) was implemented. As a result of the overhaul of draining section, the improvement of the washing cellulose quality in drainers became possible, and conversion of two thickeners №5 and №6 in the cleaning section of unbleached cellulose to the operating regime of detarrers allowed to improve the washing quality in the cleaning section.

Due to the high-quality washing in the cleaning section, the tar content in the pulp significantly decreased. This allowed to use recycled water (filter from the vacuum-filter №7) instead of the fresh water at the stage of dilution of the fibers in the bathtub of the vacuum-filter №7 without reduction of the bleaching quality. The costs of these measures amounted to 0.307 mln. rubles.

The overhaul of drainers №1-9 was carried out, that allowed to reduce the suspended matter concentration in the sewage water to 60 mg/l specified in the regulations of the technological process.

As a result, the water consumption for the production needs from the Neman River constituted 24.8 mln. m^3/year and the water discharge – 22.6 mln. m^3/year.

After 2004, the Mill continued to implement plans of development.

In 2007, the complex project of Mill reconstruction with transition to the viscose cellulose output was developed. However, in June 2008 there was a fire at the Mill, which inflicted the irre-

versible damage to the Mill. By the decision of the Board of Directors of 01.07.2008, the cellulose production at the Mill was suspended. Paper, corrugated cardboard and packaging were produced from the finished cellulose transported from the Arkhangelsk Region. The accumulated paper stuff and imported waste paper were used as a raw materials in production.

In June 2009, in view of significant account payable at the enterprise and inability to pay it off at the expense of the current activities, the General Meeting of Shareholders of the company made the decision on the voluntary liquidation of the legal entity "Sovietsk PPM". Liquidation proceeding has not been completed yet. The property of the Mill, including the territory, was sold or transferred to rent to various legal entities.

Thus, the production capacities of the former Sovietsk PPM are owned by the OJSC "Atlas-Market" in accordance with the agreement of 01.10.2010. OJSC "Atlas-Market" produces napkins from imported bleached paper, paper for production of corrugated products, paper-basis, cardboard from imported paper stuff and corrugated cardboard from the own cardboard.

The production volumes as well as the water consumption and discharge (Figure 19) were significantly decreased (approximately by 10 times). Discharge of pollutants formed during paper production (tarry matter, lignin, methanol, phormaldegyde, chloroform, ions of acetic acid, acetone, phenols) was totally ceased. Only three outfalls to the Neman River remained instead of five: the main outfall (backwater) and outfalls of the energy-generating shop and CHPP, working currently on the fuel oil.

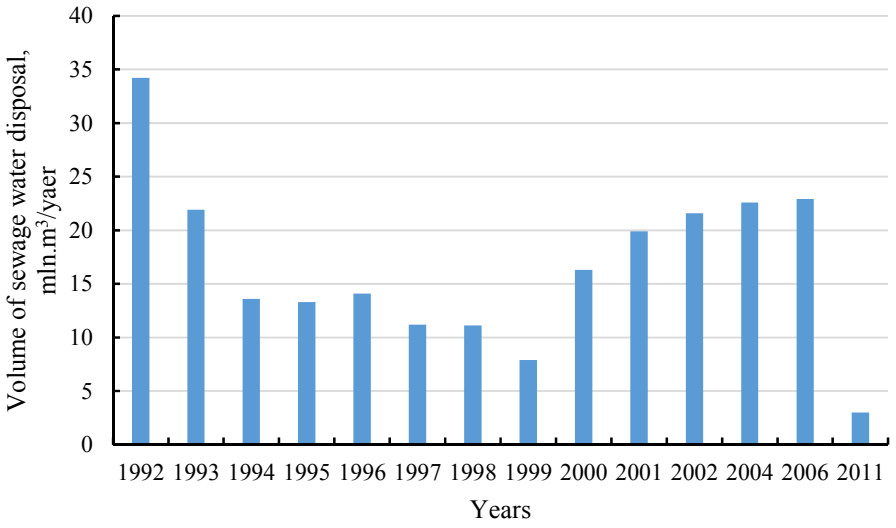


Figure 21 – Volume of sewage water of the Sovietsk PPM during the period from 1992 to 211

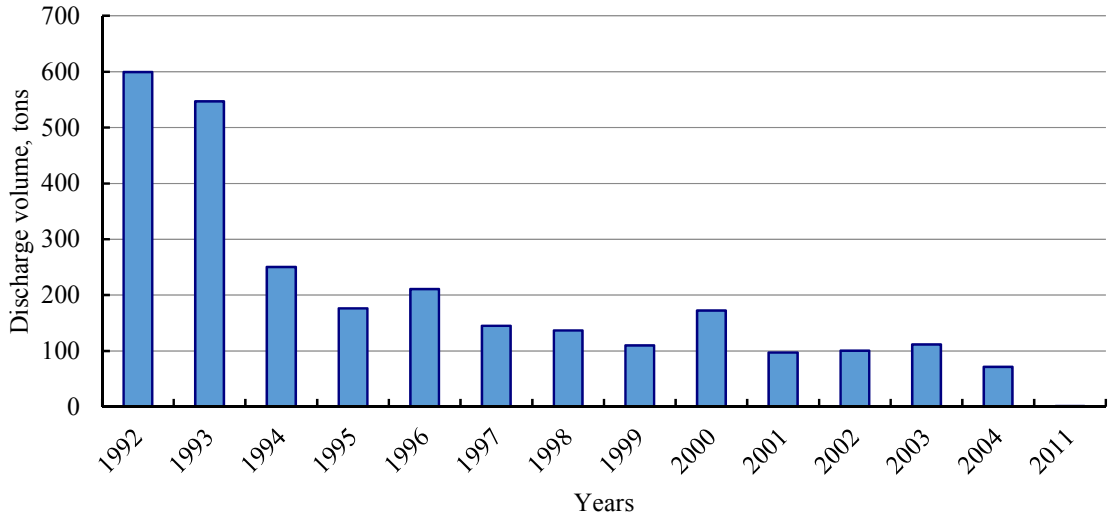


Figure 22 – Input of the total nitrogen to the Neman River with the sewage water from the Sovietsk PPM, tons/year

In 2011 the Mill discharged 3 047 400 m^3 of water after mechanical treatment only. The discharged water volume was estimated on the basis of special technological standards of the sewage water formation per unit of production. The following pollutants were discharged with the sewage water (tons):

- BOD_5 – 48.8;
- COD – 254.5;
- Total phosphorous – 0.074;
- Total nitrogen – 0.974.

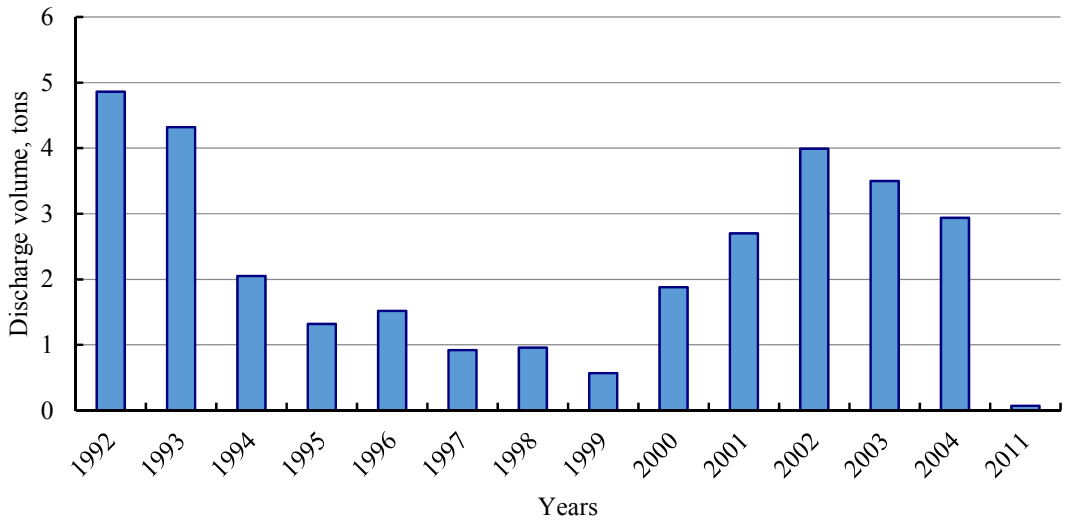


Figure 23 – Input of the total phosphorous to the Neman River with the sewage water from the Sovietsk PPM, tons/year

In addition, 7.131 tons of nitrogen oxides were emitted into the atmosphere.

The OJSC "Atlas-Market" has obtained all permitting documents for water use, emissions to the atmosphere and wastes treatment.

The OJSC "Atlas-Market" developed the "Program of the sewage water quality analysis, regular observations in the water body and its water-protection zone" of 06.07.2011, valid until 31.12.2013, with approved list of pollutants subject to analysis in the sewage water of the enterprise and monitoring points of the Neman River, which are typical for the current production of paper and cardboard from the imported raw materials.

Assessment of the water contamination level of water body resulted from the activity of the OJSC "Atlas-Market" was performed at the point 50 m downstream the last Outfall №2 (backwater) at the distance of 57.7 km from the mouth of the river, since the Outfall of ME "Vodokanal" is located further downstream.

Table 35 – Results of the water monitoring of the Neman River in 2012 at points of influence of sewage water of OJSC "Atlas-Market"

Ingredients	Outfall №1 (main) The Neman River at the discharge point of the Outfall № 1			Outfall № 2 (backwater) The Neman River at the discharge point of the Outfall № 2		
	24.07.	02.10.	average	24.07.	02.10.	average
	mg/dm^3			mg/dm^3		
pH	-	8.15	-	-	7.76	-
Suspended matters	14.0	19.0	16.5	15.0	15.0	15.0
BOD_5	3.4	13.4	8.4	2.3	5.0	3.7
COD	33.0	69.0	51.0	26.0	35.0	30.5
Chloride-ion	18.3	18.2	18.3	37.0	23.9	30.5
Sulphate-ion	16.7	22.7	19.7	21.0	22.7	21.9
Ammonium nitrogen	0.51	0.36	0.44	0.42	0.36	0.39
Nitrate nitrogen	0.26	0.15	0.20	0.46	0.77	0.62
Nitrite nitrogen	< 0.002	< 0.006	< 0.006	0.021	< 0.006	0.021
Total nitrogen	0.92	0.63	0.78	1.04	1.27	1.16
Phosphate Phosphorous	< 0.016	0.02	0.02	< 0.016	0.034	0.034
Oil products	0.011	0.130	0.071	0.015	0.013	0.014
Iron	0.122	< 0.05	0.12	0.19	0.09	0.14
Phenol (mkg/dm^3)	1.30	0.80	1.05	0.57	0.70	0.64

The OJSC "Atlas-Market" conducts investigations of the water of the Neman River in the zone of the sewage water impact in accordance with the adopted monitoring program. The monitoring results for 2012 are given in Table 36. The Table shows values of water indicators of the Neman River at points of sewage water discharge from three outfalls, 100 m upstream the top outfall and 50 m downstream the last outfall.

In 2012 the monitoring was carried out only twice, so any exact conclusions concerning the level of the enterprise impact upon the Neman River hardly could be made. However, even these results indicated the trend that the limits exceeding by 5-10% is observed for almost all indicators at 50 m downstream, while phenol exceeds the limits by about 300%.

The amount of production and consumption wastes at the enterprise constituts 400 t per year, including 70% of packaging polyethylene from the wrapping of transported waste paper. The wastes of IV and V class of hazard are transferred to the landfill.

1-outfall № 1 (main); 2 – outfall № 2 (backwater); 3 – outfall № 3 (after energy shop); 4 – control point 100 m above the outfall № 3; 5 – control point 50 m below the outfall № 2.

Figure 24 – Location of ash and bark dumps and water monitoring points of the Neman River near the outfalls of the OJSC "Atlas-Market"

Table 36 – Results of the water monitoring of the Neman River in 2012 at the points of influence of sewage water of the OJSC "Atlas-Market" (continue)

Ingredients	Outfall№ 3 (after energy shop) The Neman River at the discharge point of the outfall № 3			The Neman River 100 m above the discharge of the outfall № 3			The Neman River 50 m below the discharge of the outfall № 2 (backwater)		
	24.07.	02.10.	average	24.07.	02.10.	average	24.07.	02.10.	average
	mg/dm^3			mg/dm^3			mg/dm^3		
pH	-	7.06	-	-	8.1	-	-	8.05	-
Suspended matters	6.9	10.8	8.9	18.0	12.0	15.0	17.0	14.4	15.7
BOD_5	3.1	4.2	3.7	4.1	2.6	3.4	3.5	3.9	3.7
COD	28.0	47.0	37.5	31.0	27.0	29.0	30	30	30
Chloride-ion	17.2	16.9	17.1	16.2	17.9	17.1	23	20.2	21.6
Sulphate-ion	19.0	23.3	21.2	18.9	21.2	20.1	19	22.4	20.7
Ammonium nitrogen	0.47	0.31	0.39	0.43	0.31	0.37	0.41	0.40	0.41
Nitrate nitrogen	0.37	0.28	0.33	0.33	0.14	0.23	0.31	0.38	0.35
Nitrite nitrogen	0.010	< 0.006	0.01	0.012	< 0.006	0.012	0.012	< 0.006	0.012
Total nitrogen	1.14	0.86	1.00	0.90	0.54	0.72	0.85	0.90	0.88
Phosphate Phosphorous	0.065	0.031	0.048	0.02	0.031	0.0255	<0.016	<0.016	<0.016
Oil products	0.011	0.076	0.044	0.007	0.009	0.008	0.012	0.013	0.013
Iron	0.14	< 0.05	0.14	0.20	0.05	0.13	0.13	<0.05	0.13
Cooper	-	-	-	0.012	0.006	0.009	0.013	0.006	0.010
Manganese	-	-	-	0.07	0.023	0.047	0.043	0.015	0.029
Zinc	-	-	-	0.011	0.011	0.011	0.009	<0.005	0.009
Nickel	-	-	-	< 0.001	<0.001	<0.001	< 0.001	<0.001	<0.001
Phenol (mkg/dm^3)	0.47	0.80	-	0.71	0.46	0.59	2.50	0.90	1.70

1.3.1.2. Characteristic of the area of the bark dump location of the OJSC "Sovietsk Pulp and Paper Mill"

The bark dump (Figure 23) is located in the floodplain of the Neman River in 350 m to the west from the wood-preparation shop of the OJSC "Sovietsk PPM".

Figure 25 – Bark dump of the Sovietsk PPM

The bark dump operated since 1946. Its storage area is 7.0 hectares, the amount of accumulation is about 600 000 t. Bark was accumulated as a result of technological debarking of the fir-wood. After putting into operation the utilisation boiler house in 1972 , the bark was used as a fuel. Percentage of bark burning in 2003 amounted to 95%. Unused bark was transported to the bark dump, stored in bulk and then pressed with a bulldozer. The results of bio-testing bark sampled from the surface and at the depth of 5 m indicated the V class of waste hazard.

In 2005, the program of the bark dump monitoring was developed.

Since 2008, the bark dump liquidation had begun at the enterprise. the enterprise. Initially, the bark delivery to Finland was organised. However, the delivery was ceased because of the presence of many admixtures in the bark.

Later on, the Danish line for bark briquetting with capacity 1.5 t/hour was purchased and mounted. Currently it works in a test mode.

Simultaneously, the negotiations are carried out with the Lithuanian companies for bark sorting and delivery to Lithuania in amount of 5-7 thousand t/month. The Russian innovation company OJSC "Razvitie" is interested in the raw material for own production of carbon. If all plans of plant's administration for bark recycling are implemented, the bark dump will be liquidated during the next 10 years.

Conclusion

The estimation carried out on the basis of the previous reports and presented in the graphic form indicate that the input of nutrients resulted from the operation of the former Sovietsk PPM have been reduced to a such low level, that allows to request deleting this enterprise from the HELCOM's list of "hot spots".

1.3.2. Hot spot № 50 "Neman PPM"

1.3.2.1. History of foundation and development

The enterprise is located at the border with Lithuania on the Neman River in 76 km upstream from the Curonian Lagoon of the Baltic Sea (Figure 24).

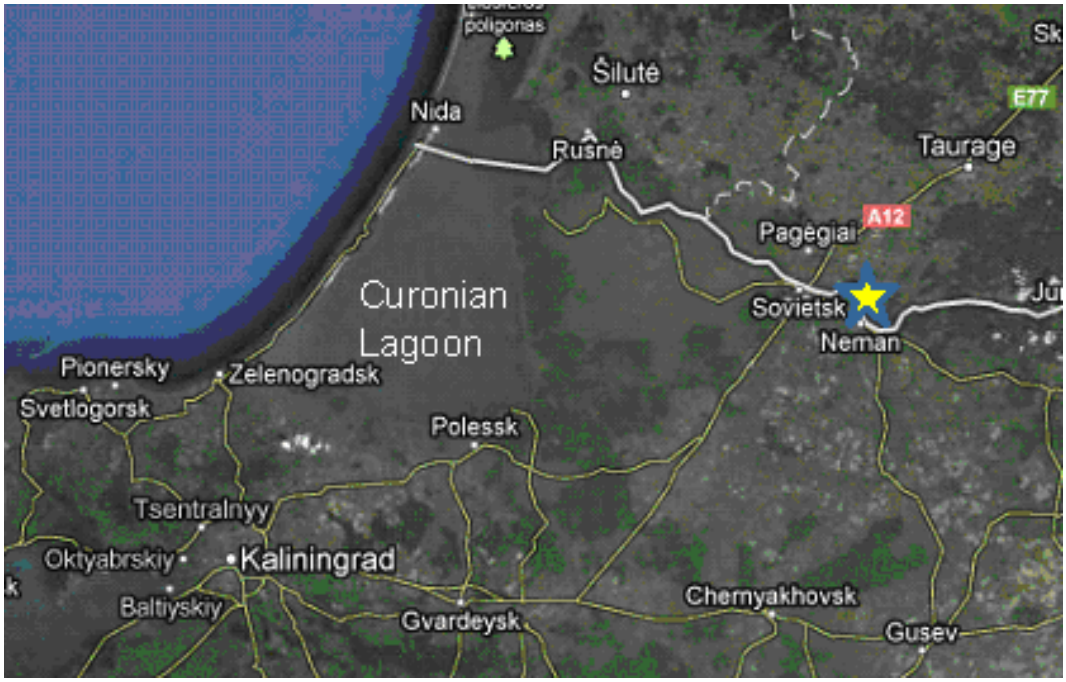


Figure 26 – Location of the Neman PPM

The Mill was created on the basis of the German Paper Mill founded in 1912. During the Second World War the Mill was destroyed and was rebuilt in 1946, when pulp and paper production output was started.

In the subsequent operation period, reconstruction and technical modernization of individual production areas were implemented (replacing of cookers, individual bleaching towers; construction of evaporation station and some other facilities).

The Mill is a socially important enterprise of the Kaliningrad Region. It is the main town-forming enterprise of Neman with population of more than 13 thousand of people making a significant contribution to the budget of the Kaliningrad Region.

The amount of pollutantsdischarged with the sewage water into the river was estimated in 1990 and constituted approximately (tons/year):

- BOD_5 – 5300,
- Total nitrogen – 2700,
- Phosphorous – 14.

The following amount of pollutants was emitted annually into the atmosphere as a result the Mill's activities (tons/year):

- Sulphur dioxide – 4569,
- Carbon black – 400,
- Carbon monoxide - 1268.

In 1990s the Mill developed some plans of reconstruction of the enterprise and implementation of some environmental measures. However, because of the crisis in the country, the Mill worked irregularly and the environmental measures were not implemented.

1.3.2.2. The period of operation within the North-West Timber Company

In September 1999 the Mill was bought by a new owner – the North-West Timber Company (NWTC) which started to reconstruct and modernize the plant on the basis of the best available technologies and international requirements of environmental safety of production.

During the period from 1999 to 2000, major investments were aimed at running the plant after a long-time idle period (urgent current repair, overhaul and ensuring of stable operation of the system of maintenance and preventive servise of environmentally hazardous equipment)

NWTC had started to reconstruct and modernize the Neman PPM on the basis of the best available technologies and international requirements of environmental safety of production The NWTC managers from the very beginning took the course to reconstruction of existing production taking into account the current requirements for environment protection. The research was fulfilled to develop the project of the Mill reconstruction and modernization in accordance with HELCOM requirements concerning application of the best available technologies. The investment project "Modernization of manufacturing paper and paper stationary products at PPM to improve the environment in the Neman Town" was developed. To substantiate this project, the "Environmental impact assessment (EIA)" was made, which passed the state environmental examination in the State Committee of Environment Protection of the Kaliningrad Region. The expert commission concluded that implementation of the planned environmental activities in the Neman PPM indicated in EIA would ensure observance of the pollutants discharge standards in compliance with the HELCOM recommendations.

Further, the following works aimed at protection of the Neman River were fulfilled:

1) In 2000 the ammonium base was totally replaced with sodium in the sulphite method of cellulose cooking thet eliminated the main source of excessive concentration of ammonium nitrogen in the sewage water of the Mill. This allowed to reduce significantly discharge of ammonium nitrogen to the Neman River (up to 4.90 mg/l in 2001). At the end of 2000, sulphite pulping was replaced with a modified bisulphite, which increased the cellulose output and led to reduction of organic matter concentrations in the cooking liquor and consequently in the sewage water of the Neman PPM.

2) The transition to the new bisulphite cooking on the magnesium base. It also allowed to reduce the amount of organic matter penetrating from wood into liquors during cooking. After construction of facilities for liquors incineration and chemicals regeneration from flue gases, full disposal of the liquor organic fraction became possible by means of its incineration with simultaneous production of steam and regeneration of cooking chemicals.

3) Installation of three pressured flotation snares CPS-18, produced by the international company «KWI. Ipc", in the paper shop № 2 . This allowed to reduce the fresh water consumption by 48.4 m^3/hour and to decrease the fiber discharge by 70.1 kg/hour. The efficiency of the sewage water treatment was 97-99%.

4) During the period from 2001 to 2003 three similar flotators were installed in the paper shop №1.

5) The grinding unit of half-finished products was put into operation (the environmental effect - 550 thousand m^3/year of the fresh water was saved)

6) During the period from 2001 to 2002 reconstruction and testing in operating mode of the vacuum evaporation unit led to reduction of organic matter discharge by 80 tons/year in 2002 .

7) To eliminate probable emergency emissions of sulphur dioxide into the atmosphere, the old exhausters in the acid sector were replaced with new in 2001.

8) The project of gas-impulsive cleaning of cookers of the Mill was developed by the LLC "Energomash" (St.-Petersburg).

9) Reconstruction of salvage cooker-room and installation of the cooker unit with the capacity of 20 MW operating on the bark and wood wastes of the Neman PPM obtained during debarking of wood (bio-fuel). The ecological effect – prevention of contamination of the Neman PPM territory with wood wastes as well as production of extra energy.

By 2002, the Mill production capacities were restored to 75% of the designed capacity.

In 2003, the construction of the join treatment plant both for the Neman Town and the Neman PPM was begun. It was implemented under the draft tripartite agreement between the Administration of the Kaliningrad Region, Administration of the Municipality "Neman District of the Kaliningrad Region" and the Neman PPM with the aim to fulfill decisions of interagency meeting on issues related to observance of the environmental regulations requirements.

The first phase of the project included installation and testing the pilot station of biological treatment of sewage water of the Neman PPM and municipal sewage water of the Neman Town. It was a compact industrial unit for treatment of highly contaminated sewage water of pulp industry and consisted of:

- pressured flotation unit on the basis of the flotator snare of "KWI SediDAF" (physical-chemical treatment phase);

- bio-reactor produced by "KWI" company (sewage water treatment phase using activated silt).

The Station was put into operation on 23 September 2003 and had been successfully tested.

The Austrian company "KWI" prepared the feasibility study of the treatment plant project . The designed capacity of the treatment plant was 48 thousand m^3/day. According to the project, the facilities consisted of eight main units that allows to discharge even cleaner water as compared to

the water taken by the company from the Neman River. More than 70% of cleaned water should be returned to the production process for reuse.

Two different approaches were used in designing the drainage system:

а) for the local in-shop treatment facilities, concentrated sewage water treatment was provided without dilution for the purpose of maximal removal of fibers and keeping the temperature of the water transported for reuse.

б) for treatment facilities outside the shop, cleaning of combined sewage water, including all excess water of the Mill, surface run-off from the Mill's territory and municipal sewage water of the Neman Town, is recommended.

The adopted technological scheme of the water treatment facilities construction at OJSC "Neman PPM" with the designed capacity of 48 thousand m^3/day was based on the combination of physical-chemical (flotation with reagents using), biological, adsorption and filtration methods of sewage water treatment. To treat the sewage water, three technological work flows were proposed, including the following for each of them:

- sewage water balancing in the balancing reservoir with mechanical and aeration mixing during 6 hours;
- removal of sand and coarse admixtures in hydrocyclones;
- physical-chemical treatment on pressure flotation units;
- biochemical treatment in bio-reactors of continuous action during 12 hours;
- removal of suspended matters on pressure flotation units;
- neutralisation in ultraviolet treatment units;
- deep post-cleaning of the treated water in automatic filters with floating load;
- dehydration of formed sludge in the belt press-filter with subsequent incineration of the sludge in the "Turmalin"oven.

The quality of industrial sewage water transported to the treatment plant was assessed taking in account the local facilities putting into operation:

- local treatment of fiber-containing sewage water of paper production using pressure flotation;
- local treatment of fiber-containing sewage water of pulp production using pressure flotation;

- local treatment of sewage water of the bleaching shop using biochemical method and pressure flotation;

- local treatment of sewage water of the cooker using pressure flotation, sorption and filtration.

According to the calculations made, the efficiency of industrial sewage water cleaning from organic substances in the local equipment had to constitute 40-50% and from suspended matter – 95%.

The quality of the treated sewage water in terms of contaminants content after implementation of the project of the treatment plant construction had to be in line with MPCs for the water bodies of fishery importance.

The project has passed the procedure of the State environmental impact assessment at the Ministry of Natural Resources (MNS) of Russia in March 2004 (The order of MNS of Russia №278 dated 19.03.2004 "On adoption of the conclusion of the expert commission of the state environmental impact assessment "Feasibility study of investments in construction of the joint treatment plant of the LLC "Neman PPM" and Neman Town").

The project has been supported by the Russian program of investments to the environment improvement (RPOI), for which the main criterion of projects successful implementation is a real contribution into the promotion of economic and institutional reforms.

In 24 December 2003, the regular meeting of Supervisory Council (SC) of RPOI was hold , where the application of Vneshtorgbank for granting a sub-loan to RPOI for implementation of the investment project (IP) "Reduction of anthropogenic impact upon the Neman River by means of constructionof the treatment plant of the LLC "Neman PPM" and Neman Town" was considered. The Supervisory Counciladopted the decision to support the proposal of Vneshtorgbank and to prepare this project funding from non-allocated residual funds of RPOI.

In 2004, the project "Construction of the water treatment plant in the Neman Town as a real contribution of the North-West Timber Company into protection of the Baltic Sea" won the National Environmental Prize awarded by the Vernandsky Fund in the nomination "Eco-efficient investments".

During the period from 2002 to 2004, designing, development, introduction and certification of the integrated management system at the LLC "Neman PPM" were implemented, including the quality control system and management system in the field of environment protection in accordance

with the international standards ISO 9000 and 14000. The following certificates of conformity were obtained:

- certificates GOST R and IQNet certifying that the quality management system of the Neman PPM in respect to designing, development and production of roll-cellulose, imitation parchment, paper, paper-stationery products, fodder yeasts and technical lignosulphonates comply with the requirements of GOST R ISO 9001-2001 (ISO 9000-2000) for the period from 26.07.2004 to 26.07.2007;

- certificate of compulsory certification system in terms of ecological requirements (without indication of the field, i.e. for entire production in general) certifying that the environmental management system of the Neman PPM meets requirements of ISO 14001 for the period from 26.07.2004 to 26.07.2007;

- certificate IQNet certifying that the environmental management system of the Neman PPM in respect to designing, development and production of roll-cellulose, imitation parchment, paper, paper- stationery products, fodder yeasts and technical lignosulphonates comply with the requirements of ISO 14001-1996 for the period from 26.07.2004 to 26.07.2007.

In 2004, the project of gasification of the Neman District of the Kaliningrad Region has been developed. Conversion of the enterprise cooker to the gas allowed to use more ecologically safe fuel as well as to reduce the cost of production and further promote the development of programs of the Neman PPM modernization.

The beginning of gasification of the Kaliningrad Region was scheduled to November, 2004.

1.3.2.3. The results achieved by 2004

1. In the field of using the best available technologies:

1) Dry debarking is available. Sewage water discharge is absent.

2) Closed treatment is absent, however, it will be provided for in the plans of future modernization.

3) Neutralisation of weak liquors before evaporation with subsequent reuse of significant part of condensates in production is provided by the technology in the project "Reconstruction of the pulp industry with transition to cellulose cooking on the magnesium base".

4) The systems providing utilization of almost all organic matter dissolved in the liquors (liquors regeneration should reach 90%) are provided in the project "Reconstruction of the pulp in-

dustry with transition to cellulose cooking on the magnesium base with heat and chemicals regeneration".

5) Discharge from the bleaching process during cooking on the magnesium base is absent.

6) The two-step bleaching of discharged sewage water is presented in the investment project "Modernisation of paper and paper-stationery production at the Neman PPM for the purpose of environmental sanitation in the Neman Town".

7) The partially closed bleaching process for cooking on the sodium base is available.

8) Biodegradable chelate substances are not used during production.

2. The sewage water treatment (availability of the treatment plant applying the method of activated silt) is provided in the investment project "Modernisation of paper and paper-stationery production at the Neman PPM for the purpose of environmental sanitation in the Neman Town".

3. During the period from 2000 to 2003 the enterprise reduced sewage water discharges owing to the operating filters "Supratsell". The similar system had to be installed in the paper shop № 1 within the framework of the general plan of the Neman PPM reconstruction. In future it had to be installed at the sewage water line of the pulp mill. The emission reduction is provided in the project "Reconstruction of pulp production with transition to magnesium-bisulphate cooking". In October 2000 the Neman PPM switched from the sulphite method of cooking with the ammonium base to the modified bisulphite method with the sodium base and reduced the specific discharge of total nitrogen from 3.7 to 1.7 mg/l.

1.3.2.4. The current state

NWTC was unable to bear the credit load and the Mill again was sold to another owner.

Currently, 400 employees are working at the LLC "Neman Pulp and Paper Mill". The Mill produces offset paper based on cellulose imported from Finland, but is in the state of bankruptcy.

In 2011, the enterprise discharged 975.01 m^3 of insufficiently treated and 98.76 m^3 of untreated sewage water (the estimation was made on the basis of the sewage water volume per unit production). Thus, the total volume of discharged sewage water constitutes 1073.77 m^3/year. It has significantly decreased for the last five years (Figure 25).

The treatment plant is a flotation trap which allows to remove about 99% of suspended matter from the sewage water.

The following amounts of contaminants were discharged to the environment from the Mill with the sewage water (tons):

- BOD_5 – 7.165,
- COD – 26.918,
- Total nitrogen – 2.41,
- Total phosphorous – 0.

The volumes of total nitrogen and total phosphorous discharged in 1990s are presented in Table 37.

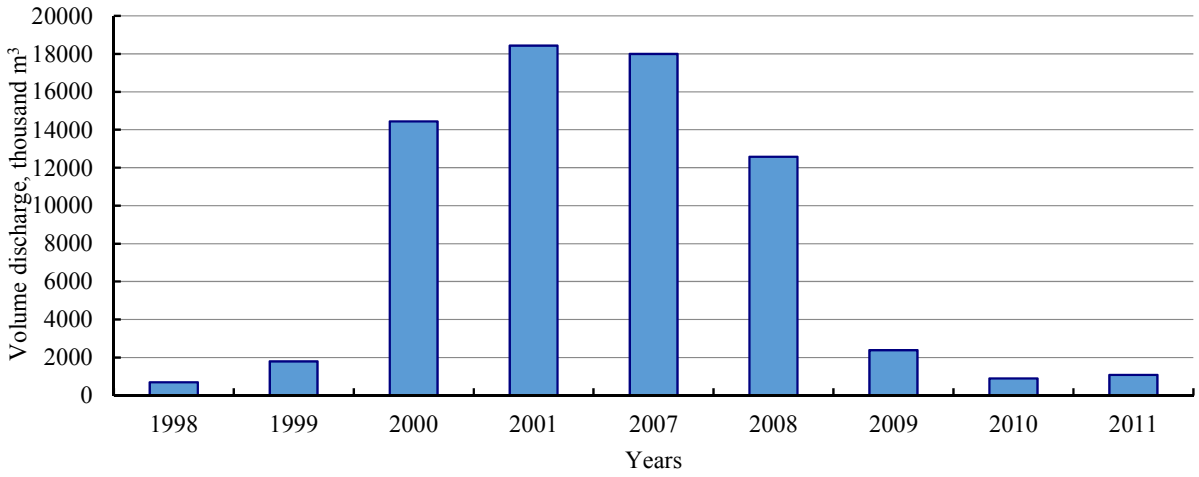


Figure 27 – Sewage water volumes of the Neman PPM during the period from 1998 to 2011

Table 37 – Volumes of discharged total nitrogen and total phosphorous, tons

Indicator	1993	1994
Total nitrogen	108.645	53.986
Total phosphorous	0.578	0.212

In 2011 the emissions of nitrogen oxides to the atmosphere was 27.23 tons.

As far as the Mill is in the state of bankruptcy no environmental projects have been developed there recently.

The results of monitoring of the water chemical indicators in the Neman River within the zone of the sewage water discharge from the Mill during the period from 2008 to 2012 are presented in Tables 38 and 39. It could be noted that almost all hydro-chemical indicators with sufficient series of observation data are about 10% higher on average at the distance of 500 m downstream from the

second sewage water outfall of the Mill as compared to the same indicators sampled at the distance of 500 m upstream the first sewage water outfall.

Conclusion

Analysis of information on the current production activities of the LLC "Neman PPM" and its negative impact upon the environment leads to the conclusion that in such state this enterprise is not a serious threat to the environment and can be excluded from the HELCOM's list of "hot spots". However, the uncertain legal status of the enterprise does not ensure that in the future it will retain the current level of impact to the environment.

Table 38 – The results of the water monitoring of the Neman River at the distance of 500 above the outfall № 1

Ingredients	Sampling date									
	03.04.2008	23.06.2008	17.06.2009	10.09.2009	24.11.2009	19.05.2010	19.05.2010	11.08.2011	04.06.2012	15.08.2012
BOD_5	2.4	6.3	3.2	3.6	3.7	2.9	4.1	7.35	-	4.5
Suspended matters	25.0	19.0	19.0	19.0	22.0	18.5	20.0	20.0	-	19.0
Solid residual	430	270	180	250	280	280	400	280	-	300
COD	35	41	24	30	30	30	30	30	-	30
Nitrite nitrogen	<0.005	0.007	0.009	0.0064	<0.0061	0.004	0.018	0.007	-	0.008
Total nitrogen	3.8	3.1	-	2.5	2.4	-	1.8	0.91	0.7	0.858
Ammonium nitrogen	0.452	0.351	-	0.84	0.40	0.39	0.38	0.39	-	0.39
Nitrate nitrogen	2.00	0.10	2.53	0.21	0.27	0.391	1.45	0.483	-	0.46
Phosphate phosphorous	0.013	<0.01	0.005	<0.01	<0.01	0.018	0.03	0.044	-	0.04
Fats and oils	<0.5	<0.5	-	<0.5	<0.5	-	-	-	1.5	-
Oil products	0.019	0.20	-	0.009	0.15	-	0.017	-		-
Formaldehyde	0.048	0.050	-	0.036	0.048	-	-	-	-	-
Furfural	0.019	0.017	-	<0.1	<0.1	-	-	-	-	-
Lignosulphonates	3.5	3.5	-	3.0	2.9	-	-	-	-	-
Acetate-ion	25.0	22.0	-	25.0	23.0	-	-	-	-	-
Sodium	28.0	17.0	-	27.0	25.0	-	-	-	-	-
Iron	0.58	0.58	-	0.52	0.60	-	0.20	-	0.113	-
Chloride-ion	24.3	18.8	26.5	18.8	47.0	46.0	14.8	45.0	-	56.0
Sulphate-ion	24.2	50.0	62.8	21.2	45.0	52.0	22.0	58.0	-	66.0
Methanol	0.85	0.90	-	0.81	0.80	-	-	-	-	-
Phenol	0.0009	0.001	-	0.001	0.0007	-	-	-	-	-
Ammonium ion	0.58	0.45	-	1.08	0.51	0.5	0.49	0.5	-	0.5
Anionic surface-active substances	-	<0.025	-	<0.025	<0.025	-	-	-	0.03	-
Non-ionic surface-active substances	-	0.19	-	0.19	0.20	-	-	-	0.58	-
Cupper	-	-	-	0.0004	<0.001	-	0.0024	-	0.0047	-
Manganese	-	-	-	0.010	0.0040	-	-	-	0.0440	-
Magnesium	-	-	-	0.035	24.0	-	-	-	17.1	-

Table 39 – The results of the water monitoring of the Neman River at the distance of 500 m below the outfall № 2

Ingredients	Sampling date									
	03.04.2008	23.06.2008	17.06.2009	10.09.2009	24.11.2009	19.05.2010	19.05.2010	11.08.2011	04.06.2012	15.08.2012
BOD_5	2,6	6,5	3,35	3,7	3,9	3,1	4,3	7,6	-	4,7
Suspended matters	31,0	24,0	21,0	22,0	25,0	20,0	25,0	22,0	-	21,0
Solid residual	490	300	190	290	320	300	420	290	-	320
COD	39	43	28	32	33	33	34	32	-	32
Nitrite nitrogen	<0,005	0,009	0,01	<0,0061	<0,0061	0,004	0,0195	0,007	-	0,008
Total nitrogen	4,0	3,4	-	2,9	2,8	-	2,1	0,911	0,84	0,951
Phosphate phosphorous	0,018	<0,01	0,006	<0,01	<0,01	0,018	0,03	0,045		0,041
Fats and oils	<0,5	<0,5	-	<0,5	<0,5	-	-	-	1,0	-
Oil products	0,020	0,21	-	0,007	0,15	-	0,017	-	0,006	-
Formaldehyde	0,050	0,055	-	0,04	0,048	-	-	-	-	-
Furfural	0,021	0,019	-	<0,1	<0,1	-	-	-	-	-
Lignosulphonates	3,7	3,8	-	3,0	2,9	-	-	-	-	-
Acetate-ion	28,0	26,0	-	27,0	24,0	-	-	-	-	-
Sodium	31,0	20,0	-	30,0	28,0	-	-	-	-	-
Iron	0,66	0,63	-	0,56	0,65	-	0,23	-	0,096	-
Chloride-ion	28,5	20,1	27,3	18,0	49,0	46,5	15,1	45,0	-	58,0
Sulphate-ion	29,0	54,0	63,5	19,3	50,0	56,0	24,6	62,0	-	70,0
Nitrate nitrogen	2,60	0,20	2,6	0,18	0,30	0,437	1,58	0,506	-	0,51
Methanol	0,88	0,95	-	0,80	0,80	-	-	-	-	-
Phenol	0,001	0,0011	-	0,001	0,0008	-	-	-	-	-
Ammonium nitrogen	0,476	0,445	-	0,81	0,41	0,406	0,38	0,42	-	0,437
Anionic surface-active substances	-	<0,025	-	<0,025	<0,025	-	-	-	0,047	-
Non-ionic surface-active substances	-	0,21	-	0,20	0,20	-	-	-	<0,5	-
Cupper	-	-	-	0,0001	<0,001	-	0,0024		0,0033	-
Manganese	-	-	-	0,011	0,0070	-	-	-	0,0340	-
Zinc	-	-	-	<0,004	<0,005	-	-	-	<0,005	-
Nickel	-	-	-	0,003	<0,001	-	-	-	-	-
Lead	-	-	-	<0,0002	<0,001	-	-	-	-	-
Aluminium	-	-	-	0,038	0,030	-	-	-	-	-

1.3.3. Hot spot № 67 "Sewage water treatment plant of Kaliningrad"

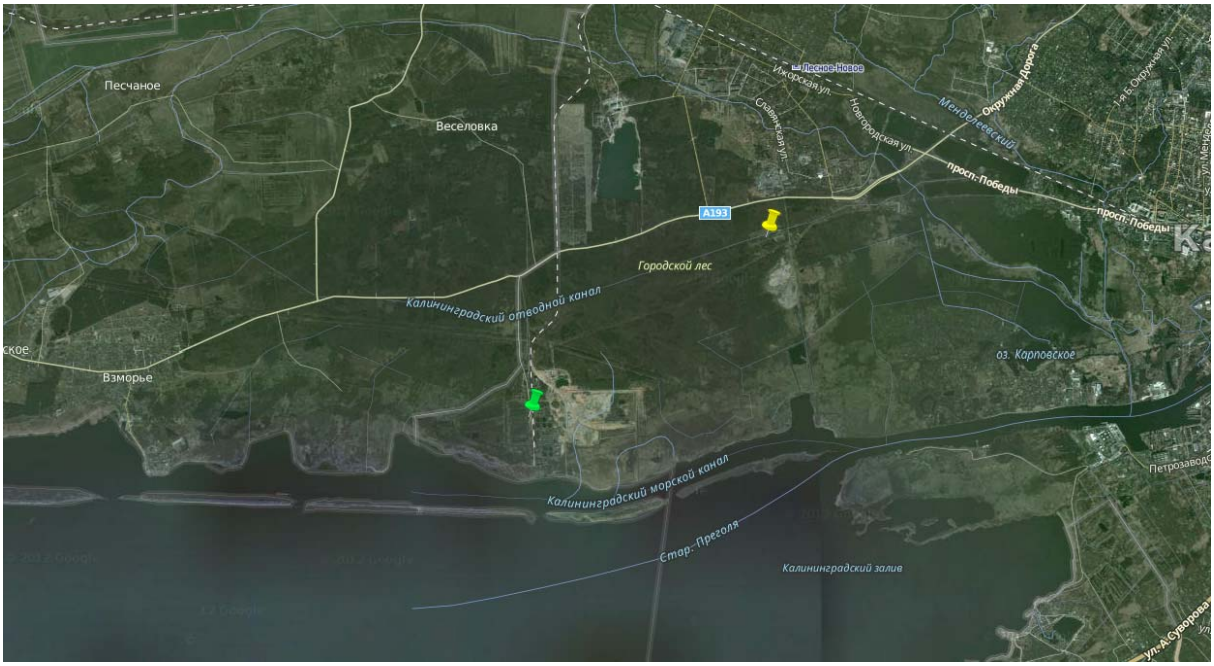
The sewage treatment plant of Kaliningrad is intended for municipal sewage treatment of Kaliningrad and is subordinated to the Municipal Unitary Enterprise of Communal Services (MUE CS) "Vodokanal" of the Urban District "City of Kaliningrad".

At present, the sewage water treatment system of Kaliningrad consists of the treatment plant of mechanical treatment, the main collector, sewerage network, sewerage pumping stations and sewerage pits.

The current sewerage system of the city is mostly represented by a branched network in the quarters, adjacent to the Pregel River, constructed on the basis of the combined sewerage system principle. Later on, in the new districts of the developing city the sewerage system was constructed on the basis of a separate scheme.. The majority of collectors is working under the same system and then transits to the combined sewerage system. The main collector is also in the combined sewerage system. Thus, the mixed sewerage system is working in the city.

Sewage waters of Kaliningrad are collected in thirty collectors and the tributaries network and are transported to the treatment plant by means of the main collector within of the city and by free-flow interceptor outside the city. There are aqueduct, several pipe subways and two sand traps in the main collector of the sewerage system.

Domestic sewage water from dwelling areas and industrial enterprises with the discharge about 160 - 180 thousand m^3/day is collected by the main collector situated along the Pregel River and discharged to the treatment plant of mechanical treatment located at the distance of 1 km from Kaliningrad and at the distance of 1.8 km from the Kaliningrad Maritime Channel (Figure 26) directly connected to the Vistula (Kaliningrad) Lagoon. The treatment plant of mechanical treatment was built in 1924 and was restored after the Second World War. The designed capacity of the treatment plant of mechanical treatment is 68 thousand m^3/day (Figure 27). After mechanical treatment at the treatment plant the sewage water is passing through the discharge channel and is drained into the Primorsk Bay of the Kaliningrad Lagoon almost without treatment (Table 40).



- location of the operated treatment plant of Kaliningrad;
- location of treatment plant under construction of Kaliningrad

Figure 28 – Location of the treatment plant of Kaliningrad

Figure 29 – Sewage water treatment station of Kaliningrad in 2004

Table 40 – Sewage water volumes discharged by the enterprise MUE CS "Vodokanal" during the period from 2007 to 2011

Year	Unit of measurement	Volume of polluted sewage water		
		Without treatment	Not enough treated	Total volume
2007	mln. m^3/year	6.06	6.06	52.20
2008	mln. m^3/year	5.72	46.03	51.75
2009	mln. m^3/year	5.35	46.69	52.04
2010	mln. m^3/year	4.10	48.04	52.14
2011	mln. m^3/year	4.00	50.19	54.19

The potential danger of the existing treatment plant of Kaliningrad results from the following reasons:

- obsolete and deprecated treatment facilities;

- the discharged water quality does not meet the requirements of the legislation of the Russian Federation;

- discharge of the sewage water after mechanical treatment in immediate proximity of the Vistula (Kaliningrad) Lagoon creates the probability of the negative impact upon the water quality in the Lagoon through the existing hydrological network (Clause 3 paragraph 2 of the Convention for the Protection of the Marine Environment of the Baltic Sea, 1992);

- the lack of treatment of the rainfall sewage water discharged through the storm water sewer to the Pregel River;

- pollution of the atmospheric air, the source of which is the discharge channel of the open type .

1.3.3.1. The environmental measures to improve the state of the hot spot implemented until 2004

In Semptember 2002 the contract was concluded between the MUE "Vodokanal" of Kaliningrad and the Swedish company "Sweco International" for providing consultancy services for the above mentioned project management and the company "VIA-Projekt" for providing consultancy services for designing and supervision of construction of sewerage treatment plant in Kaliningrad. The credit agreement for the project entered in force on 04.03.2002. In 2002 within the framework of the project implementation, the survey of previously constructed concrete facilities in the site of the sewerage treatment plant and the lower part of industrial collector was fulfilled with the report preparation.

In 2002, within the framework of the Federal target program of the Kaliningrad Region development during the period up to 2010, the works on industrial collector construction to transport sewage water of the city to the treatment plant were resumed. In 2003 relocation of the pressure header and repairing of sand trap were implemented.

Within the framework of the implementation of the project "Reconstruction of water supply system and environmental protection of the Kaliningrad City" the following funds were allocated in 2003:

- to complete construction of the sewerage treatment plant and pumping station of sewage water pumping - U$ 0.450 mln;

- to complete the construction of the lower part of the new collector from the well №5 to the main pumping station and pressure header - U$ 0.127 mln..

1.3.3.2. The environmental activities to improve the state of the hot spot implemented after 2004

1) Construction of the new treatment plant

Due to necessity to modernize the water supply and discharge systems, the Administration of the Kaliningrad Region, Mayor of Kaliningrad and the managers of the enterprise made a decision to attract the funds of the European Bank of Reconstruction and Development to invest the international project "Reconstruction of water supply system and environmental protection of the Kaliningrad City". The facilities construction is a part of the action plan for the Baltic Sea of the Helsinki Commission on Protection of Marine Environment of the Baltic Sea (HELCOM) in the Kaliningrad Region. The construction and installation works are to be carried out within the framework of the Federal target program of development of the Kaliningrad Region during the period up to 2015 using funds of the federal, regional and local budgets. The facilities construction cost after tendering amounted to 1381 mln. rubbles. The volume of assimilated funds as on 01.02.2013 constituted 1 087 940 thousand of rubbles.

The treatment plant under construction is located at the distance less than 1 km from Kaliningrad MaritimeChannel directly connected with the Vistula (Kaliningrad) Lagoon (Figure 26).

Municipal building owners are the Committee of Architecture and Building of the City Hall of Kaliningrad and the MUE CS "Vodokanal".

The general contractor of the construction is OJSC "Mostostroitelny Trest" №6 (St.-Petersburg).

The construction of these facilities was began in 1976 and currently is implemented on the basis of the design documentation developed in 2007, which corresponds to the Russian legislation and HELCOM regulations for sewage water treatment. The Project envisages the construction of several buildings and constructions implementing for stepwise treatment of sewage water, external networks and improvement and planting of the territory.

The construction starting date was fixed on August 2009 and the completion of works under the contract – on 20.12.2011, but by the decision of the Arbitration tribunal the period of construction was extended to 20.12.2012. The date of the construction completion is defined in October 2013. The precommissioning period constitutes 6 months.

The treatment plant operation sheme is based on the anaerobic-anoxide-aerobic treatment method and includes full biological treatment of sewage water by means of nitrification-denitrification and dephosphating processes and post-treatment. The sewage water neutralisation is planned to carry out by the ultraviolet method. The treated sewage water will be discharged through the scattering outfall to the Kaliningrad Maritime Channel. The sludge treatment includes dehydration, neutralisation and dehelmintization. The project envisages the additional number of emergency sludge sites able to accept 255 000 m^3 in the case of emergency or during precommissioning It is planned to use the newest scheme of internal water recirculation in aeration tanks of the treatment plant.

The designed capacity of the sewerage treatment plant under the construction will be 150 000 m^3/day with possibility to increase its capacity in the future. The technological characteristics of the treatment plant under construction are given in Table 41.

Table 41 – Technological characteristics of the treatment plant under construction in Kaliningrad

Characteristic	Unit of measurement	Value
Volume of accepted sewage water:		
Daily	m^3/day	150 000
Average	m^3/h	6750
Maximal	m^3/h	9650
Amount of mud (suspended and dissolved matters)		
Inflow (before treatment)	mg/l	206
After passing the water treatment	mg/l	3
BOD (Biological Oxygen Demand)		
Inflow (before treatment)	mg/l	174
After passing the water treatment	mg/l	2
N tot (Total nitrogen)		

Characteristic	Unit of measurement	Value
Inflow (before treatment)	mg/l	34,8
After passing the water treatment	mg/l	10
N NH_4 **(Ammonium nitrogen)**		
Inflow (before treatment)	mg/l	25
After passing the water treatment	mg/l	0.39
P tot (**Total phosphorous)**		
Inflow (before treatment)	mg/l	5.7
After passing the water treatment	mg/l	0.5
Phosphates		
Inflow (before treatment)	mg/l	3.5
After passing the water treatment	mg/l	0.2

As of 07.02.2013, the technical readiness of the plant was 50-90% and construction readiness – 78%. The works are simultaneously conducted at 20 sites and are completion degree varies from 30 to 99%.

Delivery and installation of equipment is carried out at the expense of funds of the following international financial organisations: the Swedish International Development Cooperation Agency (SIDA) in amount of 120 million of Swedish kronor and Ecological Partnership of the North Dimension (EPND) – 10 million euros. The SIDA has expressed its readiness to increase the grant amount up to 145 million of Swedish kronor for financing the purchase of all Swedish equipment. The equipment for primary and secondary precipitation tanks, compost grounds and emergency sludge sites is mounted at 98%. The equipment for building grids, silt pits, pumping stations for domestic and surface sewage water and fresh sludge is fully mounted. The equipment for the filter station is delivered, but mounted only at 5%. Installation of the delivered equipment for aeration tanks, pump-blowing station, sludge pump station is fulfilled at 17% and for the ultraviolet neutralisation station - at 10%. The equipment for the process control system is delivered in full and the laboratory equipment for the process building is delivered at 50%. In general, as of 07.02.2013, the equipment is delivered at 90% and mounted at 23%.

In addition to the construction of the treatment plant, the construction and modernisation of the auxiliary facilities related to the sewerage system of the city are carrying out. During the period from 2007 to December 2008, the overhaul of the operating sewerage collector was done and the local pumping sewerage station ("LPS of the Right bank") with the capacity of 84.7 thousand m^3 of water per day was put into operation, that allowed to improve significantly the reliability of the sewerage discharge system.

By the end of December 2012, within the framework of the federal and regional investment programs, it is planned to complete the construction and equipment of the main pump station (MPS) at the east of Kaliningrad. For this purpose, 210 million rub., including 80% from federal budget and 20% from regional budget, were allocated. MPS capacity is currently estimated at 53 thousand m^3/day, which constitutes about one third of the total sewage water of Kaliningrad. In future, the capacity of the station can be increased up to 120 thousand m^3/day owing to additional equipment installation.

2) Quality of discharged sewage water

In 2004, the discharged sewage water quality was assigned to the category of highly polluted water exceeding the standards of maximum permissible discharged concentrations of ammonium nitrogen, oil products and methanol at hundreds of times.

The MUE CS "Vodokanal" has annually developed and endorsed the "Program of industrial ecological monitoring of the of water pollution sources". In September 2010 the laboratory analysis revealed exceeding MPCs for nutrients in the sewage water (Table 42). The lack of data on many parameters and invariability of the methods used for sewage water treatment does not allow to conclude that quality of discharged sewage water had improved and, consequently, that the environmental protection requirements have been met.

Table 42 – Sewage water parameters after the treatment plant in September 2010

Parameters	Unit of measurement	Pollutant concentration
Temperature	^{0}C	18
pH	pH unit	7.3
Nitrite-ion	mg/l	<0.02
Nitrate-ion	mg/l	0.71
Ammonium nitrogen	mg/l	24.87
Phosphate phosphorous	mg/l	2.7
Suspended matters	mg/l	84
BOD_5	mgO/l	112.2
Oil products	mg/l	1.02

1.3.3.3. Results of monitoring of the Kaliningrad Lagoon as the water body-receiver

In accordance with the data of 1992, as a result of the Kaliningrad treatment plant operation, the following data on anthropogenic load to the Kaliningrad (Vistula) Lagoon were obtained. In 2010, the low efficiency of the treatment plant of Kaliningrad in terms of nitrogen and phosphorus removal was confirmed by the data presented in Table 43.

Table 43 – Indicators of anthropogenic load from the treatment plant of Kaliningrad to Kaliningrad (Vistula) Lagoon in 1992 and 2010

Indicator	Unit of measurement	Indicator value	
		1992	2010
Phosphorus	t/year	460	175.33
Nitrogen	t/year	2200	1244.87
Suspended matters	t/year	11500	-

In 2004 on the basis of the long-term observation results of the State Sanitary and Epidemiological Centre in Kaliningrad, it was found that the water quality in the Pregel River within the urban areas at the water intake points exceeded standards of bacteriological and viral contamination of water up to 15 times. During the emergency discharge of sewage water to the water body these indicators of unsatisfactory water quality are increasing by 2-3 times, therefore, the water supply sources in Kaliningrad do not comply with sanitary-hygienic requirements that negatively affects the health of people.

Monitoring of the surface water of the Primorsk Bay (the Kaliningrad Lagoon) near the outfall №1 (sewage water discharge) is carried out by the laboratory OS-1 MUE CS "Vodokanal" of Kaliningrad. The data for the period from 2008 to 2012 are presented in Tables 44 - 48. Control of pollutants in the water body is carried out at three points from the sewage water discharge point. In 2008, monitoring of the surface water was carried out for 27 parameters and in subsequent years – for 17.

In 2008, the exceeding of MPCs for pollutants in water bodies of fishery importance was detected for seven indicators. Three indicators (iron, methanol, and furfural) exceeded MPCs during the entire observation period.

Table 44 – Data of monitoring of the Primorsk Bay surface water near the outfall №1 in 2008

Controlled indicator	The average annual concentration of pollutants (mg/l)/Number of excess of MPC (from 7 measurements conducted from April to October)			MPC[1], mg/dm^3
	500 m to the right of the outfall № 1	500 m straight to the outfall № 1	500 m to the left of the outfall № 1	
pH	8.6 / -	8.4 / -	8.5 / -	-
Suspended matters	80.1 / -	81.9 / -	83.1 / -	-
Ammonium nitrogen	0.05 / -	0.05 / -	0.05 / -	0.5
Nitrate-ion	2.79 / -	2.5 / -	2.7 / -	40.0
Nitrite-ion	0.08 /3	0.09 / 4	0.09 / 3	0.1
Phosphate phosphorus	0.07 / -	0.09 / -	0.07 / -	-
Solid residual	4596 / -	4448.6 / -	4576.6 / -	-
Anionic surface-active substances	0.083 / -	0.099 / -	0.094 / -	0.5

Controlled indicator	The average annual concentration of pollutants (mg/l)/Number of excess of MPC (from 7 measurements conducted from April to October)			MPC[1], mg/dm^3
	500 m to the right of the outfall № 1	500 m straight to the outfall № 1	500 m to the left of the outfall № 1	
BOD_5	3.99 / -	5.41 / -	4.57 / -	-
Dissolved oxygen	10.7 / -	10.3 / -	10.4 / -	-
Oil products	0.03 / -	0.036 / -	0.03 / -	0.1
Colour of water	120.7 / -	115 / -	122.8 / -	-
COD	33.2 / -	53.0 / -	49.7 / -	-
Iron	0.55 / 7	0.59 / 7	0.57 / 7	0.1
Phenols	0.0005 / -	0.0005 / -	0.0005 / -	-
Sulphides	0.005 / -	0.005 / -	0.005 / -	-
Lignosulfonic acids	5 / -	5 / -	5 / -	-
Formaldehyde	0.02 / -	0.02 / -	0.02 / -	-
Boron	0.05 / -	0.05 / -	0.05 / -	0.5
Fats	0.5 / -	0.5 / -	0.5 / -	-
Methanol	0.91 / 7	1.05 / 7	0.75 / 7	0.1
Furfural	0.022 / 7	0.019 / 7	0.020 / 7	0.01
Chloroform	0.00063 / -	0.00063 / -	0.00060 / -	0.005
Cooper	0.0030 / 7	0.0033 / 7	0.0045 / 5	0.001
Zinc	0.0160 / 3	0.0178 / 3	0.0199 / 3	0.01
Nickel	0.0040 / 1	0.0032 / -	0.0031 / -	0.01
Cadmium	0.00016 / -	0.00098 / 1	0.00015 / -	0.005

[1] Water quality standards of water bodies of fishery importance, including the standards of maximum permissible concentrations of harmful substances in water bodies of fish importance based on the order of the Federal Fishery Agency №20 from 18.01.2010 "On adoption of water quality standards for water bodies of fishery importance, including the standards of maximum permissible concentrations of harmful substances in water bodies of fish importance"

Table 45 – Data of the monitoring of the Primorsk Bay surface water near the outfall № 1 in 2009

Controlled indicator	The average annual concentration of pollutants (mg/l)/Number of excess of MPC (from 3 measurements conducted from June to October)			MPC[1], mg/dm^3
	500 m straight to the outfall	50 m to the left from the outfall	50 m to the right from the outfall	
pH	8.5 / -	8,6 / -	8,6 / -	-
Dissolved oxygen	9.8/ -	9,8/ -	10,0 / -	-
Suspended matters	21 / -	21/ -	22 / -	-
BODtot.	9.10 / -	8,07 / -	8,40 / -	-
Ammonium nitrogen	< 0.05 / -	< 0.05 / -	< 0.05 / -	0.50
Nitrate-ion	1.65 / -	1.77 / -	1.85 / -	40.00
Nitrite-ion	0.08 / 1	0.08 / 1	0.09 / 2	0.08
COD	108.2 / -	98.4 / -	118.0 / -	-
Oil products	0.06 / 2	0.06 / 2	0.1 / 1	0.05
Total iron	0.43 /3	0.40 /3	0.39 /3	0.10

Controlled indicator	The average annual concentration of pollutants (mg/l)/Number of excess of MPC (from 3 measurements conducted from June to October)			MPC[1], mg/dm^3
	500 m straight to the outfall	50 m to the left from the outfall	50 m to the right from the outfall	
Zinc	0.015 / 2	0.009 / 1	0.009 / 1	0.01
Cupper	0.0051 / 3	0.004 / 3	0.004 / 3	0.001
Manganese[2]	0.0490 / 1	0.048 / 1	0.047 / 1	0.01
Nickel	0.0015 / -	0.001 / -	0.001 / -	0.01
Solid residual	5033 / -	5227 / -	5433 / -	-
Anionic surface-active substances	0.06 / -	0.05 / -	0.04 / -	0.5
Phosphate-ion	0.07 / -	< 0.05 / -	< 0.05 / -	-

[1] Water quality standards of water bodies of fishery importance, including the standards of maximum permissible concentrations of harmful substances in water bodies of fish importance based on the order of the Federal Fishery Agency №20 from 18.01.2010 "On adoption of water quality standards for water bodies of fishery importance, including the standards of maximum permissible concentrations of harmful substances in water bodies of fish importance"
[2] Investigation for manganese was conducted once in October 2009

In 2009, the exceeding of MPCs at control points was detected for six indicators. For three indicators (iron, cooper and manganese) the exceeding of MPCs was recorded at all control points.

In 2010, the exceeding of MPCs for pollutants in fishery water bodies was detected for seven indicators, for three indicators (manganese, iron, and oil products) the exceeding of MPCs was recorded at all control points.

Table 46 - Data of monitoring of the Primorsk Bay surface water near the outfall № 1 in 2010

Controlled indicator	The average annual concentration of pollutants (mg/l)/Number of excess of MPC (from 3 measurements conducted from May to October)			MPC[1], mg/dm^3
	500 m straight to the outfall	50 m to the left from the outfall	50 m to the right from the outfall	
pH	7.7 / -	8.0 / -	7.8 / -	-
Dissolved oxygen	7.6 / -	7.4 / -	7.7 / -	-
Suspended matters	91 / -	79 / -	87 / -	-
BODtot.	35.9 / -	26.7 / -	26.0 / -	-
Ammonium nitrogen	0.05 / 1	< 0.05 / -	< 0.05 / -	0.5
Nitrate-ion	0.89 / -	1.02 / -	1.04 / -	40
Nitrite-ion	0.07 / -	0.09 / 2	0.05 / 1	0.08
COD	78.4 / -	55.5 / -	52.3 / -	-
Oil products	0.27 / 3	0.18 / 3	0.11 / 3	0.05
Total iron	0.62 / 3	0.62 / 3	0.61 / 3	0.10
Zinc	0.0551 / 3	0.0332 / 2	0.0905 / 3	0.01
Cupper	0.0051 / 2	0.0066 / 2	0.00590 / 2	0.001
Manganese	0.142 / 3	0.139 / 3	0.129 / 3	0.01
Nickel	0.0030 / -	0.0010 / -	0.0017 / -	0.01

Controlled indicator	The average annual concentration of pollutants (mg/l)/Number of excess of MPC (from 3 measurements conducted from May to October)			MPC[1], mg/dm^3
	500 m straight to the outfall	50 m to the left from the outfall	50 m to the right from the outfall	
Solid residual	3700 / -	3515 / -	3547 / -	-
Anionic surface-active substances	0.42 / -	0.23 / -	0.20 / -	0.5
Phosphate-ion	0.13 / -	0.13 / -	0.10 / -	-

[1] Water quality standards of water bodies of fishery importance, including the standards of maximum permissible concentrations of harmful substances in water bodies of fish importance based on the order of the Federal Fishery Agency №20 from 18.01.2010 "On adoption of water quality standards for water bodies of fishery importance, including the standards of maximum permissible concentrations of harmful substances in water bodies of fish importance"

In 2010, the exceeding of MPCs of pollutants in fishery water bodies was detected for seven indicators, for five indicators (manganese, iron, oil products, zinc and cooper) the exceeding of MPCs was recorded at all control points.

Table 47 - Data of monitoring of the Primorsk Bay surface water near the outfall № 1 in 2011

Controlled indicator	The average annual concentration of pollutants (mg/l)/Number of excess of MPC (from 3 measurements conducted from May to October)			MPC[1], mg/dm^3
	500 m straight to the outfall	50 m to the left from the outfall	50 m to the right from the outfall	
pH	7.7 / -	7.7 / -	7.7 / -	-
Dissolved oxygen	6.8 / -	6.7 / -	6.9 / -	-
Suspended matters	99 / -	74 / -	80 / -	-
BODtot.	57.9 / -	44.2 / -	49.3/ -	-
Ammonium nitrogen	1.3 / 2	1.3 / 2	1.4 / 2	0.5
Nitrate-ion	0.81 / -	0.93 / -	1.06 / -	40
Nitrite-ion	0.08 / 2	0.09 / 2	0.08 / 1	0.08
COD	89.5 / -	66.3 / -	79.4 / -	-
Oil products	0.31 / 3	0.36 / 3	0.1 / 3	0.05
Total iron	0.48 / 3	0.48 / 3	0.48 / 3	0.1
Zinc	0.045 / 3	0.053 / 3	0.046 / 3	0.01
Cupper	0.0052 / 3	0.0046 / 3	0.0056 / 3	0.001
Manganese[2]	0.126 / 2	0.128 / 2	0.129 / 2	0.01
Nickel	0.0021 / -	0.0022 / -	0.0022 / -	0.01
Solid residual	2339 / -	2309 / -	2245 / -	-
Anionic surface-active substances	0.36 / -	0.36 / -	0.41 / -	0.5
Phosphate-ion	0.57 / -	0.43 / -	0.43 / -	-

[1] Water quality standards of water bodies of fishery importance, including the standards of maximum permissible concentrations of harmful substances in water bodies of fish importance based on the order of the Federal Fishery Agency №20 from 18.01.2010 "On adoption of water quality standards for water bodies of fishery importance, including the standards of maximum permissible concentrations of harmful substances in water bodies of fish importance"
[2] Investigation for manganese was conducted twice in May and October 2011

In 2012, monitoring was conducted at one control point. The exceeding of MPCs of pollutants in fishery water bodies was detected for seven indicators, for four indicators (manganese, iron, oil products and ammonium nitrogen) the exceeding of MPCs was recorded in the entire investigation periods.

Table 48 - Data of monitoring of the Primorsk Bay surface water near the outfall № 1 in 2012 (control point – to the right from the outfall № 1 at the distance of 50 m)

Controlled indicator	The average annual concentration of pollutants, mg/l	MPC[1], mg/dm^3	Number of excess of MPC (from 3 measurements conducted from April to October)
pH	8.6	-	-
Dissolved oxygen	6.0	-	-
Suspended matters	50	-	-
BODtot.	50.3	-	-
Ammonium nitrogen	0.67	0.5	3
Nitrate-ion	2.18	40	-
Nitrite-ion	0.15	0.08	2
COD	94.7	-	-
Oil products	0.21	0.05	3
Total iron	0.52	0.1	3
Zinc	0.0566	0.01	2
Cupper	0.0047	0.001	2
Nickel	0.0015	0.01	-
Manganese	0.35	0.01	3
Solid residual	2832	-	-
Anionic surface-active substances	0.21	0.5	-
Phosphate phosphorous	0.57	-	-
Non-ionic surface-active substances	□0.5	0.5	-

[1] Water quality standards of water bodies of fishery importance, including the standards of maximum permissible concentrations of harmful substances in water bodies of fish importance based on the order of the Federal Fishery Agency №20 from 18.01.2010 "On adoption of water quality standards for water bodies of fishery importance, including the standards of maximum permissible concentrations of harmful substances in water bodies of fish importance"

1.3.3.4. Analysis of the compliance of the Kaliningrad treatment plant with the current HELCOM Recommendations

Analysis of the compliance of the Kaliningrad treatment plant with HELCOM Recommendations is carried out on the basis of three recommendations:

- RECOMMENDATION 28E/5 Municipal waste water treatment;

- RECOMMENDATION 23/5 Reduction of discharges from urban areas by the proper management of storm water system;

- RECOMMENDATION 13/2 Industrial connections and point sources other than dwelling houses connected to municipal sewerage system (Table 49).

1.3.3.5. Planned environmental activities

Implementation of environmental activities includes putting into operation the treatment plant in 2013 within the framework of implementation of the Federal Target Program of Development of the Kaliningrad Region for the period up to 2015.

Use of the stepwise chemical-biological sewage water treatment at the treatment plant under construction will reduce the content of pollutants in the discharged sewage water, including BOD, total phosphorous, total nitrogen, suspended matter and radically decrease the impact on the environment.

1.3.3.6. Activities necessary for excluding the enterprise from the HELCOM's list of hot spots

For the purpose of radical reduction of the negative impact on the environment, it is necessary to complete the construction and putting into operation of the new treatment plant in full. The program of industrial ecological monitoring should include the assessment of the target indicators of discharged sewage water quality, such as total phosphorous and total nitrogen.

Conclusion

The enterprise exerts a serious negative impact to the environment as a result of using the incomplete cycle of sewage water treatment which, in turn, leads to non-observance of the Russian legislation and HELCOM recommendations for sewage water treatment.

Analysis of the hot spot state shows that, despite the fact that during the recent years a number of qualitative changes have occurred at the Plant (main collector overhaul, planned putting into operation of the main pumping station in the east part of the city, putting into operation of the local pumping sewerage station), the level of the negative impact remains high.

In spite of the construction of the new treatment plant in Kaliningrad within the framework of implementation of the International Project and the Federal Target Program shifting of the time of putting the Plant into operation provokes a concern.

Table 49 – Analysis of compliance of activity of the treatment plant of Kaliningrad with HELCOM Recommendations

HELCOM Recommendation	Targets	Standard	The situation at the enterprise	Conclusion about conformity of the target
RECOMMENDATION 28E/5 Municipal wastewater treatment	Compliance with the requirements of sewerage system development	Full compliance	Urban (municipal) sewage water from the domestic sector (domestic sewage water) or from industrial enterprises are not fully collected and treated before discharging into the water body and have excess of MPC	-
	Sewage water discharge should be reduced (%) or should not excess of, mg/l			
		Reduction of BOD_5, minimum, by 80%; or 15 mg/l;	Used methods of treatment do not allow to reach the target	-
		Reduction of total phosphorous, minimum, by 90%; or 0,5 mg/l;	This indicator is not assessed	-
		Reduction of total nitrogen, minimum, by 70-80%, or 10 mg/l.	This indicator is not assessed	-
	Use the best available technologies and the best environmental practice			
		Use phase sewage water treatment	Only mechanical sewage water treatment is used	-
		Use methods of safe disposal of formed sludge	Formed sludge is placed in sludge banks	-
RECOMMENDATION 23/5 Reduction of discharges from urban areas by the proper management of storm water system	Reduction of discharges from urban territories by the proper management of storm sewage water sewerage systems	Use of storm sewage water treatment system	The lack of the storm sewage water treatment system	-

HELCOM Recommendation	Targets	Standard	The situation at the enterprise	Conclusion about conformity of the target
RECOMMENDATION 13/2 Industrial connection and point sources other than household connected to municipal sewerage system	Use of the best available technologies of sewage water treatment at industrial enterprises before its connection to municipal sewerage system	Use of phase treatment system of a sewage water of industrial enterprises	Not all industrial enterprises perform phase sewage water treatment	-
	The lack of persistent, toxic or bio-accumulative matters in the treated water	Compliance of the treated water quality with MPC values	Excess of MPC for many indicators	-
		Technological capacity of the treatment plant to treat the given type of substance	Used methods of treatment do not allow to treat the sewage water from given substances	-

1.3.4. Hot spot № 69 "Cepruss PPM"

The Kaliningrad Pulp and Paper Mill №2 was reorganised in 1993 into a Closed Joint-Stock Company with foreign investments "Cepruss" (CJSC "Cepruss"). This enterprise started its commercial operation in 1906 as the North-German Pulp Mill.

The CJSC "Cepruss" is located on the right bank of the Pregel River, in the mouth of the Kaliningrad Lagoon of the Baltic Sea (Figure 28).

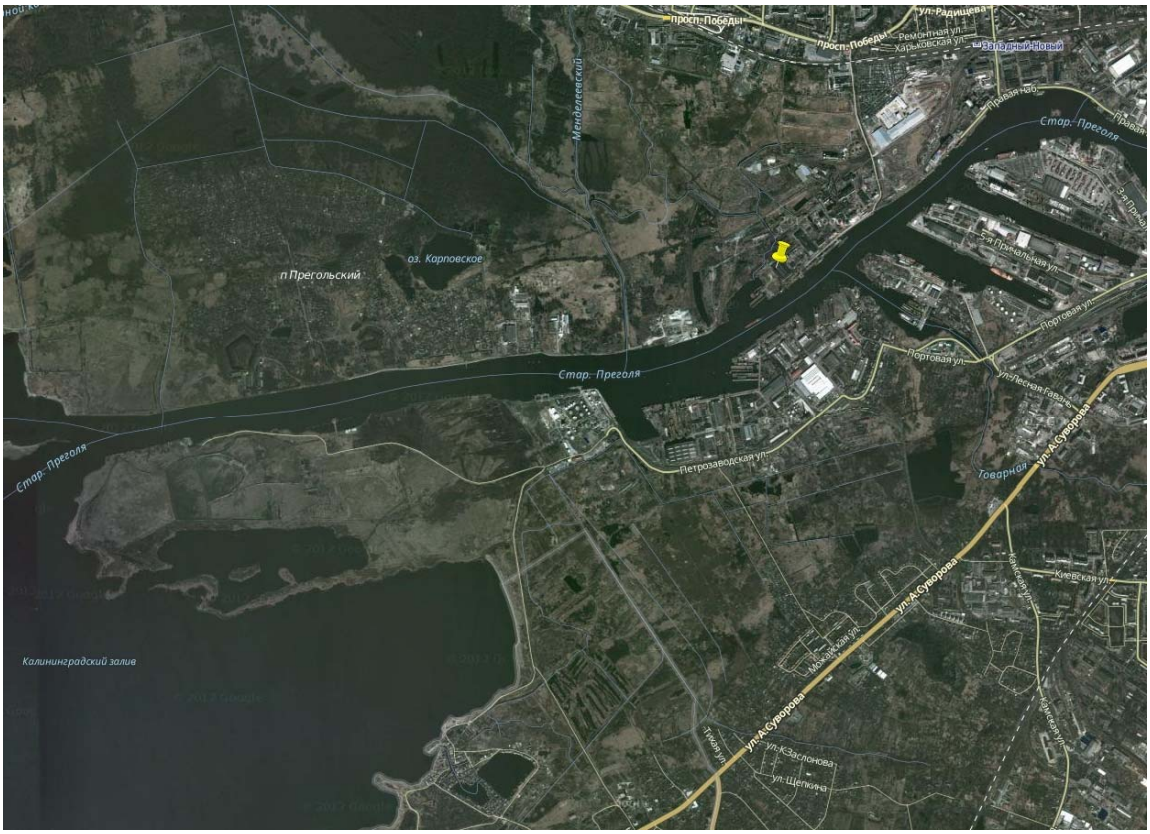


Figure 30 – Location of the CJSC "Cepruss"

1.3.4.1. State of the Mill by 1992 - 1993

During that period, the industrial technology of production of bleached cellulose included the following stages:

- debarking of the spruce timber was made in the wood-preparation shop at two debarking drums using "dry" method;

- 5 lined cookers of 220 m^3 in capacity each and two bimetallic cookers of 320 m^3 in capacity each were used in this technological process. Cooking acid was prepared on the sodium base;

- cellulose washing was carried out in the cooker and drainers. Liquor removed from the cooker was used for production of ethyl alcohol, fodder yeast and lignosulphonates;

- cellulose sorting (grey flow) was carried out using gravity centrifugal screeners and centricleaners. Sorting of white flow was made on pressure screeners and centricleaners;

- bleaching of cellulose included two stages of chlorination, two stages of alkalization and three stages of post-bleaching by sodium hypochlorite. The process was finished by the acid treatment.

- drying of cellulose was carried out in two drying machines – pulpmachines of 110 and 119 t/day of commercial cellulose in capacity;

- paper was produced in the paper-making machine of Yanki type.

The wastes formed during sorting were processed into cardboard and roll pulp.

The production process involved the following shops:

- wood-preparation shop;
- acid-cooking shop;
- evaporation shop;
- cleaning shop;
- alcohol shop;
- bleaching shop;
- yeast shop;
- cardboard shop;
- paper-making machine.

Table 50 – Production indicators of the enterprise in 1992

Product range	Unit of measurement	Volume of production
Pulping	t/year	77464
Bleached liquid cellulose	t/year	64545
Unbleached roll cellulose	t/year	4954
Cardboard technical	t/year	2509
Paper- base of sanitary hygiene	t/year	1314
Napkins	thousand packs/year	5708
Ethyl alcohol	thousand packs/year	372
Nutrient yeast	t/year	2659
Technical liquid lignosulphonates	t/year	38490

The water intake for industrial needs was carried out from the Pregel River, the Karpovsky Lake and wells for technical purposes, while the water for household purposes was taken from the wells with thw water of portable quality.

The enterprise had on its balance the thermal power station operating on coal and fuel oil.

The enterprise did not have biological treatment of sewage water. All sewage water before discharging was mechanically treated by mans of filtration and sedimentation. Household and some industrial sewage water was discharged to the urban sewerage system. Industrial sew-

age water was discharged though the four outfalls into the surface water bodies (the Pregel River and its tributaries).

Table 51 – Environmental indicators of production activity of CJSC "Cepruss" in 1992

Name of indicators	Unit of measurement	Indicator value
Fresh water intake from all sources	thousand m^3/year	34306
Sewage water discharge		
Total	thousand m^3/year	31516
including: into surface water bodies	thousand m^3/year	30681
into urban sewerage	thousand m^3/year	835
Discharge of organic matters expressed though the BOD_5 in the total sewage water discharge	t/year	13324
COD in the total sewage water discharge	t/year	86619
Total nitrogen in the total sewage water discharge	t/year	742
Total phosphorous in the total sewage water discharge	t/year	43
Suspended matters in the total sewage water discharge	t/year	1859
Emissions of pollutants to the atmosphere		
Total	t/year	8413
including: solid matters	t/year	4816
Sulphur dioxide	t/year	3143
Nitrogen oxides	t/year	341
Other	t/year	113
Wood waste (bark, sawdust)	t/year	30787*
Ash of solid fuel	t/year	10592**
* use of this waste to make compost at the enterprises of Agroprom up to 1993; ** this waste id disposed for storage in ash disposal area		

In 1993 the "Program of stepwise pulp industry development" was developed at the enterprise, which included, along with improvement of technical and economic parameters, the increase of environmental safety of production processes. The program provided stepwise transition to environmentally safe technologies, including the following three phases:

- the first phase included the reconstruction of the cooking shop and thermal power station with replacement of equipment and improvement of the technological processes;

- the second phase included reconstruction of unbleached and bleached production processes with construction of all-factory in-site treatment facilities for sewage water;

- the third stage included reconstruction of the cleaning sector of bleaching cellulose and introduction of the chemical regeneration system.

1.3.4.2. The state of the Enterprise by 2002

In 2001, within the framework of implementation of the first phase of the "Program of Pulp Industry Development" at the enterprise the following activities were carried out:

- transition to the bisulphite cooking technology, which allows to process all types of wood;

- closure of alcohol-yeast production;

- replacement of lined cookers by bimetallic with the capacity of 320 m^3 each allowing to use the modern cooking technologies without limitations;

- reconstruction of the distribution system of wood chips by cookers using modern Swedish seals;

- reconstruction of the delivery system of liquor with the replacement of two opened metallic tanks by closed bimetallic tank with capacity of 320 m^3;

- organisation of the stepwise selection of concentrated liquor and washing the pulp in the cooker;

- reconstruction of the steam supply system with replacement of steam generators and transition to burning of natural gas instead of coal and fuel oil;

- stabilization of operation of the evaporation shop with increasing production of lignosulphonates from the sulphite liquor being the liquid waste of the cooking process.

The measures implemented led to the following results:

- reduction of water consumption by 4100 thousand m^3 (12%);

- reduction of discharges of dissolved organic matter (BOD_5) by 5887 tons (44%);

- reduction of emissions of hazardous substances to the atmosphere by 7480 tons (89%).

The resultant environmental and production indicators of the CJSC "Cepruss" by 2002 are presented in Tables 52 and 53.

Table 52 – Environmental indicators of the CJSC "Cepruss" in 2002

Name of indicators		Unit of measurement	Indicator value
Fresh water intake from all sources		thousand m^3/year	30206
Sewage water discharge			
Total,		thousand m^3/year	28484
including	into surface water bodies	thousand m^3/year	27272
	into urban sewerage	thousand m^3/year	1212
BOD_5 in the total sewage water discharge		t/year	7437
COD in the total sewage water discharge		t/year	61848
Ntot in the total sewage water discharge		t/year	455
Ptot in the total sewage water discharge		t/year	11
Suspended matters in the total sewage water discharge		t/year	1643
Emissions of pollutants to the atmosphere			
Total,		t/year	933
including:	Solid matters	t/year	409
	Sulphur dioxide	t/year	167
	Nitrogen oxides	t/year	352
	Other	t/year	5
Wood waste (bark, sawdust)		t/year	14678*
Ash of solid fuel		t/year	1381**
* 13278 t of this waste is disposed on bark dump due to the termination of its use by enterprises of Agroprom;			

Name of indicators	Unit of measurement	Indicator value
**1381 t of this waste is disposed in ash dump due to the termination of the supply of natural gas		

Table 53 – Production indicators of the CJSC "Cepruss" in 2002

Product range	Unit of measurement	Volume of production
Pulping	t/year	93828
Bleached liquid cellulose	t/year	77881
Unbleached roll cellulose	t/year	3749
Cardboard technical	t/year	2836
Paper- base of sanitary hygiene	t/year	3004
Napkins	thousand packs/year	16779
Tissues	thousand packs/year	27427
Toilet paper	thousand rolls/year	980.5
Technical liquid lignosulphonates	t/year	98407

The total amount of investments for implementation of activities of the first phase was U$15 mln. of own funds. Implemented activities allowed to meet the HELCOM Recommendation 16/4, according to which the average annual sulphur emissions from the production of sulphite cellulose should not exceed 1.5 kg of sulphur per ton of produced cellulose from 1 January 2000. This recommendation was fulfilled by the CJSC "Cepruss": sulphur emissions did not exceed 1.2 kg per ton of cellulose from 2000. However, HELCOM Recommendation 17/9 has not been implemented for all indicators .

In 2004 the project "Reconstruction of production and construction of the treatment plant of CJSC "Cepruss" consisting of 2 stages was adopted but not implemented. Within the framework of the first stage, reconstruction of unbleached flow with optimisation of the water supply (first start-up complex) and reconstruction of bleached flow with bleaching without chlorine and local treatment of alkaline sewage (second start-up complex) were scheduled.

The first start-up complex included:

- construction of the washing station and transition to the closed wash-out and continuous hot washing of cellulose at three pressure filters with increasing liquor selection from 73.6% to 96.5%;

- replacement of "open" pulp sorting system to the "closed" system with the minimal fresh water consumption;

- reconstruction of the acid shop;

- optimisation of the water consumption in production shops;

- mounting of the flotation trap «Krofta» for the local sewage water treatment with reuse of the treated water in production and with closing of outfall №1 in the Pregel River.

The second starting complex envisaged construction of the shop of chlorine dioxide production, transition to chloride cellulose bleaching with excluding of molecular chlorine and sodium hypochlorite from the bleaching process, as these substances generate halogen-organic compounds including volatile chlorine-organic substances.

The second stage provided construction of all-factory in-site treatment facilities of mechanical-biological and physical-chemical treatment of the sewage from industrial and surface flows with the treated water discharge into the Pregel River and closing of two outfalls. The project provided also exclusion of the chemicals containing nitrogen and phosphorous (ammonia water and trisodium phosphate) from the production processes .

Table 54 – Planned environmental indicators of the CJSC "Cepruss" after implementation of two phases of the Program

Indicators	Unit of measurement	The actual values, 2002	I phase of the Program	II phase of the Program		HELCOM Recommendation 17/9
				1 stage	2 stage	
Water consumption	thousand m^3/year	30206	12241	7614	7697 (taking into account their own needs of Biological Treatment Plant)	-
Water discharging	thousand m^3/year	28484	12206	7534	7534	-
COD	kg/t	659	-	112,7	2.03	70
P tot.	kg/t	0.12	-	0.018	0.018	0.08
N tot.	kg/t	4.9	-	0.13	0.13	0.7
Adsorbable Organic Halogen	kg/t	-	-	0.5	0.5	0.5

In 2002, the ecological service of the enterprise including the certified eco-analytical laboratory, carried out the ecological monitoring of the production,

1.3.4.3. Current state of the enterprise

From 01.11.2006 the CJSC "Cepruss" has ceased the production of bleached and unbleached sulphite cellulose in view of its total economic inefficiency resulted from increases of the prise for raw material (softwood) and chemicals as well as cessation of the natural gas supply in amount necessary for the enterprise operation. No resumption of cellulose production is expected.

From 01.07.2009 the enterprise completely stopped paper production in view of economic reasons because of the rising cost of raw material – cellulose. And from 01.03.2011 the pro-

duction sanitary-hygienic paper from purchased paper was also ceased because of rising prices for raw material and energy.

From 2011, the main economic activities of the CJSC "Ceprus" is represented by subsidiary activities related to the water transport, including loading-unloading woks without water intake and discharge.

The production equipment was conserved and partially sold.

1) Sewage water discharge

Reduction of production capacities of the enterprise led to reduction of the sewage water discharge into the water body (Table 55).

Table 55 – Discharge of polluted sewage water by CJSC "Cepruss" during the period from 2007 to 2010

Year	Discharge of polluted sewage water, mln. m^3/year		
	Without treatment	Partially treated	Total
2007	0	3.82	3.82
2008	0	1.43	1.43
2009	0	0.47	0.47
2010	0	0.08	0.08

Due to ceasing of pulp and paper production, in 2010 the liquidation of water intake facilities in the water bodies was fulfilled, as well as the liquidation and laying-up of water discharge facilities intended for the sewage water treatment and discharge into surface water bodies were implemented. This led to the termination of activities on the water intake and discharge to the Pregel River evidenced by the absence of these activities in 2011.

The domestic sewage water generated during usage of the water from wells for household needs of employees, and the surface water run-off from the industrial area of the enterprise are transferred to the urban sewerage system under the contract with the MUE CS "Vodokanal" of Kaliningrad.

2) Emissions of pollutants

Due to the closure of sulphite cellulose production and transfer of the thermal power station to the balance of the MUE CS "Kaliningradteploset", any emissions to the atmosphere of sulphur oxides, nitrogen oxides and heavy metals were absent in 2011.

3) Waste disposal

For a long time the bark dump and ash dump were placed on the territory of the enterprise. On 08.10.2010, the territory occupied with the bark dump was transferred to the ownership of the German Company "Zarya International GMBH" under the contract of sale, and the bark as

the waste of V class of hazard was sold to the same company. On 10.09.2010, the territory occupied with the ash dump was transferred under the contract to Kaliningrad.

1.3.4.4. Planned environmental protection activities

No adopted program of environmental activities is available at the enterprise.

The enterprise does not participate in any international environmental projects

Implementation of environmental activities within the framework of the federal and regional target programs is not planned.

1.3.4.5. Activities necessary for excluding the enterprise from the HELCOM's list of hot spots

Implementation of such activities is not required due to the closure of pulp and paper production leading to radical reduction of the negative impact on the environment.

Conclusion

Economic inefficiency of production at the CJSC "Cepruss" has led to cessation of activities related to the production of pulp and paper products, liquidation of water intake facilities on water bodies as well as liquidation and laying-up of the drainage facilities intended for sewage water treatment and discharge to the surface water bodies. The thermal power station (TPS) of the CJSC "Cepruss" as the source of the negative impact to the atmospheric air has been transferred to the balance of the city of Kaliningrad.

Entering the the CJSC "Cepruss" in the HELCOM's list of "hot spots" on the basis of such negative impacts as sewage water discharge and emissions of pollutants into the atmosphere is now irrelevant due to the closure of the company operation.

1.3.5. Hot spot № 70 "The Landfill of hazardous wastes of the city of Kaliningrad"

The Landfill of hazardous wastes of Kaliningrad is designed for the storage and disposal of municipal solid wastes (MSW) from Kaliningrad, Svetlogorsk and Zelenogradsk Districts and is operated by the Municipal Unitary Enterprise (MUE) "Chistota".

The Landfill of hazardous wastes of Kaliningrad is located in the forest area at the western outskirts of the city near the settlement of Kosmodemyanskiy. From the eastern side of the Landfill the Pregel River flows. The Landfill is located on the marshland.

The distance from the Landfill to the nearest settlements is: 850 m to s. Kosmodemyanskiy, 1 km to the Kaliningrad Maritime Channel, 1.8 km to the portable water lakes (Figure 29).

There is an asphalt road coming from the main road Kaliningrad – Baltiysk to the checkpoint of the Landfill and crossing the Kaliningrad By-Pass Channel.

The Landfill was created in 1978. Its area is 13.8 hectares. Wastes disposal at theLandfill is carried out in foundation pits using isolation materials (sang, clay) (Figure 30). Waste storage is carried out in the layers up to 2 m with permanent pressing down.

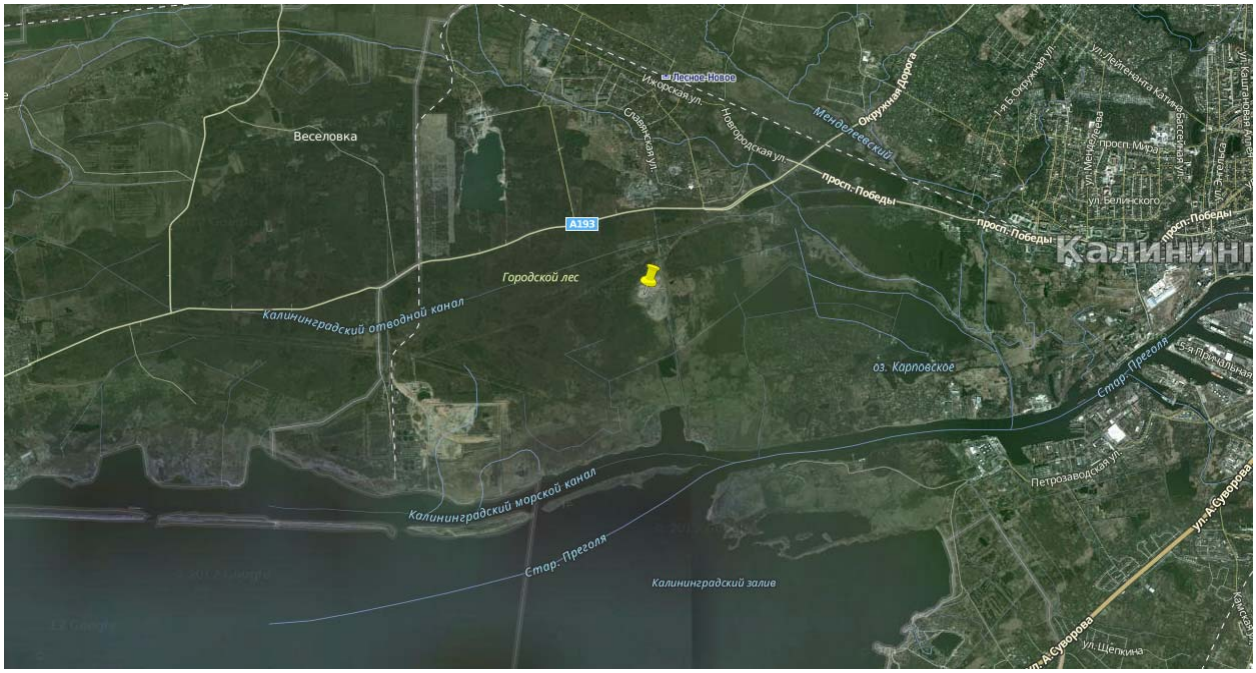


Figure 31 – Location of the Landfill of hazardous wastes of Kaliningrad

Figure 32 – The Landfill of hazardous wastes of Kaliningrad

To trap the surface run-off in the waste disposal site the channelling system is provided, and to drain filtrate – the drainage system. These wastes are collected into suction sumps system (Figure 31) built in 2008-2009. Further, the filtrate is fed by means of different pumps to the treatment plant of biological treatment built in 2009.

Figure 33 – Suction sumps at the Landfill of hazardous wastes of Kaliningrad

The Landfill service area is provided with utility premises, dispatcher's room and hangar for repairing and parking of specializes transport vehicles. The Landfill has the centralised water supply system. At the Landfill site the equipped inspection pits for the emergency repair of transport vehicles and washing facilities for transport disinfection are available. The exit from the Landfill is equipped with a concrete bathtub for disinfection of the bottom part of garbage-removal trucks.

The mean annual amount of solid waste disposed at the Landfill constitutes 4000 m^3 per day. As of 01.03.2013, the total amount of accumulated wastes is about 35 mln. m^3 .

In November 2012, the unscheduled inspection by the supervisory authorities revealed that the designed capacity of the Landfill has been exceeded by 24.8%.

The enterprise has the license № ОТ – 21 – 000296 (39) of 11.08.2008 for implementation of activities on collection, utilzation, neutralisation, transportation and disposal of hazardous wastes issued by the Department of Technological, Environmental and Nuclea`r Supervision (Rostechnadzor) of the Kaliningrad Region, valid until 11.07.2013. The current license allows the Landfill to accept wastes of 338 names in accordance with the Federal Classification Catalogue of Wastes assigned to IV-V classes of hazard. This list was approved by the Deputy Director of the Territorial Board of Rospotrebnadzor on 26.12.2008.

On the basis of the decision of the Mayor of the Kaliningrad №1535 dated 22.05.1998 "On the land allotment to MUE "Chistota" near the Baltic highway area in the October District", the land plot of 13.3 hectares in area near the Baltic highway in the October District was given to the enterprise for operation, reclamation and stepwise close-down of existing landfill of MSW of Kaliningrad. According to the decision of the Mayor №141 on 02.02.2007 the area allocated for the Landfill constituted 13.8281 hectares. The extension of the Landfill area was caused by installation of the weighting complex equipment.

In accordance with the decree of Administration of the City of Kaliningrad №960 of 15.05.2008, the leasing period for the land allocated to Landfill of MSW was extended for the enterprise MUE "Chistota" up to 31.12.2014. Currently the leasing period of this land for the Landfill purposes is extended by 25 years. This may become the ground for issuing a permanent license for neutralisation and disposal of wastes of I-IV classes of hazard.

In addition to the license, MUE "Chistota" has the following documentation:

1. Sanitary-epidemiological statement № 39.KS.14.000.M.000013.01.08 of 18.01.2008.

2. Technological regulations of operation of the Landfill MUE "Chistota" adopted by the director of the enterprise on 17.10.2008.

3. Instructions of acceptance of large-size solid wastes at the Landfill .

4. Instruction of designing, operation and reclamation of the MSW landfills adopted by the Ministry of Building of the Russian Federation of 02.11.1996.

5. Limits for waste disposal №605 and №606 of 22.01.2009 issued to the enterprise MUE "Chistota" and the Landfill of MUE "Chistota"for municipal solid wastes . The limits were adopted by the Territorial Administration of Technological, Environmental and Nuclear Supervision of the Kaliningrad Region for five years.

6. The program (plan) of industrial monitoring of the Landfill for municipal solid wastes in s. Kosmodemyanskiy.

7. The program of industrial monitoring of the wastes handling approved by the Service of Environmental Control and Supervision of Kaliningrad Region on 03.07.2012 .

The main activities of the Landfill for hazardous wastes of Kaliningrad:

1. Collection and transportation of municipal solid wastes to the Landfill from dwelling houses and enterprises of different forms of property in Kaliningrad.

2. Burial of solid wastes in the Landfill.

3. Environmental monitoring in the zone of the Landfill impact.

4. Development and implementation of ecological technologies aimed at minimization of the negative impact upon the environment.

The reasons of potential danger of the Landfill:

1 Ineffective treatment plant of the Landfill and proximity to the water body provide the probability of the negative impact upon the water quality in the Lagoon though the existing hydrological network (Clause 2 paragraph 3 of the Convention for the Protection of the Marine Environment of the Baltic Sea, 1992)

2. Occasional inflammation of the wastes placed at the Landfill leads to the air pollution.

3. Emission of the greenhouse gas as a result of solid waste burial .

4. Contamination of the ground and surface water with the filtrate and sewage drainage water subjected to the biological treatment only.

5. Swamping the the surrounding areas due to the input of sewage water and filtrate from the Landfill.

1.3.5.1. Environment protection activities performed from 2003 to 2009

The TACIS project "Support of Waste Management in the Kaliningrad Region" was implemented in 2003 - 2004. The aim of the project was to improve services efficiency and to bring them in compliance with the ecological standards of the waste management system in the Kaliningrad Region, as well as to provide solutions of the problems related to handling the wastes in the Region for a long-term period. The main results of the project implementation included:

- estimation of the existing waste management system in Kaliningrad Region was done (amount and morphology of formed wastes, existing infrastructure);
- technical solutions for the organisation of work with wastes were proposed (necessary number and location of new landfills, additional infrastructure for collection, sorting, transportation and disposal of wastes, as well as the measures for closure and reclamation of existing dumps);
- financial costs of the activities related to the wastes handling for the nearest years were estimated.

In 2004 the international TACIS project "Reduction of the Greenhouse Gases Volume Generated at the Kaliningrad Landfill (Russia)" was implemented. The aim of the project was to demonstrate possibility to reduce the landfills impact upon the environment in general, and the impact of the Kaliningrad Landfill, in particular, by means of bio-gas utilization.

The main results of the project included:

1. The laboratory analysis revealed methane concentrations from 64% to 81%. So, the volume of produced bio-gas is 11 mln. m^3/year.

2. The laboratory analysis of the leached water (filtrate) was made . The obtained BOD (Biological Oxygen Demand) value (783 mg/l) is the evidnce of the active bio-gas production formation.

3. Two options of use of biogas utilization have been proposed:

- the first option is the production of heat in amount of 45.2 GWh per year.

- the second option is the production of energy and heat. The amount of produced energy is 16.9 GWh per year, heat – 33.9 GWh per year.

4. The option of bio-gas utilization for production of energy and heat (the second option) is more efficient from an economic point of view.

Within the framework of implementation of the Federal Target Program of the Kaliningrad Region development up to 2010, the construction of the landfill for disposal of municipal and industrial wastes with the waste-sorting plant for wastes treatment was planned, but had not been implemented.

1.3.5.2. Environmental activities carried out during the period from 2009 to 2012

In 2009 within the framework of the international project "JOCCOW - JOint Capacity Building COncerning Waste Management" (2007-2009), the pilot facilities for collection and treatment of filtrate, including three water reservoirs and appropriate equipment were purchased and put into operation (Figure 32).

Figure 34 – The pilot facilities for collection and treatment of filtration water at the landfill of hazardous wastes of Kaliningrad

From December 2009, the international project "The pilot project of the Centre for recycling of wastes of electrical and electronic equipment in Kaliningrad" has been implemented. The main purposes of the project are:

- preparation of proposals for the development of technical, organisational and financial project documentation to create a uniform system for registration and disposal of electrical and electronic equipment wastes;

- creation of the Centre for treatment of electrical and electronic equipment wastes in Kaliningrad.

At the first stage of the project, various scenarios of future sustainably handling the wastes of electrical and electronic equipment formed on the territory of the city were developed . At the second stage, technical, organisational and financing documents is developed for creation of the logistic system for registration of electrical and electronic equipment wastes. On the basis of these documents, the Municipality of Kaliningrad, meeting the needs of existing municipal and private organisations, will be able to carry out ecologically safe collection and disposal of electrical and electronic wastes in Kaliningrad taking into account the environment protection requirements on a long-term basis.

Within the framework of the third stage implementation, the construction of "the Centre for recycling of electrical and electronic equipment wastes in Kaliningrad" in the industrial area of the MSW Landfill of Kaliningrad is planned.

The construction of the new modern landfill of municipal and industrial wastes for needs of Kaliningrad with the waste-treatment plant of up to 300 000 t/year in capacity is envisaged by the regional target program "Handling of production and consumption wastes in Kaliningrad Region during the period from 2012 to 2016" at the expense of the regional budget at the terms of inclusion into the regional investment program. The ongoing work on the site selection for this landfill is complicated by the absenceof the areas suitable for construction of MSW landfill in the current general plan of Kaliningrad. The option of searching the site for the landfill construction outside Kaliningrad, namely in Gurjevsk or Bargationovsk Districts, is under consideration now. After construction of the new landfill with the waste-treatment plant it is planned to start works on reclamation of the existing landfill.

1.3.5.3. Environmental impact assessment

1) Emissions into the atmosphere

Biogas emitted during waste burial is the main source of emissions into the atmosphere in the enterprise. The project of maximum permissible emissions of pollutants for the landfill with hazardous wastes has not been developed.

At the landfill the ignitions of various scale has regularly happened. The largest fire occurred in August 2012, according to the estimations of the supervisory authorities, the area of the fire occupied up to 25 thousand square meters.

2) Sewage water discharge

The enterprise does not discharge sewage water formed due to economic and household activities. The sewage water is collected by own cesspoolage cars with subsequent disposal at the treatment plant of MUE CS "Vodokanal".

The results of inspection fulfilled by the supervisory authorities in November 2012 revealed that due to irregular cleaning of adjacent (along the perimeter) area from wastes, the sewage drainage water and filtrate of the landfill forms marshland around the landfill, since only 10% of this water pass through the treatment plant. The remaining untreated sewage drainage water and filtrate pass through the soil and can enter the nearest water bodies. The treated sewage water goes to the accumulation pool, to be used for washing the cars of the landfill.

3) Soil contamination

The exceeding of the landfill designed capacity leads to littering of the surrounding area.

In November 2012, the laboratory analysis of soil samples carried out by the Federal Budgetary Institution "Centre of laboratory Analysis and Technical Measurements of Kaliningrad Region" (FBI "TSLATI of Kaliningrad Region") indicated that concentration of the mobile form of nickel in soil sampled at the control point of the MSW landfill in Kosmodemyanskiy was by 1.2 times higher than respective MPC fixed in the hygienic regulations 2.1.7.2041-06 "Maximum permissible concentrations of chemical substances in the water". The mobile form of nickel presents the greatest danger during subsequent migration of this heavy metal into the deep soil levels and ground water.

1.3.5.4. Results of the environmental components monitoring

Monitoring of hazardous wastes in the landfill of Kaliningrad is carried out in accordance with the "Program of the ecological monitoring of the landfill in s.Kosmodemyanskiy", which includes:

- industrial ecological monitoring of soil in the zone of the landfill possible impact.

- industrial ecological monitoring of the atmospheric air in the zone of the landfill possible impact;

The experts of the accredited laboratory FBI "TSLATI of Kaliningrad Region" carry out quarterly sampling and analysis of samples.

The program of the soil monitoring in the landfill impact zone includes sampling and analysis of the following parameters: hygienic indicators (bacteriological and parasitological analysis), heavy metals, pH and oil products (Table 56). Sampling is carried out at the territory of the landfill. In accordance with sanitary-parasitological indicators, the soil corresponded to the category "clean" during the research period. On the basis of almost all sanitary-bacteriological tests the landfill soil was classified as "clean", except for bacteriological samples (coliform index and enterococcus index) collected in the fourth quarter of 2012, when the soil was characterised as "moderately hazardous". Due to the lack of information on the heavy metals forms in the soil (gross metal content and its mobile form), the evaluation of the compliance with MPCs for heavy metals was carried out on the basis of the maximum MPCs depending on the the soil type.

The obtained results of analysis of the chemical indicators of soil (heavy metals, oil products) did not revealed any exceeding of MPCs.

The air monitoring program includes sampling and analysis of the following parameters: sulphur dioxide, ammonium, nitrogen oxides, hydrogen sulphide, benzene, mercury vapours, carbon dioxide and methane (Table 57). Monitoring of pollutant concentrations in the atmospheric air of the enterprise is carried out at two points (at the checkpoint area and outside the landfill territory, at the control post of the plant "Avtotor"). According to the monitoring results, the exceeding of MPCs for controlled substances in the atmospheric air was recorded for suspended matter in 2012 and for benzene in the first half of 2012 at two control points.

Within the framework of the international project BALTHAZAR "Reducing risks from hazardous wastes in Russia" in November 2009 near the landfill of hazardous wastes of Kaliningrad, the analysis of filtrate and bed silt in the adjacent water body was carried out. The results are presented in Table 58. According to the obtained results, the exceeding of MPCs of controlled substances was recorded for one indicator (for phenol - by 49 times), in the bed silt MPC was exceeded for arsenic, while the cadmium concentration corresponded to MPC.

1.3.5.5. Planned environmental activities

Currently the landfill is participating in the regional target program "Handling the production and consumption wastes in Kaliningrad Region for the period from 2012 to 2016" and

international environmental project "The pilot project of the Centre for recycling of electrical and electronic equipment wastes in Kaliningrad". The Landfill reclamation is planned after the construction of the new landfill and the waste-treatment plant within the framework of implementation of the target program. Within the implementation of the third final phase of the international project, the construction of the Centre for recycling of electrical and electronic equipment wastes at the landfill's territory is planned.

Table 56 – Results of the soil monitoring in the zone of impact of the landfill of hazardous wastes of Kaliningrad during the period from 2011 to 2012

Indicator	Unit of measurement	2011				2012				MPC[1], mg/kg
		1 quarter	2 quarter	3 quarter	4 quarter	1 quarter	2 quarter	3 quarter	4 quarter	
Coliform index	Colony Forming Units (CFU)/g	< 1	2.5	< 1	9.4	< 1	< 1	1.9	48.75	
Enterococcus index	CFU/g	< 1	6.2	< 1	< 1	< 1	< 1	1.9	98.1	
Pathogenic enterobacteria, including Salmonella	CFU/g	not detected	not detected	not detected	not detected	not detected	not detected	not detected	not detected	-[2]
Eggs and larvae of helminths (viable)	spec. /g	not detected in 1 kg	not detected in 1 kg	not detected in 1 kg	not detected in 1 kg	not detected in 1 kg	not detected in 1 kg	not detected in 1 kg	not detected in 1 kg	
Intestinal pathogenic protozoan cysts	spec. /100g	not detected	not detected	not detected	not detected	not detected	not detected	not detected	not detected	
Cadmium	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	(2)
Cooper	mg/kg	18.3	23.3	26.8	32.4	33.1	29.6	19.8	26.4	132
Zinc	mg/kg	41.6	46.8	34.2	30.8	29.9	34.5	37.3	32.1	(220)
Nickel	mg/kg	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	80
Lead	mg/kg	52.4	49.2	41.7	46.3	47.3	39.1	44	36.9	32 (130)
Arsenic	mg/kg	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	2.0 (10)
pH	mg/kg	7.1	7.03	7.00	7.00	7.05	7.02	7.00	7.02	
Oil products	mg/kg	68.9	53.4	44.0	22.4	23.0	18.0	21.0	45.7	

[1] Maximum permissible concentrations of pollutants is determined in accordance with the Hygienic Regulations HR 2.1.7-2041-06 "Maximum permissible concentrations (MPC) of chemical substances in the soil" and Hygienic Regulations HR 2.1.7.2511-09 "Tentative allowable concentrations (TAC) of chemical substances in the soil" (MPC values are given in brackets)

[2] Soil quality standards were determined in accordance with the Sanitary and epidemiological requirements to water quality SanPiN 2.1.7.1287.03 "Soil, cleaning of settlements, domestic and industrial wastes, sanitary protection of soil. Sanitary and epidemiological rules and norms".

Table 57 - Results of the air monitoring in the zone of impact of the landfill of hazardous wastes of Kaliningrad during the period from 2011 to 2012

Indicator	Unit of measurement	2011				2012				MPC[1], mg/kg
		1 quarter	2 quarter	3 quarter	4 quarter	1 quarter	2 quarter	3 quarter	4 quarter	
		Near the landfill's checkpoint								
Nitrogen oxide	mg/m^3	0.034	0.04	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.06
Nitrogen dioxide	mg/m^3	0.05	0.039	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.04
Sulphur dioxide	mg/m^3	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	-
Ammonia	mg/m^3	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.04
Hydrogen sulphide	mg/m^3	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	0.0076	-
Methane	mg/m^3	< 40	< 25	< 25	< 25	< 25	< 25	< 25	25.0	-
Carbon monoxide	mg/m^3	< 1	< 1	2	< 1	< 1.5	< 1.5	1.00	< 1.5	3.0
Mercury vapours	mg/m^3	$< 50x10^{-6}$	$< 50x10^{-6}$	$< 50x10^{-6}$	$< 50x10^{-6}$	$< 50x10^{-6}$	$< 50x10^{-6}$	$< 50x10^{-6}$	$< 50x10^{-6}$	0.003
Soot	mg/m^3	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	0.027	-
Suspended matters	mg/m^3	0.09	0.07	0.14	0.08	< 0.26	< 0.26	< 0.26	< 0.26	0.15
Benzene	mg/m^3	0.07	0.03	< 0.001	0.03	0.14	0.14	< 0.05	< 0.05	0.1
		Outside the landfill area (near the control post of the plant "Avtotor")								
Nitrogen oxide	mg/m^3	0.06	0.047	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.06
Nitrogen dioxide	mg/m^3	0.086	0.049	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.04
Sulphur dioxide	mg/m^3	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	-
Ammonia	mg/m^3	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.04
Hydrogen sulphide	mg/m^3	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	0.006	-
Methane	mg/m^3	< 40	< 25	< 25	< 25	< 25	< 25	< 25	29.8	-
Carbon monoxide	mg/m^3	1.1	< 1	< 1	< 1	< 1.5	< 1.5	1.1	1.5	3.0
Soot	mg/m^3	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	0.063	-
Suspended matters	mg/m^3	0.12	0.11	0.17	0.11	0.27	< 0.26	< 0.26	< 0.26	0.15
Benzene	mg/m^3	0.054	0.047	< 0.001	0.042	0.119	0.11	< 0.05	0.14	0.1

[1] Maximum permissible concentrations (MPC) of pollutants is determined in accordance with the Hygienic Regulations HR 2.1.6-1338-03 "Maximum permissible concentrations (MPC) of pollutants in the air of settlements"

Table 58 – Results of the filtrate monitoring near the landfill of hazardous wastes of Kaliningrad and bed silt monitoring of the water body near the landfill

Filtrate near the landfill of hazardous wastes of Kaliningrad				Bed silt of the water body		
№ п/п	Indicator	MPC[1], mg/dm^3	Concentration, mg/dm^3	Indicator	MPC[2], mg/kg	Concentration, mg/kg
1	pH	-	6.85	pH	-	6.49
2	Cadmium	0.001	< 0.0001	Phenol	-	< 0.05
3	Total chromium	0.05	0.001	Mercury	2.1	0.09
4	Mercury	0.0005	< 0.05 x 10^{-3}	Zinc	(220)	71
5	Phenol	0.001	0.049	Cooper	(132)	21
6	Arsenic	0.01	0.0004	Nickel	(80)	6.6
7	Cobalt	0.1	< 0.001	Lead	32.0 (130)	< 0.5
8	Cooper	1	0.0012	Cadmium	(2)	2
9	Nickel	0.02	0.0032	Chromium	-	36
10	Lead	0.01	< 0.001	Cobalt	-	5.3
11	Zinc	1	0.015	Arsenic	2.0 (10)	14.2
12	Cyanides	0.07	< 0.005	Oil products	-	191
13	Oil products	0.3	0.26	DCH	-	0.016
14	DCM (dichloromethane)	0.02	0.50 x 10^{-3}	Chloroform	-	0.0043
15	Chloroform	0.06	0.00217	Carbon tetrachloride	-	0.0011
16	Carbon tetrachloride	-	0.036 x 10^{-3}	DCE	-	0.00008
17	DCE (dichloroethane)	0.003	<0.001 x 10^{-3}	Hexachloroethanes	-	< 0.0002
18	Hexachloroethane	0.01	<0.001 x 10^{-3}	Pentachloroethane	-	< 0.0002
19	Pentachloroethane	-	<0.001 x 10^{-3}	Hexachloroethane	-	< 0.0002

Filtrate near the landfill of hazardous wastes of Kaliningrad				Bed silt of the water body		
№ п/п	Indicator	MPC[1], mg/dm^3	Concentration, mg/dm^3	Indicator	MPC[2], mg/kg	Concentration, mg/kg
20	Hexachloroethane	-	<0.001 x 10^{-3}	Trichloroethylene	-	< 0.0002
21	Perchloroethylene	0.005	<0.001 x 10-3	Perchloroethylene	-	< 0.0002
22	Benzene	0.001	50 x 10-6	Benzene	0.03 (0.3)	0.0017
23	Toluene	0.024	0.00127	Toluene	0.3	0.025
24	Ethylbenzene	0.002	24 x 10-6	Ethylbenzene	-	< 0.0001
25	M- and p- xylenes	-	16 x 10-6	M- and p- xylenes	0.3	0.0064
26	O-xylene	-	10 x 10-6	O-xylene	0.3	0.0034
27	Sterol	-	0.00017	Chlorophenol	-	< 0.01
28	Chlorophenol	-	<0.0001	Pentabromdiphenyl ether (sum of isomers)	-	0.0296 x 10-3
29	Anthracene	10	2.2 x 10-6	Hexabromodiphenyl ether (sum of isomers)	-	0.0064 x 10-3
30	Acenaphthene	-	70.3 x 10-6	Octabromodiphenyl ether (sum of isomers)	-	< 0.01 x 10-3
31	Acenaphthylene	-	19.8 x 10-6	Decabromodiphenyl ether	-	0.0591 x 10-3
32	Benz(a)anthracene	-	4.6 x 10-6	Hexabromocyclododecane (sum of isomers)	-	< 0.02 x 10-3
33	Benz(a)pyrene	0.00001	9.6 x 10-6	Endosulphane (sum of isomers)	-	< 0.02 x 10-3
34	Benzo(b)fluoranthene	-	12.6 x 10-6	2,3,7,8-TCDD	-	0.03 x 10-6
35	Benzo(k)fluoranthene	-	8.5 x 10-6	1,2,3,7,8-PeCDD	-	0.09 x 10-6
36	Benzo(g,h,i)perylene	-	10.2 x 10-6	1,2,3,4,7,8-HxCDD	-	0.05 x 10-6
37	Dibenz(a,h)anthracene	-	1.9 x 10-6	1,2,3,6,7,8-HxCDD	-	0.18 x 10-6
38	Indeno(1,2,3-cd)pyrene	-	5.6 x 10-6	1,2,3,7,8,9-HpCDD	-	0.23 x 10-6
39	Naphthalene	0.01	7.9 x 10-6	1,2,3,4,6,7,8-HpCDD	-	2.02 x 10-6

Filtrate near the landfill of hazardous wastes of Kaliningrad				Bed silt of the water body		
№ п/п	Indicator	MPC[1], mg/dm^3	Concentration, mg/dm^3	Indicator	MPC[2], mg/kg	Concentration, mg/kg
40	Pyrene	-	54 x 10-6	OCDD	-	0.0157 x 10-3
41	Phenanthrene	-	0.198 x 10-3	2,3,7,8-TCDF	-	0.53 x 10-6
42	Fluoranthene	-	46.7 x 10-6	1,2,3,7,8-PeCDF	-	0.31 x 10-6
43	Fluorene	-	9.3 x 10-6	2,3,4,7,8-PeCDF	-	0.31 x 10-6
44	Chrysene	-	8.9 x 10-6	1,2,3,4,7,8-HxCDF	-	0.34 x 10-6
45	Pentabromdiphenyl ether (sum of isomers)	-	0.4 x 10-6	1,2,3,6,7,8-HxCDF	-	0.23 x 10-6
46	Hexabromodiphenyl ether (sum of isomers)	-	0.04 x 10-6	1,2,3,7,8,9-HxCDF	-	0.11 x 10-6
47	Octabromodiphenyl ether (sum of isomers)	-	< 0.02 x 10-6	2,3,4,6,7,8-HpCDF	-	0.24 x 10-6
48	Decabromodiphenyl ether	-	< 0.2 x 10-6	1,2,3,4,6,7,8-HpCDF	-	1.20 x 10-6
49	Hexabromocyclododecane (sum of isomers)	-	< 0.5 x 10-6	1,2,3,4,7,8,9-HpCDF	-	0.15 x 10-6
50	Endosulphane (sum of isomers)	-	< 0.2 x 10-6	OCDF	-	1.97 x 10-6
51	3,3'4,4'-TCB (77)	0,01	2.038 x 10-6	Other TCDD	-	0.0111 x 10-3
52	3,4,4',5-TCB (81)	0,01	97.4 x 10-9	Other PeCDD	-	0.0248 x 10-3
53	3,3', 4,4',5-PeCB (126)	0,0005	8.45 x 10-9	Other HxCDD	-	0.0409 x 10-3
54	3,3',4,4',5,5'-HxCB (169)	-	< 1.9 x 10-9	Other HpCDD	-	5.1 x 10-6
55	2,3,3',4,4'-PeCB (105)	0,0005	1.484 x 10-6	Other TCDF	-	5.9 x 10-6
56	2,3,4,4',5-PeCB (114)	0,0005	97.4 x 10-9	Other PeCDF	-	3.7 x 10-6
57	2,3',4,4',5-PeCB (118)	0,0005	2.462 x 10-6	Other HxCDF	-	2.6 x 10-6

Filtrate near the landfill of hazardous wastes of Kaliningrad				Bed silt of the water body		
№ п/п	Indicator	MPC[1], mg/dm^3	Concentration, mg/dm^3	Indicator	MPC[2], mg/kg	Concentration, mg/kg
58	2',3,4,4',5-PeCB (123)	0,0005	21.3 x 10-9	Other HpCDF	-	1.8 x 10-6
59	2, 3,3',4,4',5-HxCB (156)	-	69.06 x 10-9	3,3'4,4'-TCB (77)	«0.06»	9.47 x 10-6
60	2,3,3',4,4',5'-HxCB (157)	-	20.76 x 10-9	3,4,4',5-TCB (81)	«0.06»	0.30 x 10-6
61	2,3',4,4',5,5'-HxCB (167)	-	35.17 x 10-9	3,3', 4,4',5-PeCB (126)	«0.1»	1.38 x 10-6
62	2,3,3',4,4',5,5'-HpCB (189)	-	3.39 x 10-9	3,3',4,4',5,5'-HxCB (169)	-	0.18 x 10-6
63	2,3,7,8-TCDD	1 x 10-9	< 0.12 x 10-9	2,3,3',4,4'-PeCB (105)	«0.1»	0.1582 x 10-3
64	1,2,3,7,8-PeCDD	-	< 0.13 x 10-9	2,3,4,4',5-PeCB (114)	«0.1»	0.0106 x 10-3
65	1,2,3,4,7,8-HxCDD	-	0.15 x 10-9	2,3',4,4',5-PeCB (118)	«0.1»	0.1092 x 10-3
66	1,2,3,6,7,8-HxCDD	-	< 1.21 x 10-9	2',3,4,4',5-PeCB (123)	«0.1»	8.51 x 10-6
67	1,2,3,7,8,9-HxCDD	-	<0.21 x 10-9	2, 3,3',4,4',5-HxCB (156)	-	0.0451 x 10-3
68	1,2,3,4,6,7,8-HpCDD	-	1.47 x 10-9	2,3,3',4,4',5'-HxCB (157)	-	0.01539 x 10-3
69	OCDD	-	8.90 x 10-9	2,3',4,4',5,5'-HxCB (167)	-	0.02597 x 10-3
70	2,3,7,8-TCDF	-	0.45 x 10-9	2,3,3',4,4',5,5'-HpCB (189)	-	4.83 x 10-6
71	1,2,3,7,8-PeCDF	-	0.34 x 10-9	Anthracene	-	0.1279
72	2,3,4,7,8-PeCDF	-	0.74 x 10-9	Acenaphthene	-	0.0087
73	1,2,3,4,7,8-HxCDF	-	0.50 x 10-9	Acenaphthylene	-	0.0034
74	1,2,3,6,7,8-HxCDF	-	0.39 x 10-9	Benz(a)anthracene	-	0.2173
75	1,2,3,7,8,9-HxCDF	-	< 0.14 x 10-9	Benz(a)pyrene	0.02	0.2018
76	2,3,4,6,7,8-HxCDF	-	0.61 x 10-9	Benzo(b)fluoranthene	-	0.2251

Filtrate near the landfill of hazardous wastes of Kaliningrad				Bed silt of the water body		
№ п/п	Indicator	MPC[1], mg/dm^3	Concentration, mg/dm^3	Indicator	MPC[2], mg/kg	Concentration, mg/kg
77	1,2,3,4,6,7,8-HpCDF	-	1.17 x 10-9	Benzo(k)fluoranthene	-	0.1608
78	1,2,3,4,7,8,9-HpCDF	-	< 0.3 x 10-9	Benzo(g,h,i)perylene	-	0.221
79	OCDF	-	0.86 x 10-9	Dibenz(a,h)anthracene	-	0.0471
80	Other TCDD	-	2.1 x 10-9	Indeno(1,2,3-cd)pyrene	-	0.1254
81	Other PeCDD	-	< 2.35 x 10-9	Naphthalene	-	< 0.001
82	Other HxCDD	-	4.0 x 10-9	Pyrene	-	0.9849
83	Other HpCDD	-	2.6 x 10-9	Phenanthrene	-	0.2514
84	Other TCDF	-	15.8 x 10-9	Fluoranthene	-	0.9336
85	Other PeCDF	-	8.0 x 10-9	Fluorene	-	0.0064
86	Other HxCDF	-	4.1 x 10-9	Chrysene	-	0.2242
87	Other HpCDF	-	1.9 x 10-9	-	-	-

[1] Maximum permissible concentrations (MPC) of pollutants are determined in accordance with the Hygienic Regulations HR 2.1.5.1315-03 "Maximum permissible concentrations (MPC) of chemical substances in the water of water bodies of household water use and cultural and domestic water use" and Hygienic Regulations HR 2.1.5.2280-07 "Maximum permissible concentrations (MPC) of chemical substances in the water of water bodies of household use and cultural and domestic water use. Additions and changes №1 to the HR 2.1.5.1315-03".

[2] Maximum permissible concentrations (MPC) of pollutants are determined in accordance with the Hygienic Regulations HR 2.1.7.2041-06 "Maximum permissible concentrations (MPC) of chemical substances in the soil" and Hygienic Regulations HR 2.1.7.2511-09 "Tentatively permissible concentrations (TPC) of chemical substances in the soil" (MPC values are given in brackets). MPC values, given into quotation marks «0.01», are taken from http://www.dioxin.ru/, section «About dioxins», subsections «polychlorinated biphenyls (PCB)» and «Environmental contamination by dioxins»

1.3.5.6. Analysis of the compliance of the activities of the landfill of hazardous wastes of Kaliningrad with the current HELCOM Recommendations

Analysis of the compliance of the activities of the landfill of hazardous wastes of Kaliningrad with HELCOM Recommendations is carrying out on the basis of RECOMMENDATION 24/5 Proper waste handling/disposal (Table 59).

1.3.5.7. Activities necessary for excluding the landfill from the HELCOM's list of hot spots

To reduce radically a negative impact on the environment, it is necessary to do reclamation of the Landfill of hazardous wastes and to construct the new landfill for industrial and municipal wastes as well as the waste-treatment plant within the framework of the regional target program.

Conclusion

The negative impact of the Landfill of hazardous wastes in Kaliningrad upon the environment is significant as a result of applying outdated technologies of the wastes burial without any pre-sorting and treatment and inefficient measures to minimise the negative impact of the landfill.

The comparative analysis of the hot spot for the previous period shows that in spite of the treatment plant for leakage water putting into operation the negative impact level continues to rise.

The Landfill does not meet the current requirements in terms of technical and operational characteristics . The Landfill does not have impermeable bedrocks to prevent leakage of filtrate. Any reliable information on hazardous ingredients of sewage water penetrating from the Landfill to the environment is not available Monitoring of the sewage drain water and filtrate from the Landfill affecting the ground and surface water is absent. Frequent fires happened at the Landfill provoke concern.

The implementation of activities for the Landfill reclamation will ensure its ecological safety.

By 2016, the construction of a new landfill and incineration plant with capacity up to 300 thousand tons per year is planned within the framework of the regional target program "Handling wastes of production and consumption in the Kaliningrad Region for the period from 2012 to 2016" at the expense of funds of the regional budget subject to inclusion into the regional investment program.

To control the composition and migration of pollutants together with the ground water, it is necessary to arrange the hydrogeological monitoring of the object.

Table 59 – Analysis of compliance of activity of the landfill of hazardous wastes in Kaliningrad with HELCOM Recommendations

HELCOM Recommendation	Targets	Standard	The situation at the enterprise	Conclusion about conformity of the target
RECOMMENDATION 24/5 Proper waste handling/disposal	Compliance with the national legislation in the field of waste management	Full compliance	The company has a full set of environmental documentation, developed in accordance with the Russian legislation in the field of handling with waste. Violations in the field of handling with wastes were detected in 2012 due to the scheduled inspection on compliance with environmental legislation	+/-
	Reduction of waste landfilling at the expense of their pre-separation and treatment		Wastes when accepted by the landfill are not separated and not separately treated	-

1.3.6. Hot spot № 71 Fuel and cargo complex of FSUE "State Sea Fishing Port (Port oil bunkering station of Kaliningrad)"

By 2 July 2005, the FSUE "State Sea Fishing Port" had been joined to the FSUE "Kaliningrad Sea Fishing Port" (FSUE "KSFP").

The FSUE "Kaliningrad Sea Fishing Port" carries out business operations related to loading, unloading and service of transport ships as well as receiving and treatment of bilge and ballast waters and oily waste water transported from the ships. The FSUE "KSFP" has three production areas: central (port), motor technical centre and fuel and cargo complex (FCC). The industrial area of the FSUE "KSFP" is referred to the enterprises of the first class of hazard with the sanitary-protection zone of 1000 m in accordance with the paragraph 7.1.14 of SanPiN 2.2.1/2.1.1.1200-03.

The FCC is located at the territory of the FSUE "KSFP" on the bank of the Pregel River (Figure 33). It occupies the area of 19.35 hectares, where the following facilities are located: the tank stock of 36 000 m^3 in capacity for oil products storage, two double-sided railroad overpasses for unloading and loading of black and white oil products, as well as various lubricating oils, up to 24 tank-wagons, technological pump stations for various oil products and other support services. The Fuel and Cargo Complex is able to perform simultaneous unloading of 30 tank-wagons. The industrial site of the enterprises provided with the accumulating access ways for 150 tank-wagons. The territory has deep-water terminals which allow to work with tankers of 14 000 tons of displacement and to carry out waste pumping from ships to the treatment facilities. The treatment facilities aimed at separation of suspended matters and oil products of oil-containing water and tanks for collection of oil-containing mixture, bilge and ballast waters are located in the territory of the industrial site.

The territory of the enterprise along the perimeter is enclosed with the concrete fence. It borders with the Pregel River to the North, the backwater and the territory of the Baltic Shipyard "Yantar" to the East, Transportnaya street to the South and swamp land free from buildings to the West.

The slick bars are installed in the Pregel River at the point of oil products discharge to prevent the contamination spreading .

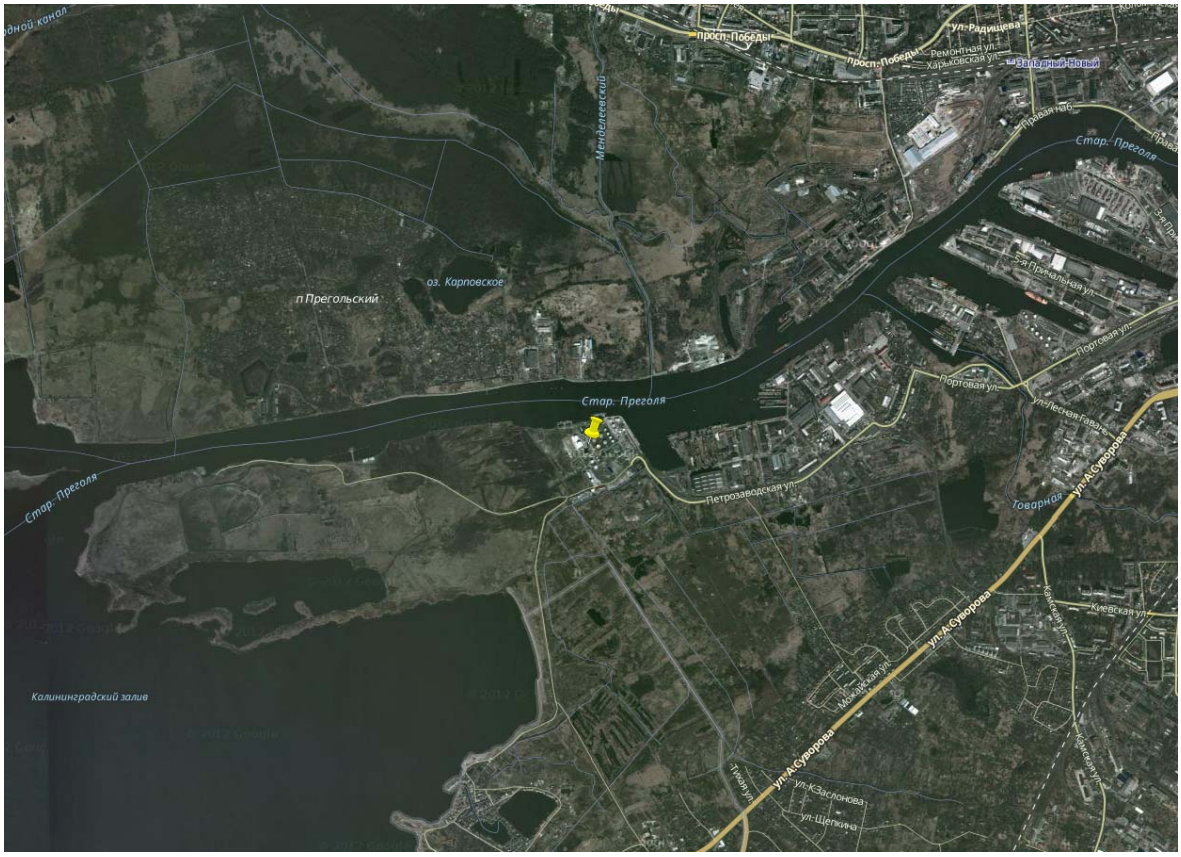


Figure 35 – Location of the FCC

The enterprise is carrying out collection of the following types of wastes from ships calling at the Kaliningrad Sea Port:

- oil-containing (bilge) waters formed during the shipoperation and accumulated in the under-deck areas equipped at ships. This waste water is treated at the treatment plant of the enterprise when accumulated.

- domestic sewage waters resulted from the everyday activities of the ship's crew and accumulated in the holding tanks of ships. This sewage water is discharged to the sewerage system of the port when accumulated.

The main activities of the enterprise include:

- acceptance, transshipment and storage of oil and oil products;
- sips bunkering with fuel;
- collection, treatment and disposal of bilge and bilge and ballast waters and other oil-containing waters (naphtha residue, oil mixtures containing chemical substances) from ships;
- analysis of oil and sewage oil-containing water.

As a result of the enterprise's activities the following types of wastes are formed:

- acceptance and treatment of oil-sluge

- BBW (bilge and ballast water);
- Oil-sludge;
- MWO (a mixture of waste oil);
- wastes of oil-sludge trap

1.3.6.1. History of the enterprise

The FCC was established on the site where the small oil bunkering station of the former German company "SHELL" remained after the Second World War and located at the right side of the Forestry Harbor of the Port. In 1954, the overhaul of the oil bunkering station and the territorial extension were begun. During the subsequent five-year period, four tanks were put into operation, bunkering and wooden fire moorings, railways, service rooms were built that allowed to start the production activities of the oil bunkering station in 1959.

During 1960s years, the horizontal oil tanks were installed, the number of vertical tanks for diesel fuel and fuel oil was increased. In 1965, the boiler room operated on the liquid fuel was built, and in 1982 it was reconstructed. By 1967, the total capacity of the oil bunkering station has reached 30 thousand m^3 of simultaneous storage of different fuels and oils, and the fire pump station was put into operation. Increase of the tanks number for storage of oil products has led to the construction of the oil fuel pumping station and modernization of pumping facilities.

During 1970s, the administrative and utility building was constructed, the laboratory for analysis of oil products and sewage water composition, storehouse for fuels and lubricants, control rooms and etc. were created. In 1976, the treatment facilities of the FCC were put into operation to treat mazut polluted, bilge and ballast and oil-containing waters. In 1982, the station for utilisation of ship wastes and oil-sludge.

In 1990s, the reconstruction and renewal of technological equipment were carried out resulted in increase of the freight turnover of the FCC.

During the period from 1999 to 2005, the enterprise existed as a separate state enterprise (FSUE) "Kaliningrad Oil Bunkering Station" (KOBS). In November, 2005, it again became a structural unit of the Kaliningrad Sea Fishing Port.

1.3.6.2. Impact upon the environment

The FCC of the FSUE "KSFP" has been included in the list of the HELCOM's of "hot spots" due to the presence of the following sources of environment pollution formed during complex operations in the territory of the FCC:

- oil-sludge accumulated in the earth storage;

- oil pollution of soils located in close proximity to the riverside that results in the drainage of oil products to the Pregel River. This creates the danger to the water quality in the Vistula (Kaliningrad) Lagoon though the existing hydrological network (Clause 3 paragraph 2 of the Convention on Protection of Marine Environment of the Baltic Sea, 1992).

In addition, the following probable ways of the fuel and cargo complex impact on the environment may appear:

a) flooding of some areas with subsequent water pollution of the Pregel River might occur due to the lack of the storm water collection and treatment system in some areas of the FCC;

b) emissions of pollutants (hazard substances, carbon dioxide) into the atmosphere during oil-sludge treatment, storing in the sludge tank, as well as during loading and unloading works.

1.3.6.3. State of the enterprise by 2000 - 2004

The tank stock consisted of 33 tanks with total capacity of 30 000 m^3 were the crude oil, diesel fuel, engine oil and bunker fuel were stored. The tank stock had banking and was equipped with the electronic information-measuring system "ENTIS".

Oil products were delivered to the enterprise in cisterns by railway and unloaded to the water and motor transport. All operations conducted with oil products during bunkering ships and loading tank-lorries were carried out using closed method. In 2003 the transshipment volume amounted to 1863.84 thousand tons.

The territory of the oil bunkering station was divided onto three functional areas: acceptance, storage and delivery (bunkering).

The acceptance area included two rail-road overpasses for 16 tank-wagons with the capacity of 60 tons each, facilities of upper and lower unloading, four pumping stations with the capacity from 200 to 700 t/hour depending on oil products density. From the acceptance area the oil products were transported to the tanks of the storage area or directly to bunkering ships.

The storage area was represented with the tank store of horizontal and vertical tanks with the capacity from 50 to 5 000 m^3. The total capacity of the tank store was 30 305 m^3 (Table 60).

Table 60 – Characteristic of the tank store in 2004

Object name	Model	Class of hazard	Hazard substance	Volume (tones)	Year of putting in operation	Date of the last inspection
Tank № 1	PBK-1000	4	Diesel fuel	895,57т	1956	2003 Diamar-servis
Tank № 2	RBK-1000	4	Fuel oil	985.53	1956	2000 Diamar-servis
Tank № 3	RBK-1000	4	Fuel oil	898.17	1957	2003 Diamar-servis
Tank № 4	RBK-600	4	Diesel oil	447.37	1957	2000 Diamar-servis

Object name	Model	Class of hazard	Hazard substance	Volume (tones)	Year of putting in operation	Date of the last inspection
Tank № 5	PBS-2000	3	Oil, gas condensate	1642.68	1961	2003 Diamar-servis
Tank № 7	PBS-1000	3	Oil, gas condensate	759.78	1965	2003 Diamar-servis
Tank № 8	PBS-1000	3	Oil, gas condensate	749.25	1961	2001 Diamar-servis
Tank № 9	PBS-5000	3	Oil, gas condensate	3600.45	1969	2003 Diamar-servis
Tank № 10	PBS-5000	3	Oil, gas condensate	3725.27	1969	2003 Diamar-servis
Tank № 11	PBS-5000	3	Oil, gas condensate	3738.23	1964	2001 Diamar-servis
Tank № 12	PBS-5000	4	Diesel oil	3847.05	1964	-
Horizontal tank № 26	RGS	4	Diesel oil	56.932	1963	-
Horizontal tank № 27	RGS-50	3	Oil	45.24	1963	-
Horizontal tank № 28	RGS-40	3	Oil	36.81	1963	-
Horizontal tank № 34	RGS-50	3	Oil	44.553	1969	-
Horizontal tank № 35	RGS-50	3	Oil	44.785	1969	-
Horizontal tank № 47	RGS-50	3	Oil	42.385	1982	-
Horizontal tank № 48	RGS-50	3	Oil	42.445	1982	-
Pumping station №1 (diesel fuel)	-	4	Diesel oil	-	1975	-
Pumping station № 2 (fuel oil)	-	4	Fuel oil	-	1978	-

The storage area was connected with the acceptance and delivery area with the surface pipeline of 219 mm in diameter and 2000 m in length. The maximum length of the pipeline between shut-off gate valves was 150 m.

The oil products delivery area was subdivided into the site of oil products delivery into tankers from moorings and the site of oil products delivery to tank-lorries.

Table 61 – Transshipment volume during the period from 1991 to 2004, thousand tons

Year	Diesel fuel	Fuel oil	Oil	Oil (petroleum)	Ship's fuel	Total transhipment
1991	-	-	-	-	-	455.0
1992	-	-	-	66	-	544.8
1993	19.1	11.2	0.5	226	-	574.3
1994	96.1	24.6	6.7	484.2	-	617.9
1995	63.9	21.7	1.2	326.5	-	413.3
1996	37.5	8.7	1.2	508	-	574.1
1997	34.5	20.5	1.0	619	-	675.1
1998	50.7	17.1	0.6	493.9	-	562.3
1999	101.65	54.7	1.25	267.3	-	424.9
2000	82.17	57.34	1.86	314.01	1.74	457.12

Year	Diesel fuel	Fuel oil	Oil	Oil (petroleum)	Ship's fuel	Total transhipment
2001	197.40	52.22	1.99	185280	-	555.73
2002	291.06	34.6	1.42	757	105.65	1348.85
2003	297.47	72.33	1.19	1401.21	417.56	1863.84
2004	-	-	-	-	-	more than 2 000

The enterprise had own sources of water supply – four artesian wells. Three of them are working and equipped with stop valves, and another one was suspended. In 2004 the total water consumption constituted 120.7 m^3/day, including:

- 20.5 m^3/day for domestic needs;
- 100.2 m^3/day for production needs.

The FSUE "KOBS" has its own treatment plant. The designed capacity of the treatment pant is 2.8 thousand m^3/day, and the actual load in 2004 amounted to 38.4 m^3/day.

The water discharge to the Pregel River was 231.4 m^3/day.

The sewage water discharge in 2004 was 43 thousand m^3/year, including:

- 29 thousand m^3/year of untreated water ;
- 14 thousand m^3/year of insufficiently treated water.

The blige and ballast water accepted from ships and third-party organisations was fed to the treatment facilities of the FSUE "Kaliningrad oil bunkering station" in amount of 14 thousand m^3/year.

The amount of the rain and melt water coming from the territory of the enterprise was 78.6 m^3/day.

In 2004, the starting-up and adjustment works of the unit "UNIVERSAL" for treatment of oil-containing waters were carried out at the treatment facilities. This unit allowed to decrease significantly the content of pollutants in the discharged water.

In 2000, during investigation carried out by the Special Bureau of Independent Examinations of St.-Petersburg, the weight of oil products in soils at the oil bunkering station within the fuel overpasses zone was 1332 tons , and the volume of soil contaminated with oil products constituted 19 041 m^3. The soil of the oil bunkering station territory within the fuel overpass zone in close proximity to the shoreline of the Pregel River falling into the Vistula (Kaliningrad) Lagoon is classified as heavy polluted with oil products. Such accumulation of oil products in soil (sometimes in the form of lens) is caused by the long-term operation without paying proper attention to the environmental requirements. This became a serious source of water pollution of the Pregel River and Vistula Lagoon by oil products. The actual concentrations of pollutants in the sewage

water discharged by the oil bunkering station to the Pregel River exceeded the maximum permissible concentrations for some indicators by several hundred times.

1.3.6.4. The completed works on the improvement of technological production processes and improvement of the "hot spot" state during the period from 1992 to 2004

Table 62 – Activities carried out during the period from 1992 to 2004

Year	Activities	The total cost of the works, Rub.
1992	The reconstruction of technological equipment was carried out, pumping oil station and technological pipeline were mounted.	-
1993	Electronic information-measuring system of oil products accounting "ENTIS" put into operation	-
1993-1994	Standers SP-250 at the moorage №4 put into operation. Stander is a facility for loading (unloading) of oil products to ships by the closed method.	-
1994	Ferroconcrete fence with length of 700 running meters was mounted.	-
1995	Three standers SP-250 at the moorage №3 for bunker oil, diesel fuel, fuel oil and oil were installed; 33 installations for lower unloading of oil products from rail tank cars by the closed method were mounted.	-
1996	Harbor booms were purchased	-
1997	Horizontal tank with the capacity of 200 m^3 in underground version for collection of industrial storm runoff was mounted	-
1998	3 pumping facilities were mounted: in fuel and pumping – 2, oil and pumping – 1. Repairing of pumping stations, utility building and storage rooms were implemented.	-
1999	Area with horizontal tanks was repaired.	-
2000	Design works on the construction of facilities for oil-sludge treatment were implemented; engineering and environmental expertise of the territory and waters in the region of fuel overpass was carried out by the Scientific Production Company "GT Inspect" of St. Petersburg.	207 284
2002	Installation for oil-sludge treatment of the KHD "Klockner-Humboldt- Deutz", manufacturer "BAKER PROCESS" (Germany), was mounted and put into operation. It is an environmental protection object providing water and soil protection from pollutions by wastes of oil products and secondary resources return.	40 920 269
2003	On the basis of recommendations of engineering and environmental expertise in order to avoid the coming of oil products in the soil during loading and unloading works, works on repairing of concrete encasement of front discharges of 1 and 4 railways with system of collection and discharge of storm and industrial sewage water to treatment plants.	3 476 085
	According to the HELCOM Recommendation 20/5 "Minimum ability to respond to Oil spillages in Oil Terminals" the LARN plan was developed by the FSUE "KOBS" and adopted by the Maritime Administration of the Port "Kaliningrad" and LARN post was equipped which included: environmental boat "Boom`sboat -150"; booms of constant buoyancy BPP-830; emergency side barrier ABZ-500; skimmer booms of threshold type SB-6; anchor system, positioning chain.	1 864 806
	Equipment for fire extinguishing by nontoxic, biodegradable foaming agent was purchased (PETROFILM-PHH FFFP, NIZHEGORODSKIY AFFF)	2 500 000
2004	The work project "Compact installation of stabilization of hydrocarbon raw materials at the Kaliningrad oil bunking station" on which the stabilization of physical and chemical indicators of treated discharged oil products of group of mixture of waste oil (MWO) was developed and adopted by the supervisory authorities. Later, the complex of civil and erection works were implemented and the ancillary equipment of stabilization installation of hydrocarbon raw materials was mounted.	1 600 000

Year	Activities	The total cost of the works, Rub.
	The work project "Tank farm for reception and storage of oil-sludge and MWO at the territory of the FSUE "Kaliningrad oil bunkering station" was developed. The project provided a collection and storage of oil-sludge and treated MWO as well as collection of storm and industrial sewage water from the territory of the existing tank farm with its further transfer for the treatment. The outfall №1 was liquidated. Implementation of the project would eliminate the open sludge collector with the capacity of 800 m^3 and reclamate land.	7 784 047
	Tanks RVS-1150 were purchased in the amount of 4 units.	
	Standards of maximum permissible discharges in sewage water of the outfall to the Pregel River were adopted.	
	The technical re-equipment of treatment-plants of bilge and ballast water was implemented: renovation of building and premises of the treatment plants was done; project documentation for the installation of sewage water treatment "Universal", conclusion of ecological assessment was got; technological equipment of installation for sewage water treatment "Universal" was purchased; mounting of installation equipment was carried out; works on development of banking of tanks №№ 1, 2, 3, 4, 13 were implemented (geomembrane installation).	2 767 138
The total cost of the work performed by the FSUE "KOBS" own funds		58 619 629

The activities aimed at improvement of the "hot spot" (designing and construction of biological treatment facilities for domestic sewage water of the outfall №3, designing and construction of facilities for burning of municipal solid wastes) planned for 2005 were not implemented.

1.3.6.5. The current state

The amount of transshipment of oils and oil products of the FCC for the recent years is presented in Table 63. The potential treatment of oil products constitutes up to 3 million tons per year.

Table 63 – The amount of transshipment of soils and oil products during the period from 2007 to 2012, thousand tons/year

Product	Possible amount	The amount of transshipment of soils and oil products				
		2007	2008	2009	2011	2012
Oil		61	-			
Diesel fuel, kerosene	500	453	-	-	-	-
Benzine	2 100	1 567	2 019	-	-	-
Mazut	40	14	36	-	-	-
Oils	1	0,02	-	-	-	-
Total amount of transhipment of oil and oil products	3 000	2 166	2 047	2 000	1 621.13	780.9

There is a terminal for volatile flammable liquids (VFL) in the Kaliningrad Sea Fishing Port at the territory of the FCC intended for transshipment of white oil products. The tank stock capacity of this site is 12 000 m^3. Currently, the VFL terminal is out of service.

In 2011 the reconstruction of the tank stock was begun in the territory of the FCC , including construction of four new tanks with the capacity of 5 thousand m^3 for oil products reception.

The bilge water collector (BWC) "Minoga" transfers domestic and sanitary sewage water to the sewerage system of the port and to the FCC site. The BWC "Minoga" provides acception of oil-containing, domestic and sanitary water. At a time the ship can accept aboard 150 tons of oil-containing water and 12 tons of domestic and sanitary water.

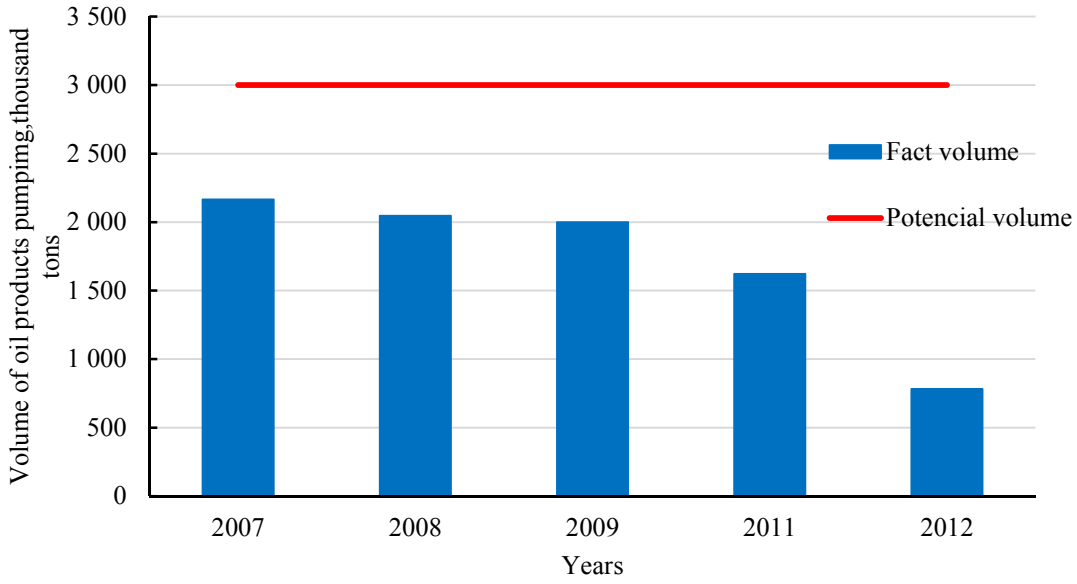


Figure 36 – The amount of transshipment of oil and oil products during the period from 2007 to 2012

Table 64 – The capacity of moorings of the FCC of the FSUE "KSFP"

Moorage №	Product	Technological operations	Tank shipment (tons)	Efficiency (tons/hour)
1 bunkering	Diesel fuel Oils	Unloading-loading	500 500	100 25
2	Diesel fuel, kerosene	Unloading-loading	Up to 3 000	400
	Mazut			120
3	Benzine	Unloading-loading	Up to 10 000	1 000
	Diesel fuel			600
	Kerosene			600
	Oil			1 200
4	Benzine	Unloading-loading	Up to 14 500	1 000

The oil-containing water is transferred to the treatment facilities of the FCC of FSUE "KSFP". Acceptance and transfer are carried out using the hose of 76 mm in the diameter.

The sewage water (oil-containing bilge and ballast water) treated at the treatment facilities to the required quality is discharged into the Pregel River.

1.3.6.6. Characteristics of the treatment facilities of the fuel and cargo complex of the FSUE "Kaliningrad Oil Bunkering Station"

The FSUE "Kaliningrad Oil Bunkering Station" carried out modernisation of treatment facilities putting into operation the modular treatment plant "Universal" with the post-treatment unit. This project implementation was ecologically important and was aimed at meeting the requirements of the environmental legislation. It allowed to improve the environmental situation by means of reducing the water pollution of the Pregel River and Kaliningrad (Vistula) Lagoon.

The modular treatment plant "Universal" is designed for treatment of oil-containing and bilge and ballast water. The designed capacity of the "Universal" is up to 55 thousand tons/year. The total volume of technological tanks is 96 m^3. The bilge and ballast water after mechanical treatment is discharged into the Pregel River. During 2012 the enterprise took for treatment 1178.888 m^3 of bilge and ballast water from ships and third-party organisations (the LLC "Transnefteproduct" and the LLC "Utilnefteproduct")

Table 65 – Indicators of the treatment quality of the modular treatment plant "Universal"

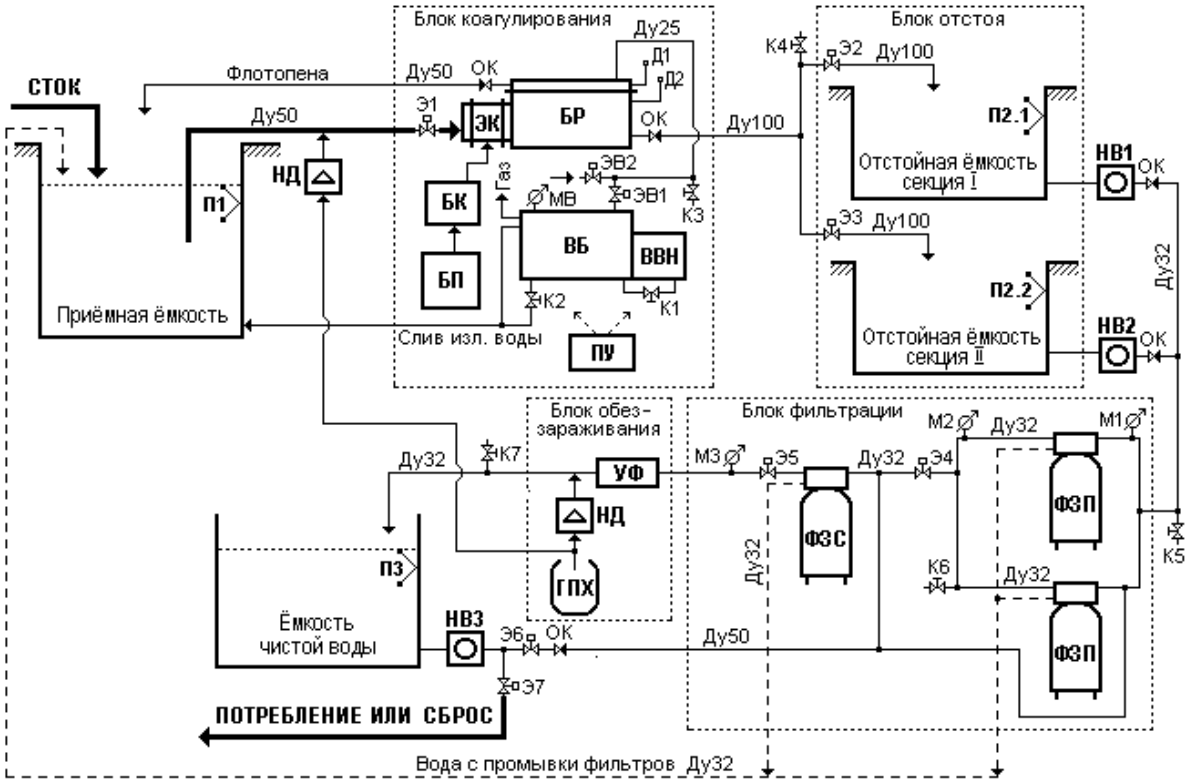
Standardized ingredients	Quality treatment indicators (mg/dm^3)
Suspended matters	20.0
Solid residual	700.0
BOD total	3.0
Chlorides	100.0
Sulphates	10.0
Ammonium nitrogen	0.1
Nitrate nitrogen	0.03
Nitrite nitrogen	0.01
Oil products	0.05
Phosphates	0.03
Alkylsulfonates	0.03
Fats	Is not allowed

The water treatment facilities of the fuel and cargo complex of the FSUE "Kaliningrad Oil Fishing Port" consists of the following:

- receiving stander;
- receiving pipeline;
- storage tanks (2 pcs.): the first tank – 5000 m^3; the second tank – 2350 m^3.
- receiver tank;
- coagulation unit;
- sludge unit;

- filtration unit;
- neutralization unit;
- tank of fresh water.

The hydraulic scheme of the system of the sewage water treatment is based on the technological scheme and treatment equipment selected for its implementation. The hydraulic scheme of the treatment system is presented in Figure 35. The uninterrupted treatment method is used.



Symbols:

ЭК – electrocoagulator; ФЗП – sandy backfilling filter; БР – expansion tank; ФЗС – sorptive backfilling filter; ВБ – vacuum unit; ФЗИ – ion-exchange backfilling filter; БП – power unit; УФ – ultraviolet irradiator; БК – commutation unit; ГПХ – hypochlorite receiving installation; ПУ – control panel; ЭВ1, ЭВ2 – electromagnetic valve; ВВН – vacuum pump; Э1…7 – electromagnetic valve; НВ1,2,3 – water pump; ОК – inverted valve; НД – doser pump; К1…7 – ball valve; П1…3 – float; М1…3 – manometer; Д1, Д2 – level sensors; МВ – vacuum manometer. УОС – reverse-osmosis installation;

Figure 37- Hydraulic scheme of the treatment system

The fuel and cargo complex of the FSUE "Kaliningrad Sea Fishing Port" provides collection of oil wastes of all types . The characteristics of the reception facilities of the FCC are presented in Table 66.

Table 66 – Information on the adequacy of reception facilities of the fuel and cargo complex of the FSUE "KSFP" as at 7 February 2012

Type of parameter	Parameter	Type of accepted wastes
		All types of oil wastes
Type of structures	F (stationaries)	F
Limitations of reception	Minimal amount (m^3)	Is not limited
	Maximum amount (m^3)	160
	Maximal speed of reception (m^3/hour)	75
	Other (specify)	–
Availability of reception facilities	24 hours per day, 7 days per week	–
	Only hours of service, 5 days per week	+
Scheme of payment	Cost is included in port charges	+
	Cost, separate from other services	+
Required minimum notification	Hours	24

1.3.6.7. Pre-treatment of waste on the treatment facilities of the fuel and cargo complex of the FSUE "Kaliningrad Sea Fishing Port"

The technological tanks used for wastes pre-treatment at the treatment facilities of the fuel and cargo complex of the FSUE "Kaliningrad Sea Fishing Port" are presented in Figure 35 and Table 67.

Table 67 – Purpose of technological tanks of the treatment plants of the FCC

Tank's name	Tank's volume	Tank's purpose
Reception tank	24 m^3	For receiving, storing and averaging of chemical composition of the incoming sewage water.
Tank for sedimentation of discharge sewage water (2 sections)	24 m^3each	For sedimentation of sewage water, passing treatment phase in electrocoagulator (flocculation).
Tank for preliminarily treated water	24 m^3	For the accumulation of the treated water aimed for washing filters.

The procedure of the wastes pre-treatment at treatment facilities of the fuel and cargo complex of the FSUE "Kaliningrad Sea Fishing Port" is as follows:

1. Bilge water collected by the ships-collectors is pumped into the storage tanks. The original sewage water (oil-containing bilge and ballast water) is transferred for treatment into the reception tank from the tank being the part of the treatment facilities of the FSUE "KSFP". When the top level of the float (П1) operation is reached, the liquid-packed ring vacuum pump(ВВН) is switched on. and creates the low partial pressure up to 0.2 atm. both in the expansion tank (БР) and electrocoagulation unit (ЭК). To intensify the oxidation process up to the

required level at the entrance point of the unit, the active chlorine, produced at the unit of sodium hypochlorite, is dosed.

2. The input electromagnetic valve (Э1) of the electrocoagulation unit opens and the sewage water is delivered to aluminium plates of electrocoagulator (electrodes) by means of vacuum suction. During the passage of electric current the electrode is dissolved in water in the form of anodic dissolved aluminium. In this way the coagulant is introduced into the treated water. In addition, whereas the voltage at the plates exceeds 4 V, the water electrolysis with release of oxygen and hydrogen occurs as a result of the process of oxidation-reduction reactions. As a result of these processes and due to increase of the water pH in the near-electrode zone, the contaminants in the form of insoluble hydroxides are extracted from the water The coagulant stimulates aggregation of extracted contaminants that is necessary for their further rapid sedimentation and removal. This process is called "coagulation".

3. Then the water is transported to the expansion tank (БР), where the coagulation process is finishing, while due to reduction of the flow rate, the intensive ascending of significant amount of electrolysis gases (due to vacuum) in the form of the smallest bubbles (flotation) is happened. In this case, the bubbles "catch" the floating and rapidly coagulating contaminants and then are fed to the reception tank in form of flotation foam.

4. After the flotation foam removal and degassing in the expansion tank (БР), the level sensor (Д1) is activated and pumping-out is switched off. The gas is fed into the expansion tank (БР) until the atmospheric pressure is achieved. Then the part of treated water is discharged to the storage tank by gravity. When the level sensor (Д2) is switched off, the feeding is stopped, pumping-out is switched and the electromagnetic valve (Э1) of input into the electrocoagulator is opened. A new water portion is fed for treatment. Therefore, the electrocoagulator and expansion tank are working in the portion-cyclic regime (intake - discharge).

5. The treated water is fed into the storage tank, where the flotation process is completed, and the extracted contaminants in the form of flakes are descending on the bottom (sludging).

The water treated in the vacuum unit is sludged during at least 20 minutes to finish the coagulation process. For maximum use of the electrocoagulator unit capacity, two sedimentation tanks (unit I, unit II) are required, the filling of which is regulated by the electromagnetic valves (Э2, Э3) and floats (П2.1 and П2.2).

6. The settling-vat water is pumped alternately from two units of the sedimentation tanks to the post-treatment unit by means of pumps (НВ1 or НВ2). The post-treatment unit consists of the following self-flushing filters of series connection:

- sand clarifier. The silica sand is used as a consumable material.

- adsorption filter with the filling from the activated carbon.

For filters backwashing the pump (HB3) is used, which is operated by the washing control device (УУП). When the pump (HB3) is switched-on for filters washing, the pumps (HB1 and HB2) are switched-off, the valve (Э6) is opened, the valves (Э7, Э4, Э5) are closed, rinsing water is discharged into the reception tank.

7. After post-treatment of the sewage water, the disinfection of clarified and filtered water is carried out, using the ultraviolet radiation treatment. At this stage, viruses and coliphages are destroyed, and post-treatment of dissolved fraction of organic pollutants is performed using post-burning (photooxidation) method. Then, sodium hypochlorite is supplied with the doser pump (НД) to provide the post-effect of the water disinfection and to fulfill the filters disinfection during backwashing.

8. After disinfection, the water is supplied to the tank of purified water for further discharge with the pump (HB3) or utilization for filters washing.

9. The discharge of purified water into the Pregel River is carried out in accordance with the standards of SanPiN 2.1.5.980 – 00. The entire technological process is automatized and operated by means of the control panel (ПУ).

Method of sludge utilisation

The sludge formed during the sewage water treatment is accumulated in the special metal container and, as required, is transported to the landfill of s. Kornevo under the contract with the LLC "Roskemping".

When sludge transportation is not possible, it may be utilizes by processing into ecologically safe soil using inertisation and biological treatment technologies.

1.3.6.8. Main parameters of environmental impact

The enterprise has its own accredited laboratory to carry out analysis of the sewage and surface water as well as the natural water of the Pregel River. The laboratory performs the following types of works:

- analysis of characteristics of oil-containing bilge waters received from the ships calling at the port;

- analysis of oil content in the water during testing oily-water filter equipment of the ships;

- analysis of pH, nitrogen total content, aluminium, ammonium ion, BOD total, boron, suspended matters, iron total, total hardness, fats, calcium, magnesium, manganese, cooper, urea, oil products, nitrate - ion, nitrite –ion, anionic synthetic surface-active substances, hydrogen sul-

phide, sulphide, sulphate – ion, solid residual, lead, phosphate – ion, phosphorous total, COD, chloride –ion, zinc in the sewage water;

- analysis of temperature range, pH, ammonium ion, BOD total, suspended matters, iron total, fats, dissolved oxygen, oil products, nitrate - ion, nitrite –ion, anionic synthetic surface-active substances, sulphate – ion, solid residual, phosphate – ion, phosphorous total, COD, chloride –ion in the natural water .

All enterprise activities related to the ecological control are certified in compliance with the requirements of ISO 14001:2004.

1.3.6.9. Discharge of pollutants into the water body during the period from 2010 to 2011

The has developed the approved "Program of Regular Monitoring of the Water Bodies". According to the program the sampling points after the water treatment plant are defined. The discharge control of pollutants and microorganisms is carried out according to the standards of permissible discharges of pollutants and microorganisms into the water body adopted by the Department of Water Resources of the Neva-Ladoga Basin Water Board (NLBWB) of the Kaliningrad Region.

The enterprise has four outfalls, while one of them (outfall №1) is not functioning. The discharge of the storm sewage water after the oil remover is carried out through the outfall №3. The outfall №4 is for discharge of industrial sewage waters after its treatment at the modular treatment unit into the Pregel River. The household and sanitary sewerage system is connectd to the detritus tank with subsequent discharge of the treated water through the outfall №5.

In 2010 the volume of insufficiently treated sewage water discharge was 88.27 thousand m^3, in 2011 – 88.36 thousand m^3. In 2011 the discharge of of insufficiently treated sewage water into the Pregel River was carried out through three outfalls (Table 69).

Table 68 – Discharge volume and mass of pollutants in 2010

Indicator	Unit of measurement	Value
Discharge volume	thousand m^3	88.27
BOD	t/year	0.55
COD	t/year	3.62
N tot.	t/year	0.12
P tot.	-	0

Table 69–Discharge volume and mass of pollutants in 2011

Indicator	Unit of measurement	Outfall №3	Outfall №4	Outfall №5
Discharge volume	thousand m^3	20.910	62.06	5.300
BOD	ton/year	0.24	0.25	0.06
COD	kg/year	941.89	2489.53	194.49
N tot.	ton/year	0.04	0.06	0.02

Indicator	Unit of measure-ment	Outfall №3	Outfall №4	Outfall №5
P tot.	-	0	0	0
Mg	kg/year	47.21	-	-
Ca	kg/year	363.30	-	-
Zn	kg/year	-	0.35	0.12
Cu	kg/year	-	22.43	0.02
Mn	kg/year	-	3.68	-

1) Water body pollution by oil products

Duting the inspection performed by supervisory authorities in March 2011 at the FCC site, the permanent pollution of the Pregel River water with oil products within the area enclosed with slick bars was revealed.

2) Soil pollution with oil products

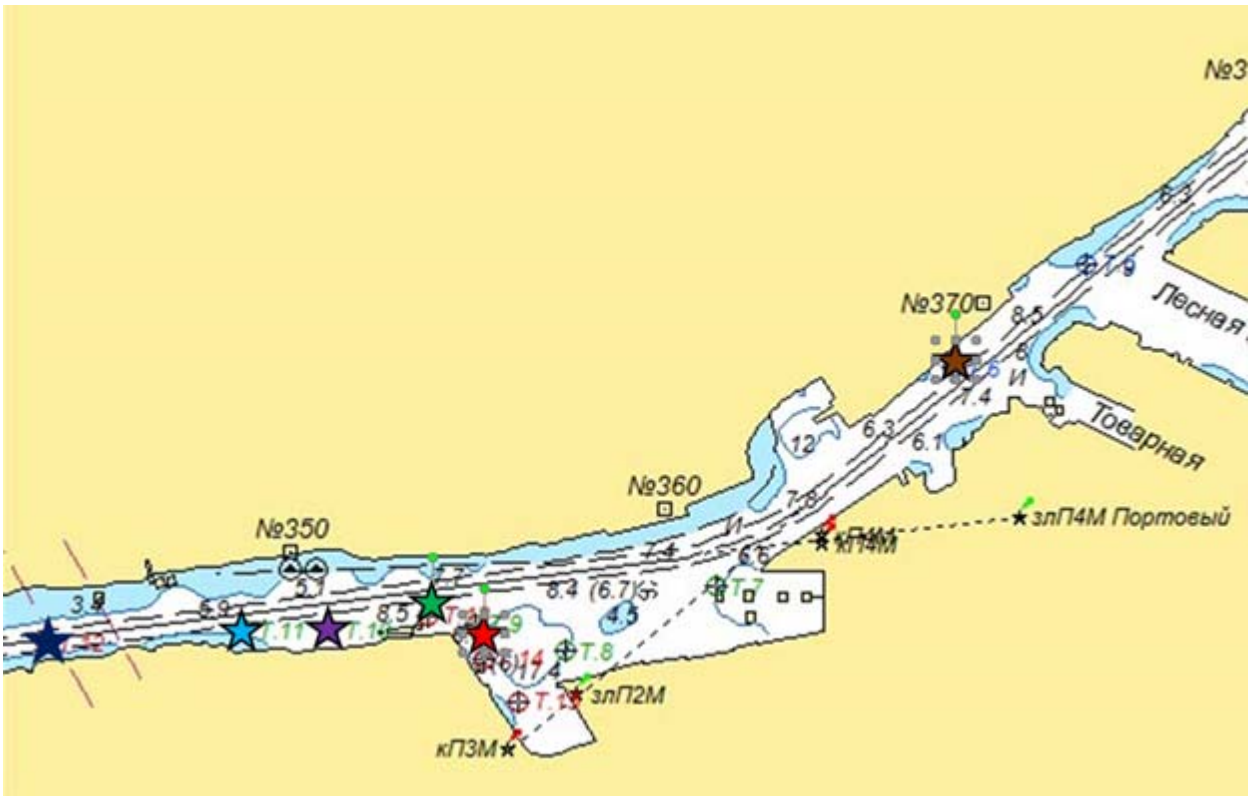
During the inspection performed by supervisory authorities in March 2011 at the FCC site, the oil pollution of the soil on the river bank at the point of discharge to the Pregel River was revealed.

1.3.6.10. Results of the environment components monitoring

The analysis of the natural water quality in the Pregel River within the FCC area was carried out in November 2010. The hydro-chemical samples were collected at two depth levels (surface and near-bottom) and the bed silts were sampled and analyzed. Sampling at the study points was fulfilled twice in November 2010.

Within the FCC area, monitoring of the natural water of the Pregel River was carried out at four points indicated in Figure 36. The obtained hydro-chemical characteristics of the natural water of the Pregel River within the FCC area are presented in Table 70.

The analysis of hydro-chemical indicators of the Pregel River water within the FCC area in November 2010 revealed the exceeding of MPC (for water bodies of fishery importance) for cooper, oil products, ammonium ions at all points and water depth levels and for zinc – at two points (Table 70). The concentration of dissolved oil products in the near-bottom layer exceeded MPC by 442 times. No exceeding of MPC for other indicators was detected.



- Условные обозначения:

Fuect and cargo complex of the FSUE "KSFP"; point 9; point 11; point 10; point 6; point 13; point 12

Figure 38– Scheme of location of hydrogeochemical stations in the FCC area of the FSUE «KSFP"

Table 70 - Averaged hydro-chemical characteristics of the natural water of the Pregel River in the FFC area of the FSUE "KSFP" in November 2010, mg/dm3

Indicator	Horizon	Point 9		Point 10		Point 11		Point 13	
		Average value	Number of MPC excess*	Average value	Number of MPC excess*	Average val-ue	Number of MPC excess*	Average value	Number of MPC excess*
Total nitrogen	Surface layer	3.6		4		3,75		3,95	
	Near-bottom layer	4.15		3,95		3,85		3,85	
Total phosphorus	Surface layer	0.26		0,26		0,26		0,26	
	Near-bottom layer	0.29		0,26		0,4		0,3	
Nitrates	Surface layer	12.28		13,22		12,68		12,46	
	Near-bottom layer	14.12		12,94		12,9		12,01	
Nitrogen nitrate	Surface layer	2.77		2,99		2,87		2,82	
	Near-bottom layer	3.19		2,93		2,92		2,71	
Nitrites	Surface layer	0.04		0,04		0,04		0,04	
	Near-bottom layer	0.05		0,04		0,04		0,04	
Nitrogen nitrite	Surface layer	0.01		0,01		0,01		0,01	
	Near-bottom layer	0.01		0,01		0,01		0,01	
Phosphates	Surface layer	0.74		0,72		0,75		0,73	
	Near-bottom layer	0.73		0,75		0,73		0,73	
Phosphate phosphorus	Surface layer	0.24		0,23		0,25		0,24	
	Near-bottom layer	0.24		0,24		0,24		0,24	
Ammonium ions	Surface layer	0.91	2	0,95	2	0,9	2	0,9	2
	Near-bottom layer	0.65	2	0,59	2	0,59	2	0,55	2
Ammonium nitrogen	Surface layer	0.75		0,78		0,74		0,74	
	Near-bottom layer	0.53		0,49		0,49		0,45	
Turbidity	Surface layer	4.3		4,65		4,5		5,05	
	Near-bottom layer	5.05		4,85		4,8		5,6	
Suspended matter	Surface layer	6		6		5		6	
	Near-bottom layer	9		12		4		11	
BOD total	Surface layer	2.86		3,19		2,75		3,19	
	Near-bottom layer	3.06		2,77		6,92		2,99	
Hydrogen sulfide	Surface layer	<0.002		<0,002		<0,002		<0,002	
	Near-bottom layer	<0.002		<0,002		<0,002		<0,002	

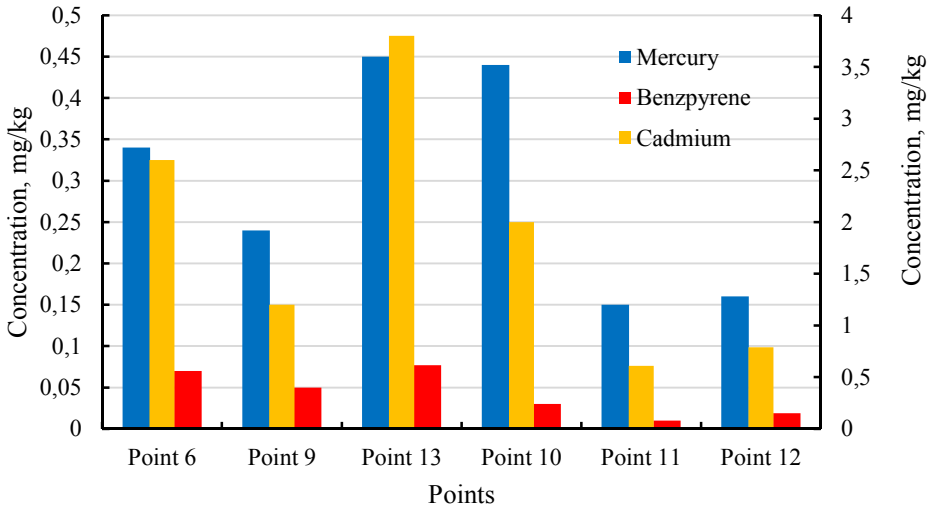
Indicator	Horizon	Point 9		Point 10		Point 11		Point 13	
		Average value	Number of MPC excess*	Average value	Number of MPC excess*	Average value	Number of MPC excess*	Average value	Number of MPC excess*
Anionic synthetic surface-active substances	Surface layer	0.048		0,05		0,043		0,074	
	Near-bottom layer	0.073		0,063		0,063		0,079	
Cadmium	Surface layer	<0.0001		0,0001		<0,0001		<0,0001	
	Near-bottom layer	<0.0001		<0,0001		<0,0001		<0,0001	
Cooper	Surface layer	0.0022		0,0014		0,0023		0,0019	
	Near-bottom layer	0.0023		0,0017		0,0048		0,0014	
Chromium	Surface layer	<0.001		<0,001		<0,001		<0,001	
	Near-bottom layer	<0.001		<0,001		<0,001		<0,001	
Zinc	Surface layer	0.0104	2	0,0059		0,006		0,0088	
	Near-bottom layer	0.0071		0,006		<0,005		0,011	2
Arsenic	Surface layer	<0.005		<0,005		<0,005		<0,005	
	Near-bottom layer	<0.005		<0,005		<0,005		<0,005	
Mercury	Surface layer	<0.00001		<0,00001		<0,00001		<0,00001	
	Near-bottom layer	<0.00001		<0,00001		<0,00001		<0,00001	
COD	Surface layer	46.7		52,7		49,8		46,5	
	Near-bottom layer	77.8		81,3		72,7		90	
Dissolved oil products	Surface layer	0.07	2	0,07	2	0,08	2	0,13	2
	Near-bottom layer	0.59	2	0,79	2	0,94	2	19,44	2
Redox potential, mV	Surface layer	278.35		279,85		271,6		277,95	
	Near-bottom layer	146.95		107,2		76,29		104,52	
Dissolved oxigen	Surface layer	10.18		10,08		10,36		10,2	
	Near-bottom layer	8.62		8,82		8,76		7,94	
pH	Surface layer	7.89		7,86		7,89		7,92	
	Near-bottom layer	8.2		8,24		8,15		8,17	
Alkalinity total, mmole/dm^3	Surface layer	4.15		4,15		4,15		4,05	
	Near-bottom layer	3.7		3,8		3,75		3,8	
Hydrogen carbonates	Surface layer	253.23		253,23		253,23		247,13	
	Near-bottom layer	225.77		231,88		228,83		231,88	

* Water quality standards of water bodies of fishery importance, including the standards of maximum permissible concentrations of harmful substances in water bodies of fish importance based on the order of the Federal Fishery Agency №20 from 18.01.2010 "On adoption of water quality standards for water bodies of fishery importance, including the standards of maximum permissible concentrations of harmful substances in water bodies of fish importance"

The data of monitoring at points within the FCC area and upstream and downstream were used in analysis of the bed silt chemical composition in the Pregel River (Figure 36). Only some trends of variability of the bottom sediments chemical composition can be traced in the researched area in view of improper selection of investigation points in the Pregel River, proximity of other large pollutants (enterprises) and influence of wind-induces factors and currents. In general, the pollutants concentration is higher upstream than downstream of the investigated area. The increase of some pollutants concentration is observed in the FCC area(Table 71, Figures 37 -39).

Table 71 - Investigation results of chemical composition of bed silt of the Pregel River in the FFC area of the FSUE "KSFP"

Indicator	Point 6	Point 9	Point 13	Point 10	Point 11	Point 12
Sampling depth, m	7.8	10.5	10.1	9.5	5.5	9.6
Mercury, mg/kg	0.34	0.24	0.45	0.44	0.15	0.16
Benzpyrene, mg/kg	0.07	0.05	0.077	0.03	0.01	0.019
Zinc, mg/kg	350	100	250	190	53	93
Cooper, mg/kg	100	28	79	46	8.3	28
Nickel, mg/kg	28	14	33	23	6.5	12
Lead, mg/kg	16	6.5	30	11	9.6	6
Cadmium, mg/kg	2.6	1.2	3.8	2	0.61	0.79
Chromium, mg/kg	64	24	74	47	7.3	18
Arsenic, mg/kg	64.8	29.3	59	46.1	14.4	24
Oil hydrocarbons, mg/kg	226.96	722.93	146.96	524.96	107.8	112.23
PCB 28, mmg/kg	0.12	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
PCB 52, mmg/kg	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
PCB 101, mmg/kg	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
PCB 138, mmg/kg	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
PCB 153, mmg/kg	0.25	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
PCB 180, mmg/kg	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Sum of 7 PCB, mmg/kg	< 1	< 1	< 1	< 1	< 1	< 1
Total content of PCB, mmg/kg	< 5	< 5	< 5	< 5	< 5	< 5
α - Hexachlorocyclohexane, ng/kg	< 1	< 1	< 1	< 1	< 1	< 1
Hexachlorobenzene, ng/kg	< 1	< 1	< 1	< 1	< 1	< 1
Lindane, ng/kg	< 1	< 1	< 1	< 1	< 1	< 1
Heptachlor, ng/kg	< 1	6.1	6.1	6.1	6.1	6.1
Heptachlorepoxide, ng/kg	< 1	< 1	< 1	< 1	< 1	< 1
o,p -DDE, ng/kg	< 1	< 1	< 1	< 1	< 1	< 1
p,p — DDE, ng/kg	< 1	< 1	< 1	< 1	< 1	< 1
o,p — DDD, ng/kg	< 1	< 1	< 1	< 1	< 1	< 1
p,p -DDD, ng/kg	< 1	< 1	< 1	< 1	< 1	< 1
o,p — DDT, ng/kg	< 1	< 1	< 1	< 1	< 1	< 1
p,p — DDT, ng/kg	< 1	< 1	< 1	< 1	< 1	< 1



- Figure 39 - Concentration of some pollutants in bed silt of the Pregel River in 2010

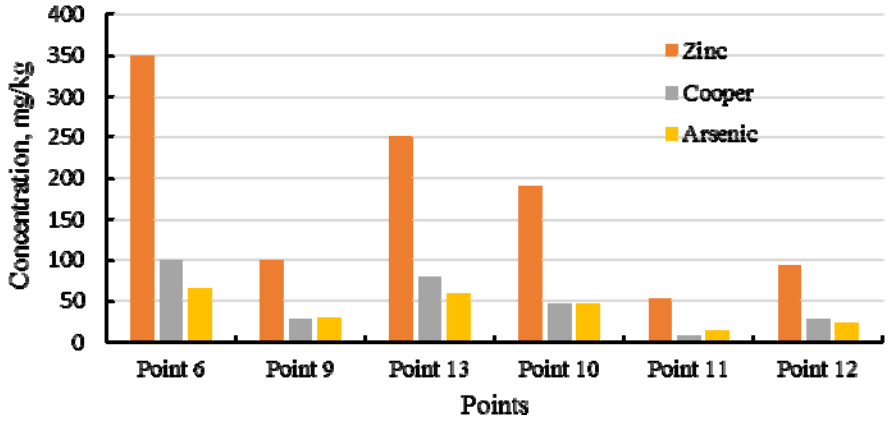


Figure 40 - Concentration of some pollutants in bed silt of the Pregel River in 2010

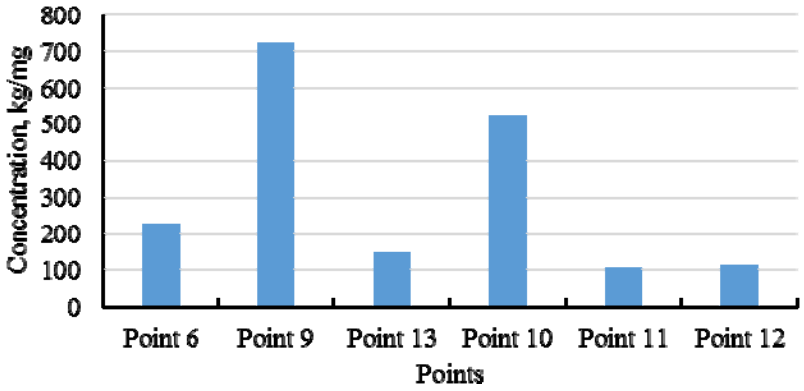


Figure 41 - Concentration of oil hydrocarbon in bed silt of the Pregel River in 2010

1.3.6.11. Implemented environmental activities

Currently, the FSUE "KSFP" is carrying out the following measures to eliminate the above mentioned sources of pollution:

1. In 2010 under the contract with the LLC "Ecoprom"of 27.02.2010, the treatment of residues of oil sludge formed in the earth reservoir at the territory of the fuel and cargo complex of the FSUE "KSFP" was started. The LLC "Ecoprom" has a license for collection, utilization, neutralization, transportation and disposal of wastes of I-IV class of hazard, valid until 10.09.2015. The planned works include treatment of oil sludge in amount of 300 m^3. In 2010, 147.07 m^3 of oil sludge were transported for treatment. By March 2013, the volume of oil sludge in sludge collector of the enterprise constituted 650 tons.

The works are carried out using special equipment of the contractor located in specially prepared and enclosed site (the former incineration station of the FCC of the FSUE "KSFP"), which is equipped with the metal caisson for accumulation of raw materials, telfer, personnel service premises and tanks for reagent storage. During the treatment process of oil sludge the utilization product of oil wastes (mineral powder "PUN") is formed.

The product of oil wastes utilization (mineral powder "PUN") consists of the finest particles of oil wastes uniform in colour and composition, which are encapsulated in solid, hydrophobic, frostproof and calcareous capsules. The mineral powder includes the following components:

a) neutralized oil wastes – not more than 50% (including 0.05% of heavy metals) – the 4^{th} class of hazard

b) hydrated lime Ca(OH)2 GOST 9179-77 (the 3^{rd} class of hazard) and chalk CaCO3 (the 4^{th} class of hazard) – 45 – 47%;

c) technical fat (GOST 1045-73) – 3 – 5%.

The mineral powder "PUN" is intended for use in road building as an additive or component of asphalt-concrete mixture or as a structural component of roads.

During the inspection by supervisory authorities in March 2011, the violations of requirements of the temporal storage of the formed product were revealed. The formed product must be stored at the enclosed site, in bunkers or silo pits, while the powder packaged into paper bags must be stores in closed storehouses.

2. Under the contract № 08/11 of 01.01.2011 concluded with the LLC "Ecopartner"for collection, reception, transportation, temporal storage, neutralization and utilization of hazardous (toxic) industrial wastes, the works on collection,

transportation of emulsion wastes and mixture wastes of oil products from the FCC area were started in 2011. The emulsion wastes and mixture wastes of oil products are assigned to the waste of the 3rd class of hazard and include of more than 95% of oil products.

The LLC "Eco-partner" has a license for collection, utilization, neutralization, transportation and disposal of wastes of the 1st -4th class of hazard valid until 01.04.2015.

During 2011 – 2012, pumping of oil products penetrated into soil was carried out form 13 wells located in the area of the fourth pier and railway lines. The production capacity of wells depends on the funnel width and constitutes from 30 to 200 litres per day. During the 1st quarter of 2011, the volume of oil products pumped through the wells reached 57.32 m^3 (44.25 tons for the product density of 0.772). At the end of 2012, the volume of oil products pumped through the wells was about 200 m^3 (168 tons for the product density of 0.84). During the period from 2011 to 2012, pumped oil waste were accumulated in the tanks located in the enterprise's territory, where they have remained until now.

3. In 2005, the FSUE "KSFP" developed the draft project "FSUE Oil Bunkering Station of Kaliningrad. Reconstruction of the Bank Consolidation". The project envisages erection of the bank protection constructions including the unanchored bulwark consisting of boxes and rabbets. To prevent oil products penetration into the waters, the project proposes construction of the drainage along the entire back-end line of the bank protection constructions with installation of underground tank and pumping house for pumping of the oil-containing waters. This project was not submitted to the state ecological expertise and, consequently, no positive conclusion has been obtained.

1.3.6.12. Planned environmental activities

The enterprise does not participate in federal target programs aimed at improvement of the "hot spot" state. In March 2013, realization of the international project aimed at investigation of the possibility to clean the FCC's territory from the oil pollution was started.

The enterprise plans the following activities, which could significantly reduce the impact on the environment:

1. Implementation of the project of reconstruction of the bank protection by means of construction of drainage along the entire back-end line of the bank protection and installation of underground tank and pumping house for pumping the oil-containing water. This will allow to eliminate the oil products penetration into the water of the Pregel River.

2. Treatment of the oil sludge stored in the earth storage at the FCC territory and collection and transportation of emulsion wastes and mixture wastes of oil products from the FCC's territory are continued.

1.3.6.13. Analysis of compliance of the fuel and cargo complex FSUE "KSFP"activities with HELCOM Recommendations

Analysis of compliance of activities of the fuel and cargo complex FSUE "KSFP" with HELCOM Recommendations is carried out on the basis of the following recommendations (Table 59):

- RECOMMENDATION 20/5 Minimum ability to respond to oil spillages in oil terminals;
- RECOMMENDATION 24/5 Proper handling of waste/burial;
- RECOMMENDATION 10/7 General requirements for reception of wastes;
- RECOMMENDATION 19/12 Waste management plans for ports;
- RECOMMENDATION 19/13 Basic principles of ashore handling of ship-generated wastes;
- RECOMMENDATION 23/5 Reduction of discharges from urban areas by the proper management of storm water system;
- RECOMMENDATION 15/4 Additional maritime safety and pollution prevention measures in the Baltic Sea area.

Table 72 - Analysis of compliance of activity of the fuel and cargo complex of the FSUE "KSFP" with HELCOM Recommendations

HELCOM Recommendation	Targets	Standard	The situation at the enterprise	Conclusion about conformity of the target
RECOMMENDATION 24/5 Proper handling of waste/landfilling	Compliance with the requirements of national legislation in the field of handling with wastes.	Full compliance	The enterprise has full set of environmental documentation developed in accordance with the Russian legislation in the field of handling with wastes. Violations in the field of handling with wastes were revealed in March 2011 in connection with the verification of compliance with the environmental legislation.	+/-
	Using a proper handling of wastes		Storing and accumulation of oil sludge in the earth storage.	-
	Using a proper practice of closure and following restoration of territory used for landfilling wastes.		In 2010, the works on treatment of oil sludge contained in the earth storage were begun. Activity on reclamation of adjustment to sludge tank lands is absent.	+/-
RECOMMENDATION 20/5 Minimum ability to respond to oil spillages in oil terminals	The presence of the approved Plan of elimination of oil spills and oil products	Full compliance	The presence of the approved Plan of elimination of oil spills and oil products in the waters of the Kaliningrad sea port.	+
RECOMMENDATION 10/7 General requirements for reception of wastes	The presence of a sufficient reception capacity for oil-containing wastes.		The enterprise has sufficient reception capacities for oil-containing wastes.	+
	Providing a sufficient pumping rate of oil-containing wastes from ships of 1000 GRT and below/above.	Ships of 999 GRT and below should be able to pump the wastes with a minimum rate of 2,5 m^3/h and ships of 1000 GRT and above with a minimum rate of 5, 0 m^3/h.	The maximum pumping rate of any types of oil wastes up to 75 m^3/h is provided	+
RECOMMENDATION 19/12 Waste management plans for ports	The presence of management plan for ship-generated wastes in ports		The enterprise as a unit of the FSUE "Kaliningrad sea fishing port" has the approved management plan for ship-generated wastes in Kalinin-	+

HELCOM Recommendation	Targets	Standard	The situation at the enterprise	Conclusion about conformity of the target
			grad sea port.	
RECOMMENDATION 19/13 Basic principles of ashore handling of ship-generated wastes	The observance of basic principles of ashore handling of ship-generated wastes.	Waste reduction and handling with them at the expenses of use of the best available technology (BAT) and best environmental practice (BEP).	Used technologies do not prevent the waste pollution of the Pregel River and soil.	-
		Presence of competent and trained staff in the field of handling of wastes.	The enterprise has the trained staff in the field of handling of wastes.	+
	Compliance of used technologies of utilization, final treatment and disposal of oil-contaminated wastes with the requirements of national legislation.	Full compliance	Used technologies of utilization, final treatment and disposal of oil-containing wastes cause the negative impact on the environment. According to the inspection of supervisory authorities in March 2011, presence of permanent pollution of waters of the Pregel River by oil products within the slick bars and oil pollution of soil on the shore at the point of ingress to the Pregel River were revealed.	-
RECOMMENDATION 23/5 Reduction of discharges from urban areas by the proper management of storm water system	Limitation of oil in storm waters.	Connection to a storm water system and separate treatment of storm waters.	The enterprise had been connected to a storm waters and carrying out the separate treatment of storm waters by oil remover.	+
		Use of effective measures of water pollution control when discharging to the recipient	The enterprise has its own laboratory and approved "Program of regular observation of the water bodies".	+
RECOMMENDATION 15/4 Additional maritime safety and pollution prevention measures in the Baltic Sea area	Annual compulsory reporting on port receiving facilities for IMO		The enterprise does not provide annual compulsory report about port receiving facilities for IMO	-

Activities necessary for excluding the enterprise from the HELCOM's list of "hot spots"

Radically reduction of the negative impact on the environment requires implementation of several measures aimed at:

- protection of the waters from the oil penetration from the area of fuel overpasses and from the railway road;
- liquidation of the sludge tank of 650 m^3 in volume and reclamation of adjacent lands;
- reduction of pollutants emission resulted from oil-cargo works by means of installing the equipment for capture and recovery of oil and oil products vapor.

Conclusion

The enterprise has a significant negative impact on the environment. Oil permanently penetrates into the waters of the Pregel River. At the enterprise's territory, the areal contamination of soil with oil products is remained, the open sludge tank has not been liquidated and the reclamation of adjacent lands has not been fulfilled.

The comparative analysis of the hot spot for the previous period shows that, in spite of reconstruction of a certain part of the tank stock and putting into operation the modular plant for purification of oil, bilge and ballast waters, the level of the negative impact remains high.

Solution of environmental problems of the enterprise requires significant financial investments. Currently, the exclusion from the list of "hot spots" is not possible.

1.3.7. Hot spot № 72 "Agriculture of the Kaliningrad Region"

1.3.7.1. History of the problem

The inclusion of agriculture of the Kaliningrad Region into the HELCOM's list of "hot spots" has been related to the physical-geographical and economic features of the Kaliningrad Region up to the mid- 1990s.

The agricultural area of the Kaliningrad Region is about 820 thousand hectares, while 90% of this amount are represented with the areas of land-reclamation. The climatic conditions of the region are favourable for agricultural development. The long vegetation period (160-180 days), sufficient humidity and rich soils create a good basis for successful development of agriculture. Productivity of the nature meadow-lands in the region was one of the highest in the Russian Federation. In

1980s the main agricultural sectors in the Kaliningrad Region included dairy and meet livestock farming, poultry farming, vegetable growing, fishery and fur farming. Poor development of the environmental management systems at agricultural enterprises and active application of organic and mineral fertilizers along with the high land reclamation led to the large discharge of nutrients into the Baltic Sea.

However, from the mid-1990s a stable trend towards the reduction of areas allocated for agricultural production was recorded and the soil fertility decreased. At the beginning of 2000s the share of agriculture in the gross regional product was about ten percent. More than two times The technical equipment of the agricultural sector has reduced and the liquidation of almost entire infrastructure of the agricultural sector occurred (agricultural chemistry, agricultural machinery, reclamation maintenance and other).

Table 73 – The number of cattle in all categories of farms in 2007-2008 (thousands of heads)

	Farms of all categories		Including					
			Agricultural enterprises		Farm enterprises		Household farms	
	2007	2008	2007	2008	2007	2008	2007	2008
Cattle	80.1	67.1	44.6	36.5	4.1	2.4	31.4	28.2
Including: Cows	40.5	34.3	18.0	14.8	1.9	1.2	20.6	18.3
Pigs	52.0	41.7	32.1	27.7	5.8	2.7	14.1	10.2

From 1990 the trend to reduction of milk production volumes had been observed in the livestock farming. However, from 2008 this trend has changed. In 2010 the gross milk yield in the farms of all categories was 146.2 thousand tons and in agricultural enterprises – 62.2 thousand tons, exceeding the level of 2009 by 2.1% and 9.2% respectively.

Increase of the milk yield during the recent years was achieved due to construction and modernization of dairy farms (7 complexes were put into operation in 2006-2010 and 1 complex in 2011) , as well as owing to import of highly productive cattle.

Every year, the production of meat increases in the region, while pork production increases most rapidly.

Table 74 – Production of the major livestock products

Production of the major livestock products, thousand tons					
Name	2006	2007	2008	2009	2010
Cattle and poultry for slaughter (in live weight)	39.9	39.2	39.5	42.5	49.5
Milk	165.9	149.8	134.5	143.3	146.2

In 2009 within the framework of the Balthazar project the "Report of Inventory of Cattle-Breeding Farms in the Kaliningrad Region" falling under the criteria of the "hot spots" of the Convention on the Protection of the Marine Environment of the Baltic Sea (Part 2, Appendix III) was prepared. "Hot spots" include the farms which do not meet the requirements of ecological standards and rules for handling manure and dung and which has the following number of cattle/pigs/poultries heads:

- 40 000 heads of poultries,
- 2 000 heads of fattening pigs (more than 30 kg),
- 750 heads of sows,
- 400 heads of cattle.

In 2009 the number of large livestock farms amounted to 25 in the Kaliningrad Region. Currently, two farms from this list were closed down and two new farms have been put into operation.

1.3.7.2. Total number of livestock and poultry in the Kaliningrad Region at present time

In 2010 and 2011 the agricultural enterprises had the following number of livestock and poultry (in thousands) (Table 75).

Table 75 – The number of livestock and poultry which agricultural enterprises have in 2010 - 2011

Name	By 01.12.2010	By 01.12. 2011	Growth rate in %
Cattle (including cows)	31.7	31.2	98.5
(without cows for fattening)	14.1	13.5	96.5
Pigs	87.0	122.9	141.2
Sheep and goats	2.3	1.5	64.9
Birds of all kinds	1184.9	1426.7	120.4
Horses	0.8	0.6	80.1

In accordance with the forecast of the Ministry of Agriculture of the Kaliningrad Region (Appendix 1), the number of cattle, pigs and poultry will significantly increase by 2015 (Table 76).

Table 76 – The number of cattle, pigs and poultry in accordance with the forecast of the Ministry of Agriculture of the Kaliningrad Region

Group of animals	Number (heads)		
	2011	2013	2015
Cattle	61 475	102 975	126 000
Pigs	136 273	233 065	306 820
Poultry	1 595 700	3 808 000	6 018 000

1.3.7.3. The volume of manure and dung produced at farms of the Kaliningrad Region

The volumes of produced manure and applied organic fertilizers in the Kaliningrad Region during the period from 2001 to 2011 are given in Table 77.

Table 77 – The volumes of produced manure and applied organic fertilizers in the Kaliningrad Region during the period from 2001 to 2011

Year	Manure production, thousand tons	Fertilizer application, thousand tons	Apply to 1 hectare of arable land, tons
2001	309.5	146.2	0.5
2002	343.3	152.5	0.4
2003	229.4	104.5	0.3
2004	171.5	88.9	0.2
2005	163.4	82.6	0.2
2006	189.9	117.9	0.3
2007	131.1	73.5	0.2
2008	186.7	94.4	0.3
2009	109.9	94.1	0.3
2010	193.6	149.7	0.4
2011	207.1	163.7	0.4

The main producers of organic fertilizers in the region are: CJSC "Zalesskoe milk" (manure), CJSC "Novoe Vysokovskoe" (liquid manure), CJSC "Pobedynskoe" (manure), CJSC Pradvinskoe Svinoproizvodstvo (unlittered liquid pig's manure), LLC "Pribaltiyskaya Myasnaya Kompaniya Tri" (unlittered liquid pig's manure), LLC "Baltptitseprom" (sawdust and dung compost), farms of agricultural holding "Dolgov and C" (manure, liquid manure).

The volumes of manure production in agricultural enterprises and farms were estimated for 2007. (Table 78).

Table 78 – The estimated volumes of manure production in agricultural enterprises and farms for 2007, thousands of tons

Group of animals	Excrement output (thousand tones)	Conversion of excrement to nutrients		
		Nitrogen	Phosphorous	Potassium
Cattle	568.5	2.4	1.6	2.8
Pings	78.2	0.5	0.3	1.4

The volumes of manure and dung produced at the livestock enterprises in 2009 are presented in Table 79.

Table 79 – Volumes of manure and dung, produced at livestock enterprises in 2009

Group of animals, annual manure output (tons)		
Cattle	Pigs	Poultry
889 753.2	284 148.8	104 598.9

Manure is calculated on the basis of the following manure output rate: 40 kg per day for cattle, 10 kg per day for pigs, 0.190 kg per day for poultry.

On the basis of the above mentioned manure and dung output rates, it is possible to calculate potential production of manure for 2011-2015 (Table 80).

Table 80 – Potential production volumes of manure for 2011-2015

Group of animals	Annual output of manure and dung (tons)		
	2011	2013	2015
Cattle	895 076	1 503 435	1 839 600
Pigs	497 396	850 687	1 119 893
Poultry	110 662	264085	417 348

Thus, if the government plans for the development of livestock and poultry farming in the Kaliningrad Region are implemented, in 2015 the region will produce about 3 million tons of manure and more than 400 thousand tons of dung.

1.3.7.4. Livestock waste management systems in farms of the Kaliningrad Region

In 20 large livestock-breeding farms, the untether cattle keeping with twenty-four-hour pasture during the warm season and stalled keeping during the cold season are most popular. Two farms have separators for separating of manure into liquid and solid fractions. The liquid manure is produced by 5 farms and is stored in dung-yards of the "lagoon" type or in metal leak-proof tanks. The solid fraction is stored in clamps at the open sites either with a leak-proof base (in 7 farms), or without leak-proof base (in 5 farms). In all farms manure of all types is utilized by means of applying into the fields after holding for the period from 4 months to 2 years.

In 7 large pig-breeding farms of the region the stalled keeping without pasture is used resulting in liquid manure formation . Manure is stored in dung-yards of the "lagoon" type with concrete base and walls. The dung-yard of one enterprise is not provided with a solid leak-proof coating, while another enterprise has built the closed "lagoon". The main way of pig's manure utilization is its applying into fields at different time of the year after holding during 1 - 8 months.

As a result of poultry keeping in two poultry farms, the litter and solid forms of dung are produced. Neither poultry farm has a dung-yard. One of the farms is processing the dung into com-

post in compliance with the technical specifications. Another farm transports the dung to third-party organisations for applying it to the fields.

In the Slavsk District 13 farms (10 cattle-breeding and 3 pig-breeding) were inspected to reveal the state of manure management systems. The detailed information on the number of heads of animals, areas of arable lands and pastures, soil types, volumes of water consumption and manure production, applied mineral and organic fertilizers was collected for each farm. The maps of fields with the water bodies were drawn. As a result, the volume of manure produced during the year was determined:

- liquid manure from cattle – 71 000 t,
- solid manure from cattle – 21 000 t,
- liquid manure from pigs – 1 140 t.

In 7 farms cows are on pasture for twenty four hours during the warm season . The solid manure is stored at the open sits without leak-proof covering. At the cattle- and pig-breeding farms the liquid manure is stored in special tanks. In general, only 3 farms have completely formed systems for protection of the surface and ground water and soil from contamination with manure. The solid manure constitutes about 30% of the total amount of manure produced. Any documentary accounting of manure production is absent. At some farms the lack of sufficient volumes of tanks and areas for manure prevents the manure transportation to the fields all year round. The necessary documentation for livestock wastes (passport of wastes, project of standards of waste production and limits of disposal, technical regulations, certificates for organic fertilizers made from manure) is not available in the farms. The initial recording of wastes is not provided and the annual reports in the form "2TP-wastes" are not prepared.

In 2012 within the framework of the BALTHAZAR project, the research "Environmental and economic evaluation of possibility of manure recycling and disposal at livestock farms in the Kaliningrad Region" was fulfilled. The following results were obtained:

- review of technologies for recycling manure and dung and utilization of the recycling products in different countries;
- approximate evaluation of investments and operating costs required to enterprises for recycling manure and dung in the territory of the Kaliningrad Region, taking into account the amount of wastes from existing livestock (including poultry) farms;

- assessment of possibility to use products of manure and dung recycling in the territory of the Kaliningrad Region, other regions of Russia and the European Union countries on the basis of the existing and future demand;

- possible ecological consequences of creating enterprises for recycling manure and dung in the territory of the Kaliningrad Region and environmental effect of the recycling products usage;

- comparative analysis of environmental efficiency of various technologies of manure and dung recycling in the territory of the Kaliningrad Region.

For three pilot farms the technological regulations on recycling manure and dung into organic fertilizer and its further application into the fields were developed.

1.3.7.5. The Target Program "The main ways of the agricultural sector development in the Kaliningrad Region during the period from 2007 to 2016"

The adopted Target Program has the special section "Ecology and environment protection in the agricultural sector of the Kaliningrad Region". The purpose of this section is to protect the environment during development of the agricultural complex of the Kaliningrad Region and to stimulate the development of enterprises producing ecologically safe foodstuffs in compliance with the requirements of environmental safety.

Implementation of this task envisages the following:

- ensuring the ecological balance (well-being) of the agricultural sector on the basis of proper use of the latest scientific and technical achievements;

- development of agro-industrial enterprises to meet the requirements of environment protection;

- facilitating introduction of environmentally safe technologies into production;

- arrangement of closed cycles with recycling of industrial wastes at enterprises ;

- fulfillment of the ecological evaluation of investment projects in the agro-industry complex along with the economic and industrial evaluation;

- introduction of biological methods of pest and crop sickness control .

The disadvantage of this Program's section is the absence of provision of additional funding from the budget of the Kaliningrad Region. However, the Program envisages financing of other tasks indirectly relevant to recycling of manure and dung, such as:

- "Soil reclamation and fertility";

- "Improvement of material and technical basis and servicing of agriculture";
- "Development of crop production, livestock sector and processing industry"

Conclusion

Agriculture in the Kaliningrad Region is currently experiencing a period of rapid development. The Federal Government and regional authorities actively support the creation of modern livestock complexes which would work subject to all national and international environmental requirements. And such complexes have already appeared.

However, enterprises created in the Soviet epoch, when the ecological requirements to their activities were not so strict, are still working in the Region. The regional authorities are developing mechanisms to stimulate the introduction of advanced technologies, including the ecologically safe management of manure, at these enterprises.

In general, the level of compliance with environmental requirements in the livestock sector of the Kaliningrad Region is still low and does not allow to exclude this sector from the HELCOM's list of "hot spots".

To assist the Ministry of Agriculture of the Kaliningrad Region in the implementation of the Russian National Plan of HELCOM's Baltic Sea Action Plan (BSAP) in the section "Agriculture", the new project BASE has been launched in January 2012. The project will be implemented up to March 2014. The main tasks of the project include:

a) Compilation of the database of agricultural enterprises of the Kaliningrad Region containing the actual information on manure/dung formation and organic fertilizers utilization .

b) Development of the draft long-term target program "Utilization of agricultural wastes produced in the enterprises of agricultural complex of the Kaliningrad Region in the form of organic fertilizers" or any other document to provide the economic stimulation of enterprises observing the environmental requirements.

c) Development of guidelines for applying the system of environmental and technological assessment criteria in evaluation of investment projects of the livestock sector development during planning of agricultural-industrial complex development in the Kaliningrad Region.

Implementation and practical adoption of the project will also contribute to the implementation of the adopted Target Program "The main ways of development of agricultural complex of the Kaliningrad Region during the period from 2007 to 2016" and the section "Ecology and environmental protection in the agricultural production of the Kaliningrad Region". This will allow, after a

certain time period, to return to the problem of referring the agricultural sector of the Kaliningrad Region to the HELCOM's "hot spots" and possible exclusion of most farms from this list.

2. Proposals for excluding the Russian "hot spots" from the list of HELCOM

The results of investigation of the current state of the Russian HELCOM's "hot spots" give opportunity to propose the following.

1) Hot spot № 18 (hot sub-spots 18.1-18.19). Municipal sewage water treatment in St. Petersburg.

Hot sub-spot № 18.1 – The sewage water treatment plant; collectors. To prepare the application for exclusion of the hot sub-spot № 18.1 and to submit it at the 19th meeting of the HELCOM LAND Group in May 2014.

To postpone the consideration of exclusion of the hot sub-spot **№ 18.11 - WWTP "Town of Kolpino"** and the hot sub-spot **№ 18.15 – WWTP "Settl. of Metallostroy"** from the list of "hot spots" until commissioning the treatment plants in these settlements after 2015.

2) City dump Hot spot № 23 «Hazardous Waste Landfill - State Unitary Nature Conservation Enterprise (SUNE) "Krasny Bor Landfill".

To postpone the consideration of excluding the hot spot **City Dump Hot spot № 23 «Hazardous Waste Landfill - State Unitary Nature Conservation Enterprise (SUNE) "Krasny Bor Landfill"** from the list of "Hot Spots" until commissioning the plant of hazardous waste treatment after 2015.

3) Hot spot № 14 «Syaskiy Pulp and Paper Mill (PPM)".

Solution of the enterprise ecological problems is associated with high financial costs. Taking into account the economic situation of the Mill, the problem of exclusion of the enterprise from the "hot spots" list cannot be quickly solved now without the investment support.

4) Hot spot № 15 "Volkhov Aluminium Plant (Limited Liability Company "Metankhim")".

As far as the "Volkhov Aluminium Plant" was divided into three independent enterprises after reorganization, it is proposed to divide this hot spot into three hot sub-spots:

№ 15.1 Limited Liability Company "Parosilovoe Hozyaystvo - Volkhov" - should be excluded from the HELCOM's list of hot spots in view of the minor negative impact.

№ 15.2. VAZ-SUAL of OJSC "SUAL" is a serious source of emissions into the atmosphere.

№ 15.3 Limited Liability Company "Metakhim" is the source of sewage water discharge. The construction of the sewage water treatment plant is scheduled to 2013 – 2014.

5) Hot spot № 24 "Large livestock farms (sewage water treatment and sediment treatment)".

Introduction of the Technological regulations for handling manure and dung at all large livestock enterprises of the Leningrad Region will allow to reduce significantly the nutrients load on the Baltic Sea and to exclude the agricultural sector of the Region from the HELCOM's list of "hot spots".

6) Hot spot № 49 "Sovietsk PPM".

The input of nutrients from the former Sovietsk PPM operation has been reduced so considerably, that it is possible to request the exclusion of this enterprise from the HELCOM's list of "hot spots".

7) Hot spot № 50 "Neman PPM".

At present the LLC "Neman PPM" does not seriously endanger the environment and can be excluded from the HELCOM's list of "hot spots".

8) Hot spot № 67 "Sewage water treatment plant of Kaliningrad".

Construction of the sewage water treatment plant of the Kaliningrad City will be finished in 2014. Therefore, the consideration of this hot spot exclusion from the HELCOM's list of "hot spots" is proposed to postpone to 2015.

9) Hot spot № 69 "Cepruss PPM".

In view of the closure of paper and cellulose production at the Cepruss PPM, the water consumption and sewage water discharge to the Pregel River have been ceased. Therefore, the exclusion of this enterprise from the list of "Hot Spots" is proposed.

10) Hot spot № 70 "Landfill of Hazardous Wastes of the City of Kaliningrad".

The Landfill of Hazardous Wastes of Kaliningrad continues to expose the environment to a considerable negative impact and cannot be excluded from the list of "hot spots".

11) Hot spot № 71 Fuel and Cargo Complex of FSUE "State Sea Fishing Port"(Port Bunkering Station of Kaliningrad)"

The enterprise continues to expose the environment to a considerable negative impact. The permanent discharge of oil products into the Pregel River is recorded. In the enterprise's territory the

areal contamination of soil with oil products still remains, the open sludge tank has not been liquidated and the reclamation of adjacent lands has not been fulfilled.

The comparative analysis of the hot spot state for the previous period shows that, in spite of reconstruction of a certain part of the tank stock and putting into operation of the modular plant for purification of oil, bilge and ballast waters the level of negative impact remains high.

Solution of ecological problems of the enterprise requires significant financial costs. Currently, the enterprise exclusion from the list of "hot spots" is not possible.

12) Hot spot № 72 "Agriculture of Kaliningrad"

Agriculture in the Kaliningrad Region is currently experiencing a period of rapid development.However, the enterprises created in the Soviet epoch, when the requirements to environmental aspects of their activities were not so strict, continue to work in the Region. The regional authorities are developing mechanisms to stimulate the introduction of advanced technologies, including the ecologically safe management of manure, at these enterprises.

In general, the level of compliance with environmental requirements in livestock sector of the Kaliningrad Region is still low and does not allow to exclude this sector from the HELCOM's list of "hot spots".