Ramboll Barents AS

UNEP-GEF Project

Russian Federation – Support to the National Programme of Action for Protection of the Arctic Marine Environment

PRE-INVESTMENT STUDIES

Modernization of the Landfill for Municipal Solid Waste Disposal in Vorkuta, Komi Republic

FINAL REPORT

Project is financed by

Client:	NPA-Arctic
Client's reference:	Evgeniy Konygin, Project Manager
Project Manager, Ramboll Barents:	Naida Murtazalieva, Senior Consultant
Project Team:	Lise Flø, Director, Sector for Environment and Regional Planning, Senior Consultant Naida Murtazalieva, Local Coordinator, Senior Consultant Alexander Uryupinskov, Technical Expert, Senior Consultant Evgeny Cheglyakov, Technical Expert, Consultant Vladimir Blinov, Technical Expert, Senior Consultant Erkki Ikäheimo Financial Expert, Senior Consultant Kristine Bondo Pedersen, Expert in Soil Pollution, Senior Consultant Nathan Gaasenbeck, Technical Expert, Senior Consultant

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Ramboll Barents AS
Storgata 5
P.O. Box 73
N-9915 KIRKENES
NORWAY
www.ramboll-barents.com

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ABBREVIATIONS

BS	- Balance sheet
EBRD	- European Bank of Reconstruction and Development
EPS	- Environmental protection system
GEF	- Global Environment Facility
GN	– Hygienic norms
GOST	– State standard
IFC	- International Finance Corporation
IFI	- International financial institution
IP	- Investment project
IS	- Income statement
NDEP	- Northern Dimension Environmental Programme
NEFCO	- Nordic Environment Finance Corporation
NIB	- Nordic Investment Bank
PINS	- Pre-investment studies
SanPIN	- Sanitary rules and norms
SAP	- Strategic action programme
MSW	- Municipal solid waste
UNEP	- United Nations Environmental Programme

CONTENT

SUMMARY

The PINS Report containing among other things the Project Financial Assessment was developed when the project owner was MUE Vorkutaremstroy. On 29 March 2010 the Vorkuta City Administration made a Resolution to establish a new enterprise MUE Poligon which will start rendering services of municipal solid waste receipt and storage at the land-fill from 01 August 2010. The information given in the Report will require updating depending on the project progress.

Project title	Modernization of landfill for municipal solid wastes in Vorkuta, Komi Republic
Project owner	MUE Vorkutaremstroy (now – MUE Poligon)
Branch	Municipal services, waste management
Brief description of IP and its benefits	The IP provides for modernization of landfill for municipal solid wastes in Vorkuta based on modern technologies on collection and reclamation of solid wastes according to environmental standards. Implementation of this investment project will allow reducing overall pollution load on the local environment by elimination of pollution of Vorkuta River by wastewater, detritus, flushed wastes, and also by reduction of greenhouse gases emissions into atmosphere. Elimination of polluters similar to this facility will allow reducing the negative environmental impact in future not in an individual city but along the Arctic coast, thus preserving the unique natural and offshore environment.
Project implementation period	**3 years**
Total investments	**1 661 027 EUR**

Project costs, EUR

Component	Cost
Capital costs for reconstruction of domestic waste landfill	
Levelling of the landfill base by a bulldozer	4 874
Transportation works	970 313
Excavation works	69 356
Excavation of intercepting ditch with ground levelling and compacting	14 605
Indirect expenses	32 652
TOTAL	**1 091 800**
Operational costs of reclamation of domestic waste landfill	
Wages of personnel, taxes	103 746
Power	614
Water	545
Chemicals and materials	454 545

Maintenance and repairs of equipment	9 773
TOTAL	**569 227**

Capital and operational costs of reclamation of domestic waste landfill, EUR

Capital and operation costs of reclamation of landfill by category	2011	2012	2013	Total
Capital cost of reconstruction of landfill	545 900	545 900	0	1 091 800
Operational costs of reclamation of landfill	189 742	189 742	189 742	569 227
TOTAL	**735 642**	**735 642**	**189 742**	**1 661 027**

Financing plan, EUR

Financial sources of IP	2 011	2 012	2 013	Total	Share of the loan, %
International funds, loan	250 118	250 118	64 512	564749	34%
Grant	147 128	147 128	37 948	332205	20%
Equity	338 395	338 395	87 281	764072	46%
TOTAL planned investment	**735 642**	**735 642**	**189 742**	**1661027**	**100%**

* Change in particular years of project implementation will require adjustment of financial indicators of the project.

Financial conditions

Parameter	Showing	Unit
Total investments	**1 661 027**	**EUR**
Equity	764 072	EUR
Grant	332 205	EUR
International funds, loan	564 749	EUR
Conditions of loan granting		
Loan interest rate	7	%
Loan repayment period	15	years
Grace period	3	years

Terms: Economic life time = 15 years
Inflation rate = 18,0%
1 EUR = 44 RUB

Financial analysis

Maximum loan	Feasible maximum loan was found to be 34% of the financing needs when waste tariff increases gradually 30%.

Tariff schedule	A feasible tariff increase schedule: 0.0% - 2011, 9.1% - 2012, 9.1% - 2013 and 9.2% - 2014.
Sensitivity of IP	The feasible maximum loan amount is most sensitive in changes in sales revenues (tariff level) and much less sensitive to changes in interest rate and operating costs.
Commercial risk	• Lack of own funds at the enterprise for co-financing and covering of liabilities under international loan. • The co-financing from local budget sources is not confirmed. • Change of the Project Owner. The process of issuing/re-registration of required permits and licences takes time.

1. INTRODUCTION

1.1 Description and assignment

The present report summarises the work related to preparation of regional pre-investment study (PINS) for upgrading the municipal landfill in Vorktua town in the Komi Republic. The work has been undertaken in the frames of the project "Russian Federation – Support to the National Programme of Action for Protection of the Arctic Marine Environment (NPA-Arctic Project). The overall aim of the project is to protect the global marine environment in which the Arctic plays a fundamental role. More specific the program shall contribute to developing and establishing a sustainable framework to reduce environmental degradation of the Russian Arctic from land-based activities on a systemic basis. NPA-Arctic has been established through cooperation between the Ministry of Economic Development of the Russian Federation and United Nations Environmental Program (UNEP) and is financed by the Global Environment Facility (GEF).

The NPA-Arctic Project is coordinated by the Executive Directorate of National Pollution Abatement Facility (NPAF), NPA-Arctic Project and consists of four main components:

1. The preparation and adoption of a Strategic Action Program (SAP)
2. Completion of a set of Pre-Investment Studies (PINS)
3. Development and implementation of an Environmental Protection System (EPS) consistent with the SAP
4. Undertake three demonstration projects;
   - Preservation of indigenous people's traditional lifestyle in association with development;
   - Oil contamination remediation using marine alga; and
   - Environmental remediation of decommissioned military bases

Ramboll Barents was given the assignment to develop pre-investment studies for 5-8 selected Investment Projects (IP) in the Central Arctic Region of Russia, including Arkhangelsk Oblast, Nenets Autonomous Okrug, Republic of Komi, and Yamalo-Nenets Autonomous Okrug. Initially in the project selection phase, reference was given to the Hot Spot List of the Barents Region. However, an important criterion for selection of IP has been to comply with the overall and specific objective of the Project objectives. The overall criteria for project selection have been to describe and develop projects prioritised by the regional authorities. The regional environmental administration has thus had a central role in the project selection process.

The following 5 IP in the Central Arctic Region of Russia have been selected and described in separate reports:

<u>Komi Republic</u>

1. Modernization of the Landfill for Municipal Solid Waste Disposal in Vorkuta.
2. Modernization of sewage water treatment system in Vorkuta.

<u>Arkhangelsk region:</u>

3. Land remediation from oil products in water protection zone of Northern Dvina River of White Sea basin near settlement Krasnoe of Primorsky district of Arkhangelsk Region.
4. Construction of new sewage treatment facilities in Lesnaya Rechka residential district of Arkhangelsk.

<u>Nenets Autonomous Okrug:</u>

5. Modernization of Waste Water Treatment Facilities in Settlements Kachgort and Bondarka.

The Project "Modernization of the Landfill for Municipal Solid Waste Disposal in Vorkuta" is one of the top-priority projects for the Komi Republic (Annex 1). The project was recommended by the Ministry of Natural Resources and Environmental protection of the Komi Republic for development of PINS. The Ministry has provided full support during the preparation of the pre-investment studies report and is intended to contribute to further development of the project. The republican and local authorities are extremely interested in implementation of this IP, since the existing municipal solid waste landfill is of environmental threat to local and regional environment, including the Arctic environment.

The key objective of this Pre-Investment studies is to define the technical and economical parameters for improvement of the situation with the municipal solid waste management (MSW) in the city of Vorkuta (Komi Republic) and to develop the recommendations on storage and management of MSW taking into account all the sanitary and hygienic requirements and environmental safety.

It is obvious that modernization of the municipal landfill in Vorkuta will have little direct impact in reducing the overall pollution to the Arctic marine environment and to the Barents Sea. However, it must been seen as one concrete action in the efforts for reducing pollution from local sources in the Central Arctic Region. Taking into account that the landfill is located in a permafrost area and climate changes may in the future lead to considerable increased risk for pollution from the landfill.

1.2 Report structure

In compliance with the requirements of the Terms of Reference the PINS should include the following information: information about the owner of the project; description of the investment project; ecological and social assessment of the project; status of the investment project and its implementation activities; project financial viability assessment; legal or any other limitations for Russian and foreign investors; assessment of potential risks and justification of choice and other additional information pertaining to the investment project.

Section 1 – introduction. **Section 2** describes the municipal entity "City of Vorkuta", including its geographical location, demographical situation, ecological condition and social and economical situation. **Section 3** contains information about the owner of the project – Municipal Unitary Enterprise Vorkutaremstroy, its brief description and current financial status. **Section 4** contains information about the current status of the investment project, description of possible options for liquidation of land plot pollution and description of proposed technical solutions for implementation of IP. Project costs estimates are presented in **Chapter 5**. **Chapter 6** includes an assessment of the environmental and social impacts of the investment project. **Chapter 7** describes project financial viability. **Chapter 8** covers project implementation status and arrangements. **Chapter 9** deals with risk assessments and selection justification. **Section 10** – conclusion.

Besides the above mentioned information presented in the relevant sections, the report contains additional information which gives a fuller picture of current aspects and opportunities for implementation of the investment project.

2. SOCIAL AND ECONOMIC SITUATION IN VORKUTA, KOMI REPUBLIC

2.1 Geographical location

The Vorkuta municipality in the Komi Republic borders the Yamalo-Nenets Autonomous Okrug of the Tyumen Region in the northeast and the Nenets Autonomous Okrug (Arkhangelsk Region) in the northwest and west.

The city of Vorkuta is located 904 km north-east from Syktyvkar (capital of the Komi Republic) and has status as a republican city (Fig. 1). Vorkuta city is located in the Bolshezemelskaya tundra, in the permafrost area, on the banks of the Vorkuta River. The location is 160 km north of Arctic Circle and 150 km south of the Arctic Ocean, on the western side of the Polar Urals (67º30´N 64º02´E).

The total area of the municipality, covering the border of Vorkuta city and its administrative areas is 24 179.6 km^2.

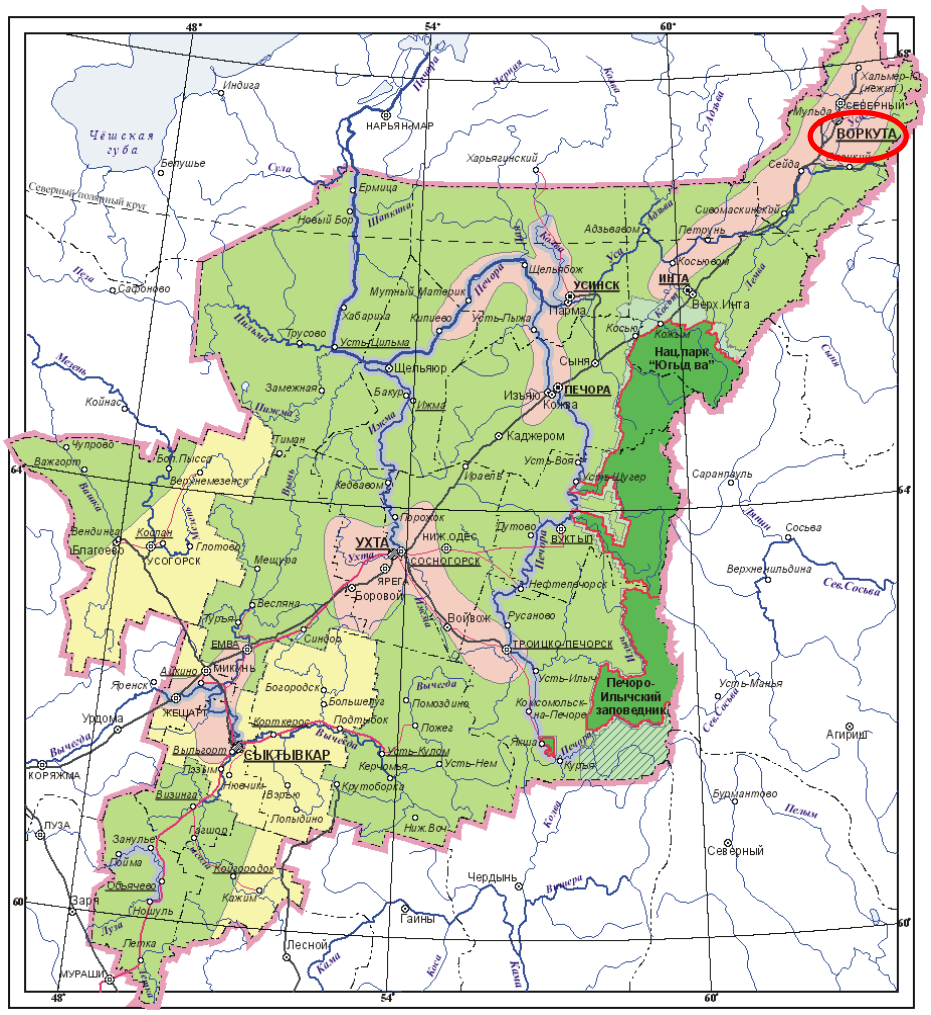


Figure 1: Administrative map of the Komi Republic showing the location of Vorkuta

2.2 Demographics

According to the data of the State Statistics Service of the Komi Republic, the population of Vorkuta was 113 400 people as of 1 January 2009 (Table 1). During the recent years there has been a steady decrease in population by approximately 3 500 persons per year. Table 1 below shows changes in Vorkuta population during the past five years (based on the data from the Federal State Statistics Service of the Komi Republic).

Table 1: Development trends in the population of Vorkuta

Year	2003	2004	2005	2006	2007	2008	2009
Population (thousand people)	**133,5**	**130,1**	**127,5**	**123,8**	**120,1**	**116,9**	**113,4**
Born, people	1379	1394	1288	1210	1126	-	-
Deceased, people	1563	1534	1529	1254	1064	-	-
Migration, people	3379	2518	3421	3751	3177	-	-

In 2008 44 622 peoples were registered as employed in Vorkuta distributed in the following sectors:

Mining industry: 20%
Transport: 10%
Education: 12.5%
Health sector: 9.5 %

The remaining part of the working population is occupied in other spheres of activities, i.e. trade, social sphere, communications, service enterprises etc, and their share varies from 0.1 to 5% (according to Statistical Report of the State Statistics Committee in Komi Republic in 2008).

Average wage in the town in 2008 amounted to 23 134 roubles. Comparatively the average wage in the Republic of Komi at that time was 20 826 roubles.

Only 38.2 % of the working population is employed in the private sector, the rest is occupied in the public and service sector. There are no plans to open new mines. Furthermore, the old mines and industries connected with them are closing as a consequence of the restructuring program for the coal mining sector. Possibilities to establish new production activities in the Far North are very limited.

As a result per 01.01.2008 the total unemployment rate was 3% of the population in the municipality, the companies reported a demand of 865 people (31% of the registered unemployed (2 189 peoples). The number of pensioners is increasing and currently makes 33 000 people (28, 2% of the population). In terms of unemployment rate Vorkuta is on 7th place in the Republic of Komi.

The average age of the population in Vortuka is increasing fairly quickly due to the lack of possibilities for Vorkuta residents to move after retirement. The average age of the population is 35 years.

2.3 Nature and Environmental conditions

Vorkuta is located in the Bolshezemelskaya tundra in the Pechora Region, which drains directly to the Barents Sea. The average annual temperature is -6.6 ºC ranging from -52.4 °C as minimum temperature and 33 ºC as maximum. The number of frost-free days is 67 and winter duration is estimated to 225-235 days/year. The mean annual precipitation is 518 mm and the south westerly wind prevails in the region. The vegetation in the area is characteristic for sub-Arctic shrub tundra bordering forest tundra and taiga in the south (Fig. 2).

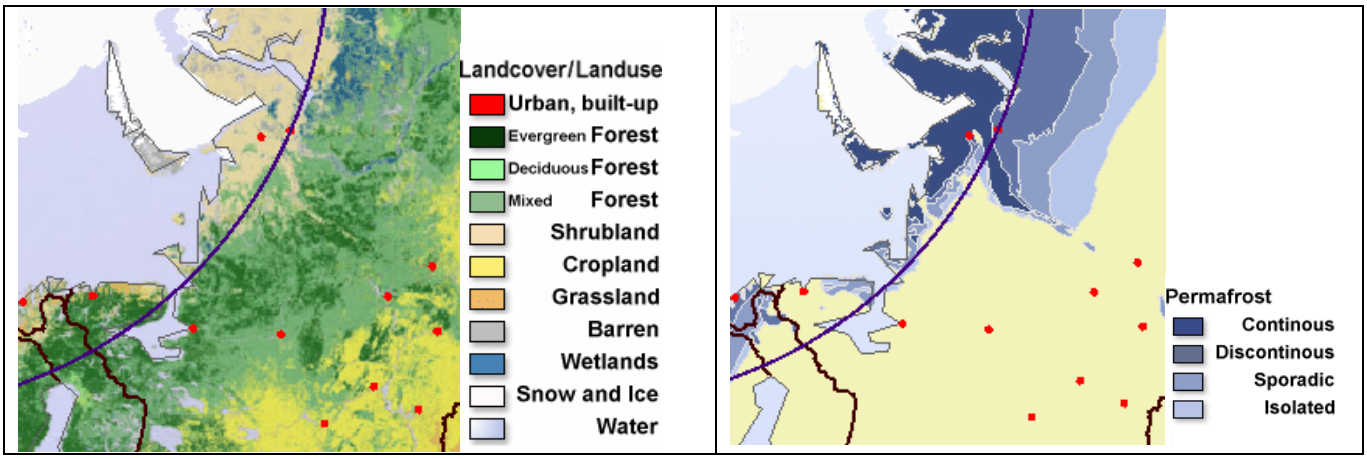


Figure 2: **Illustrations of land cover and permafrost conditions in the Barents Euro Arctic Region. Source: www.grida.no**

2.3.1 Permafrost

Permafrost terrain comprises a seasonally thawed active layer underlain by frozen ground (Fig. 2). The thickness of the active layer varies from a few centimeters to several meters depending on summer conditions and the thermal properties of ground materials. The thickness is greatest in dry sand and bedrock, and least in moist and organic soils.

Permafrost is defined as ground that remains at or below 0°C for at least two consecutive years. Ground consists of soil/rock and organic material and ice. Permafrost is classified as:

- Continuous (underlying 90 – 100 % of the landscape)
- Discontinuous (underlying 50 – 90 % of the landscape)
- Sporadic (underlying 0 – 50 % of the landscape)

The thickness of permafrost varies from less than one meter to more than 1 000 meters.

The formation, persistence and disappearance of permafrost are highly dependent on the climate. The distribution, temperature and thickness of permafrost respond to natural environmental changes and anthropogenic impacts that cause alteration to the ground thermal regime. Modifications of the ground thermal regime could occur due to changes in:

- Air temperature
- Precipitation

- Surface disturbances (clearing of vegetation, removal of insulating topsoil, forest fires, river channel migration, shoreline erosion, etc.)

Vorkuta has discontinuous permafrost, which means that the permafrost distribution in the region is complex and patchy, and permafrost free terrain is common.
Mean annual air temperatures are anticipated to rise up to several degrees over much of the Arctic. In the discontinuous permafrost regions, where temperatures are within 1 – 2 degrees of melting, permafrost will likely ultimately disappear as a result of ground thermal changes. In the areas where the ice content in the ground is high, permafrost degradation will have associated physical impacts:

- Soil instability upon thawing (Thaw settlement, creep/slope failure)
- Thawing ponds
- Increased lake drainage

The physical impacts may have implications for the landscape, ecosystems and infrastructure.

2.3.2 Local pollution

The peculiar feature of the Vorkuta municipality is the concentration of all industrial facilities within one town – Vorkuta. There are not any permanently operating large industrial enterprises and facilities, producing negative impact on the environment outside the city, except the cement plant which is located approximately 40 kilometres northwest of Vorkuta town.

Due to this fact, all facilities which are potentially hazardous for the environment (such as power engineering facilities and coal industry facilities) are located in the city and neighbouring settlements. There have been no registered man-made accidents resulting in significant environmental pollution at these facilities during the past ten years. No fuel spills or significant emergency discharges in water basis have been recorded.

In Vorkuta town and the nearest vicinity, the soil environment is characterised by significant alkalisation due to continuous discharges of fly ash from the coal mines, coal heating plant, and the cement plant. In the wider surroundings of Vorkuta the pH is lower and thus characterised by a more acidic soil environment. This gives strong indication of the alkaline impact of fly ash and cement dust from the industrial sources in Vorkuta town. Elevated levels of Al, Ba, Ca, K, Mg and Sr in the top soil layers and snow in Vorkuta town has been documented. Reduced production of fly ash and cement dust in the future, due to lower production rates, may result in acidification of the soil environment in Vorkuta and thus increased solubility of the heavy metals (Walker et al. 2009, 2008, and 2003). The general environment in the Vorkuta environment is considered more or less pristine and there is little documentation on potential industrial pollution. Analyses undertaken by Walker et al. (2009, 2008, and 2003) support this.

In general, during the past ten years there has been a tendency of decreasing air emissions and industrial waste water discharges in the area which is most of all due to the economic situation in the area. However, the area is still facing a number of problems related to man-made environmental pollution.

There are continuous fires of spoil heaps from the Severnaya, Vorkutinskaya and Komsomolskaya mines of OAO Vorkutaugol that result in significant pollution of air around these facilities. Fire-fighting actions have not been efficient. The most unfavourable situation is in the area of spoil heaps from the Severnaya mine, located in

close proximity to the settlement of Severny. The reason for spoil heap fires is the initial violations of their formation process.

Problems related to municipal waste water treatment at the Vorkuta WWTP (Waste Water Treatment Plant) remains. Modernization and expansion of WWTP provided by the Republican Programme Environment-2005 was not completed due to termination of funding. For the present time the WWTP can only provide partial treatment of the sewage in the town and is operating with overload during freshet periods. This facility and the sewage pipe network in the town demands serious investments for repair, modernization and reconstruction.

The oldest enterprise in the town, the Vorkuta cement factory (now JSC «Vorkutacement»), does still has problems treating dust and gas emissions due to unfinished construction works and commencement of electrofilters. The almost ready facility and equipment became useless during recent years. Despite the decrease in production until 2006, the problem with dust collection could appear when factory reach its projected capacity.

2.3.3 Waste management

The problem with waste utilization has become apparent in recent years. Due to the town's geographical location it is almost unrealistic to get waste transported to other places for utilization. This causes problems with utilization of waste such as carton, paper, plastic waste, and the recycling and utilization of tires, accumulators and wood waste. Due to strict environmental requirements for utilization of waste requiring special decontamination facilities, it is currently not possible to recycle fuels and lubricants, wiping material and the already mentioned wooden waste.

At present the Komi Republic does not have a unified program of municipal solid waste management. However, since 2008 the Ministry for Nature of the Komi Republic has been actively working on development of a target republican program on production and consumer waste management. The draft program based on the proposals of municipal entities was reviewed at the Meeting of Interdepartmental Committee on Natural Resources Management and Observation of Environmental Legislation under the jurisdiction of the Council of the Komi Republic on 5 June and 3 October, 2008. Based on the results of the work done, Instruction No.487-r was issued by the Komi Republic Government on 8 December 2008, on development of the target republican program on waste management which has to be ready by the end of 2009.

In addition and as a result of joint work between the Ministry for Nature of the Komi Republic and the local government authorities most municipal entities are working on the development and approval of municipal programmes on waste management. Municipal programme Wastes of the Municipal Unit Urban District Vorkuta for 2009-2011 years was approved by Resolution of Vorkuta Town District Council № 261 dated 25 November, 2008.

A list of activities for the target republican programme "Wastes" was developed for Vorkuta. Item 1 on this list regards the problem of municipal solid waste management.

2.4 Economic status and future perspectives

According to the republican regional statistical report from 2008, the main part of the industry in the town is presented by the coal mining industry (74%) and power production (21%). Other branches (engineering and metalworking industry, production of

building materials, consumer goods industry, food production etc.) are represented by 5%. 1.7 thousands companies are registered in the town. The largest of them is JSC Vorkutaugol (coal mining and benefication), production units of Komienergo (heat and power production), and JSC Vorkuta cement factory (production of cement).

At the beginning of 2008, the average salaries in these sectors were as follows:

- Coal mining: 28 606 roubles
- Power production: 23 793 roubles
- Engineering and metalworking industry: 21 373 roubles
- Consumer goods and textile industry: 6 647 roubles
- Food production industry: 18 336 roubles

Agglomerating coal from Vorkuta is delivered to JSC Severstal, JSC Novolipetsk, Moskva mining and coke plant, Nizhnyi Tagil metallurgical plant, JSC Coks, Magnirogorsk and Chelyabinsk metallurgical plants, and abroad, including CIS countries and Baltic states. Power station coals, sufficient for energy production in the town, are also delivered to Severodvinsk heat and power plant.

The social sector includes hospitals, educational institutions (including pre-school educational institutions), and cultural institutions. In the beginning of 2008 the town had 13 hospitals, 45 kindergartens, 38 comprehensive schools, 7 technical schools and 3 high schools (branches).

Closing of mines and connected industrial productions in Vorkuta performed within the coal sector restructuring programme, started in the 1990's and still ongoing, made several thousand workers unemployed without any perspectives for new working places. As a result the living standard of the population and birth rate has decreased, and the sickness rate in the period has increased.

In 1998 the Vorkuta city administration developed the Program to reduce the surplus population in the town. The program includes other program on closing down unpromising settlements and moving their inhabitants.

It was, however, the approved measures without any financial support from the city budget and termination of the financing from the state budget that caused the real bankruptcy of the whole municipal sector. The municipal budget incomes accounted for 700 million roubles, whilst the minimum demand to maintain the municipal infrastructure is over 1 400 million roubles per year. At the same time the house building program stopped, causing lots of dilapidated and damaged houses; the operation costs of maintaining these types of houses are higher than standard and this deteriorated the already distressed situation of the town.

2.4.1 Federal and Republican Development Plans for the Komi Republic

The Komi Republic bases its economical and social policy on the general development concept for the Russian Federation. At the same time, the strategy and tactic of the reforms in the Komi Republic are being developed and implemented on account of local factors and the specific social and economic status. The Strategy for Economic and Social Development of the Komi Republic for the Period up to 2020 (further referred to as the Strategy) was approved by the Resolution of Komi Republic Government № 45 dated 27 March, 2006.

The objective of the Strategy is to define the sources and reserves for economic growth in the Komi Republic, definition of the mechanisms for increasing the efficiency of the use of natural, industrial, financial and labor resources, development of industrial and innovative activities, development of the industrial and transport infrastructure, intensification of investment and innovation activities, development of the state government system in the Komi Republic, increasing the taxable base and growth of tax revenue to the republican budget, increase in the working age population employment and decrease in unemployment rate, growth of income for all population groups and reduction of the poverty level, in other words – formation of the Komi Republic economic model which is oriented at increasing the level and quality of life for the Komi Republican population.

The strategic goals in the sphere of economic development are:

- growth of investment appeal and formation of positive image of the Komi Republic;
- assurance in efficient use of natural and resource potential;
- achievement and maintenance in the long-term perspective of the stable economical growth no less than 5% per year;
- diversification of the economy structure in the direction of manufacturing and high-tech branches as well as services;
- increase in competitiveness of the products produced in the Komi Republic in the internal and external goods' markets;
- renewal of the fixed assets of the economic branches;
- implementation of large infrastructural projects, creation of transport system which would fully provide for the needs of commercial entities and the public;
- creation of an optimal structure for the agricultural industry and provision for food supply security for the people;
- increase in the contribution of small-scale businesses in the republican economy;
- increase in the role of the consolidated budget of the Komi Republic in ensuring the economic growth

The strategic goals in the social development sphere are:

- stabilization of the demographic situation: increase in birth and reduction of death rates, increase in the public life span, improvement of health and social and psychological conditions of the population;
- increase in the cultural and educational levels of the population;
- creation of conditions for working age citizens that would allow increasing the social consumption level at the expense of their own income, including comfortable accommodation, better quality of services in the sphere of education and public health, adequate level of life for the elderly;
- increase in the role of the younger generations in the social and economical development of the republic;
- growth of the real earnings of the population;
- increase in the efficiency of social protection programmes which are aimed at overcoming the poverty in the republic, reduction of the percentage of the population whose income is less than the living minimum wage by no less than 10%;
- ensuring the availability and increase in quality of public social services;
- improvement of the accommodation conditions for the population;
- increase in efficiency, stability and security of the public utilities functioning;
- solving the problem of migration of the superfluous population of the northern towns of the republic;

- reduction in crime levels and increase in the social safety of the population;
- improvement of the ecological situation

The goal of the ecological policy introduced in the Komi Republic is improvement of ecological situation and increasing the ecological safety in the republic, creation and maintenance of natural complexes, assurance of rational and stable nature management, and protection of the public health and provision of favourable conditions for living.

The ecological safety section includes a list of priority goals. One of the paragraphs states that the priority direction is provision of ecological safety in the housing and utilities sphere, including the reduction in the negative influence of industrial and consumer waste; reconstruction and construction of treatment facilities; prevention and reduction of ecological consequences in case of depressurization at pipe ducts of the housing and utilities system.

2.4.2 General Development Plan of the town of Vorkuta

The General Development Plan of municipal district Vorkuta was worked out by the Administration of Vorkuta city in 2009 and agreed with the Government of the Komi Republic in 2010. Autumn 2010 the General Development Plan of municipal district Vorkuta will be introduced to the session of the Vorkuta City Council for review and subsequent approval.

3. PROJECT OWNER: ASSESSMENT OF THE FINANCIAL SITUATION

This Chapter gives information on MUE Vorkutaremstroy. On 29 March 2010 a new enterprise MUE Poligon was established which will start providing services to the city in receipt and storage of municipal solid waste at the land-fill from 1 August 2010.

3.1 Project Owner

The project owner is the Municipal Unitary Enterprise Vorkutaremstroy. The enterprise was registered in February 2006 (

Annex 1: Letter of MINPRIRODA of Komi Republic with request to include this IP for PINS development, dated of 11.02.2009

**МИНИСТЕРСТВО
ПРИРОДНЫХ РЕСУРСОВ
И ОХРАНЫ ОКРУЖАЮЩЕЙ
СРЕДЫ РЕСПУБЛИКИ КОМИ
(МИНПРИРОДЫ РЕСПУБЛИКИ КОМИ)**

**КОМИ РЕСПУБЛИКАСА
ПРИРОДАСА ОЗЫРЛУНЪЯС, ВӦР-ВА
ДА СЫНӦД ВИДЗАН МИНИСТЕРСТВО**

Интернациональная ул., д.157,
г.Сыктывкар, ГСП-2, 167982
тел. 24-07-44, факс 44-13-90
e-mail: mprrk@rkomi.ru
mprrk@mail.ru

11.02.2009г. № 05—13-

На № _____

ООО "Ramboll Storvik"

филиал в г.Сыктывкаре
старшему консультанту
Урюпинскову А.И.

В рамках реализации Проекта ЮНЕП (Программа ООН по окружающей среде)/ГЭФ (Глобальный экологический фонд) «Российская Федерация – поддержка Национального плана действий по защите арктической морской среды», Министерство природных ресурсов и охраны окружающей среды Республики Коми предлагает включить для проведения прединвестиционных исследований следующие проекты:

1. Утилизация твёрдых бытовых отходов в г.Воркута, Республика Коми;
2. Модернизация системы очистки сточных вод в г.Воркута, Республика Коми;
3. Сбор, транспортировка и термическое обезвреживание опасных отходов лечебно-профилактических учреждений Республики Коми.

Реализация вышеперечисленных проектов приведёт к значительному улучшению экологической обстановки в заполярном городе Воркуте, и в Арктическом регионе, в целом.

Министр А.П.Боровинских

Тюпенко Т.И.
28 80 67

Annex 2: MUE VORKUTAREMSTORY Registration Certificate

). The main types of activities in the enterprise are:

- general construction works on miscellaneous (auxiliary) buildings and facilities,
- acceptance and disposal of MSW,
- maintenance of the MSW landfill.

Secondary types of activities of the enterprise include:

- manufacture of asphaltic concrete during the summer period,
- maintenance of personal water consumption recorders,
- management of traffic lights and road signs.

The structure of the enterprise is given on Figure 3.

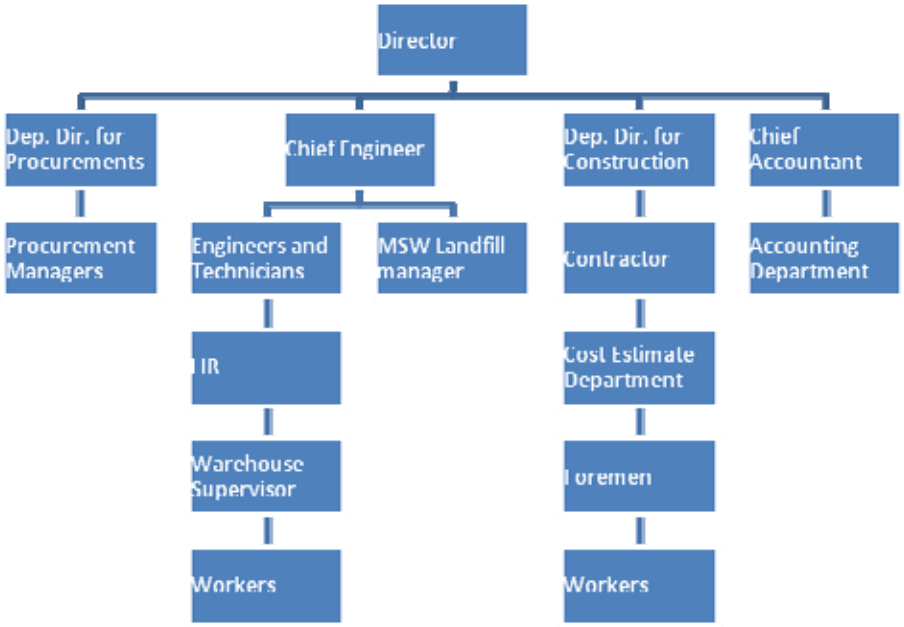


Figure 3: Organizational Chart of MUE Vorkutaremstroy

The commercial entity MUE Vorkutaremstroy contains an administrative building, warehouse, 4 garages, cold store with 5 rooms, asphaltic concrete plant, and besides that, various auto-equipment that allows conducting primary and auxiliary activities.

Vorkutaremstroy leases out the city MSW landfill which is located in Vorkuta, 1.5 km from the closest neighboring buildings which belong to OOO Olensovkhoz (Olensovkhoznaya Street, 8). The MSW landfill contains:

- Land plot for MSW placement;
- Motor road for access to the landfill;
- A general checkpoint with a swing gate.

The area of sanitary protection zone of the city MSW landfill is 178 198 m^2, of which 12 100 m^2 is the area of the small landfill and 110 400m^2 is the area of the large landfill (

Annex 3: Sanitary protection Area Layout

and Annex 4: MSW Landfill Layout within the Land Plot Borders

respectively).

Contacts in the Vorkuta Administration and MUE Vorkutaremstroi Administration are presented in Table 2.

Table 2: Contacts

Project owner:	**Municipal unitary enterprise Vorkutaremstroi**,	
Contact person:	Igor Posolenik, Director	
Address:	60-b, Lenina str, Vorkuta, 169900	
Telephone/fax:	+7 (82151) 61 341	+7(82151) 69 105
E-mail:	vrs67@mail.ru	
Applicant:	**Administration of the municipal unit Urban District Vorkuta**	
Address:	7, Tsentralnaya str., Vorkuta, Komi Republic, 169900	
Contact person:	Olga Plotnikova, Main Specialist of Department for Municipal Services and Development.	
Telephone/fax:	+7 (82151) 33 158	+7 (82151) 33 279
E-mail:	amo@mayor.vorkuta.ru	
Project owner:	**MUE "Poligon"**	
Head:	A. Djyachishin, Director	
Address:	2в, Piszhevikov st., Vorkuta, 169900	
Telephone/fax:	+7 (82151) 7 20 33	+7(82151) 7 21 14
E-mail:	mup.poligon@mail.ru	

3.2 Present financial situations of the municipal enterprise Vorkutaremstroy

Characteristics of the financial situation at the MUE Vorkutaremstroy:

The sales revenues for works, services (ex. VAT)	74 304	thousand roubles
Cost price of the sold works and services	71 136	thousand roubles
Sales income	3 168	thousand roubles
Other income	158	thousand roubles
Other expenses	2 516	thousand roubles
Pre-tax income	810	thousand roubles
Income tax amounted to	831	thousand roubles
Book loss for the reporting year	21	thousand roubles
Profit for tax purposes	2 451	thousand roubles

In the first quarter of 2009 the net incomes for the reporting period was 17 thousand roubles.

In 2008 the largest share of the total profit came from construction works – over 80%:

Building and construction works:	83.8%
Production of the road concrete mix:	4.0%
Municipal solid wastes utilization:	1.2%
Traffic signs and lights maintenance:	1.9%
Sale of goods and valuables:	4.5%
Maintenance of water meters:	3.5%
Rent, design work:	1.2%

Rates for waste disposal (utilisation) are calculated by the Republic Centre on information and indexation in building sector based on minimum wage rates at 2 600 roubles; and approved by the city mayor (Resolution № 239 dated 27. October, 2008.)

4. DESCRIPTION OF THE INVESTMENT PROJECT

4.1 Project information

The project provides analysis of the existing situation with disposal of municipal solid waste in Vorkuta and development of recommendations based on sanitary, hygienic, environmental and technical requirements, and main regulations for municipal solid waste handling.

4.1.1 Regulatory documents in the sphere of MSW management

In compliance with Article 16 of Federal Law No.131-FZ dated 06.10.2003 "On general principles of local government in the Russian Federation" the decisions related to the norms of MSW accumulation, their management rates have been made by Vorkuta City District Council. The latter is guided by the following regulatory documents:

- Federal Law No. 89-FZ dated 24.06.1998 "On industrial and consumer waste";
- Federal Law No. 52-FZ dated 30.03.1999 "On sanitary and epidemiological wellbeing of the population";
- SanPiN 42-128-4690-88 "Sanitary Rules for Maintenance of the Territories in Residential Areas";
- SanPiN 2.1.7.1038-01 "Hygienic requirements to arrangement and maintenance of landfills for municipal solid wastes";
- SanPiN 2.1.7.1287-03 "Sanitary and epidemiological requirements to the quality of soil";
- SanPiN 2.1.7.1322-03 "Hygienic requirements to placement and treatment of industrial and consumer wastes";
- SP 2.1.7.1386-03 «Sanitary Rules for Defining the hazard Class of toxic industrial and consumer wastes";
- Resolution of Chief State Sanitary Doctor, KR No.1 dated 10 January, 2008, "On observance of the requirements for sanitary legislation in managing the industrial and consumer wastes in Komi Republic".

The Vorkuta City District Council adopted the following regulatory documents:

- Resolution No.239 dated 27 October, 2008, "On approval of the rates for management (landfill) of municipal solid wastes for consumers of MUE Vorkutaremstory in the Vorkuta City District Council";
- Resolution No.40 dated 24 May, 2007, "On the norms of municipal solid waste accumulation";
- Resolution No.96 dated 14 December, 2007 "On Approval of Rules for improvement, maintenance, clean-up and sanitary cleaning of streets, roads, housing areas and excavation works in the territory of Vorkuta City District".

In Russia waste is classified in accordance to the Waste Classification Catalogue approved by the Ministry of Natural Resources of the Russian Federation dated 02.12.02: No. 786 'About approval of Federal Classification Catalogue of Wastes' updated 30.07.03 as No. 663. The Federal Waste Classification Catalogue specifies and systemizes waste generated in the Russian Federation according to a 13 digit code system based on the following features of the waste: origin, aggregative state, physical state, hazardous properties and level of harmful effect on the environment.

In Russia the classification of hazardous waste is rated in 5 classes. The classification and rating of hazardous waste is based upon the hazardous impact on the environment. Class 1 is highly toxic waste, while class 5 has very low hazardous characteristics. An overview of the 5 classes of hazardous waste and examples of waste type is given in Table 3 below.

Table 3: Classification of hazardous waste in Russia

Class	Hazardous impact on the environment	Type of waste
1	**Very high**	Highly toxic waste (industrial/construction waste)
2	**High**	Toxic waste with content of inorganic and organic pollutants (industrial, construction, household waste)
3	**Moderate**	Content of organic pollutants such as oil products (industrial/construction/household waste)
4	**Low**	Content of low hazardous pollutants (organic/household/construction waste)
5	**Very low**	Low content of low hazardous pollutants (organic/household/construction waste)

4.1.2 Brief analysis of the situation with disposal of MSW in Vorkuta

The landfill for disposal of municipal solid waste from Vorkuta (denoted MSW landfill) has been in operation since 1989. The facility was constructed based on design No. 282 dated 19.09.74. There is a gap of 15 years between design approval and operation and the landfill construction is hence based upon regulations of the seventies long before the environmental regulations of today.

The landfill is designed for storage and disposal of solid waste from residential houses, institutions and organisations from Vorkuta and the settlement Sovetsky. Until December 2008 the landfill was operated by the Municipal Unitary Enterprise Spestavtokhozyaistvo. In December 2008 by the Order of the Head of Vorkuta Municipality the facility was handed over for maintenance and operation to the Municipal Unitary (MUE) Enterprise Vorkutaremstroi.

The volume of waste accumulated in the 19 years of operation is 3 128 160 m³. The capacity is 164 640 m³/year (according to the certificate for MSW landfill).

The MSW landfill is located outside the Vorkuta residential areas, 2 km from the Vorkuta River. The access to the landfill is restricted, there is a check point where the delivered waste is primary accounted and checked.

The operating company Vorktuaremstroy has at present not received an operating certificate from the environmental authorities (Rostechnadzor). However, the application process is in progress and Vorktuaremstroy expect to receive the evaluation report from the authorities in the near future. The MSW landfill fails to comply with environmental requirements due to the following reasons:

1. The MSW landfill is formed by violating the existing regulatory requirements for landfills. The approved method of layer-by layer disposal of waste using inert insulation materials is practically not used. The waste is disposed using the simple

method of unloading waste from waste collection trucks with its further dispersion and compression by heavy machinery (bulldozers, tractors).

2. Due to violations of existing regulatory requirements and degradation processes in the landfill formation (production of gas) there are continuous burning spots at the facility resulting in air pollution with combustion products, including greenhouse gases. During unfavourable weather conditions and corresponding wind direction, the smell of burning waste has been registered by the populations in settlements in the vicinity of the landfill. Actions taken by services operating the landfill to extinguish burning areas have not been efficient, due to the depth of the waste fire sources.

3. The landfill has a separate facility for disposal of liquid waste, the so-called sewage reservoir, accumulating liquid waste from unsewered facilities, waste (sludge) from the municipal sewage treatment facilities and local treatment facilities of the city enterprises. This facility does not meet the environmental requirements, since it is not provided with a required waterproofer and the bund wall has fractures. Negative impacts on neighbouring water facilities (small lakes and bogs) have been observed (presence of oil film). Laboratory tests of the water bodies have not been conducted.

4. There is restricted access for unauthorised people at the landfill. However, due to the lack of fencing around the landfill, local people (scavengers) violate the restrictions and utilise the landfill for collecting usable waste. The activities of the scavengers at the landfill also include initiating fires. The smell of burning waste has occasionally been registered by the populations of settlements in the vicinity of the landfill. The landfill service operators do not have the capacity to take measures for preventing the access of unauthorised people at the landfill.

5. Environmental monitoring does not include all necessary indicators. Air and soil quality indicators are monitored. Ground water, surface water and water bodies are not monitored.

4.1.3 Existing waste types and volumes

The waste deposited at the landfill is registered as hazardous class 4 and 5 waste. Due to the lack of a waste sorting system and lack of disposal sites for hazardous waste class 1 – 3, it is likely that the deposited waste at the landfill includes components of class 1 – 3 waste. The relative amounts of class 1 – 3 waste at the landfill have not been registered.

The following types of waste are brought to the landfill:

- Solid unsorted waste from residential houses (hazard class 4);
- Construction waste (hazard class 4);
- Waste after cleaning outer and administrative premises (hazard class 4);
- Large-size waste from household premises of organizations (hazard class 5);
- Waste after cleaning outer premises and facilities of wholesale and retail trade of industrial goods (hazard class 5);
- Waste after cleaning outer premises and facilities of educational, cultural and sports institutions (hazard class 5);
- Waste after cleaning outer areas of cemeteries and cineraria (hazard class 5).

Snow from city streets and yard areas is not delivered to the MSW landfill.

The landfill was established in 1989, the volume of waste accumulated during 19 years is 3 128 160 m³. There has never been any established system of waste volume accounting by waste type, however, the majority of waste at the MSW landfill is unsorted waste from residential houses.

4.2 Technical description

Waste management in a remote place like Vorkuta represents a great challenge due to lack of solutions for a sustainable utilizing of waste. The existing situation at the MSW landfill requires actions aimed at improving efficiency of the waste management system in Vorkuta. Use of the existing methods for MSW disposal will lead to further degrade in the environmental situation of the city and neighbouring areas. These works are included in the List of measures of republican programme "Wastes".

4.2.1 Alternative technical solutions

The following options can be considered among alternative solutions for the existing situation and improvement of the waste handling system efficiency:

1. Construction of a MSW incineration plant.
2. Construction of a new MSW landfill.
3. Reconstruction/upgrading the existing MSW landfill.

1. Construction of a MSW incineration plant
Today there is an increasing trend of looking at waste as a resource and not purely as a problem without any assets. The construction of a MSW incineration plant offers opportunities for waste management of high environmental standards and re-using produced energy for heating purposes. Currently, technical solutions for incineration plants with different types of processing capacity are available internationally. Construction of an incineration plant will have to be combined with proper environmental decommissioning of the existing landfill. This work has not been included in the List of Activities for the republican program "Wastes".

2. Construction of a new MSW landfill
The construction of a new landfill offers the possibilities of designing a new landfill with modern technology. Vorkuta is surrounded by natural landscape and finding a new location should not represent any unsolvable challenge for the local administration. The construction of a new landfill will have to be combined with proper environmental decommissioning of the existing landfill. (Not included in the List of Activities for the republican programme "Wastes").

3. Reconstruction/upgrading the existing MSW landfill
Reconstructing/upgrading the existing MSW landfill provides technical improvements for meeting current environmental standards and regulations and will contribute in reducing future negative impacts on the environment. The reconstructing/upgrading of the existing MSW landfill does not provide a long-term and sustainable solution for MSW management in Vorkuta.

4.2.2 Preliminary assessment of most appropriate technology

In order to choose the most appropriate technical solution at the given time and situation, a preliminary assessment and evaluation of the 3 suggested solutions has been made. A screening of the 3 solutions regarding social, environmental, technical, capacity, financial and legal liability is presented in Table 4. The screening includes a preliminary evaluation in 3 classes A, B and C. 'A' symbolises a condition with no or few difficulties, 'B' symbolises a condition with medium difficulties/challenges and 'C' symbolises a condition with many difficulties/challenges.

Table 4: Preliminary assessments and evaluation of the 3 alternative technical solutions. The evaluations are classified in classes A, B and C, where A has the highest denotation and C the lowest.

Social liability	Environmental liability	Technical liability	Capacity building	Financial liability	Legal liability	Assessment
Solution 1: Incineration plant						
Project owner sceptical Local administration sceptical Environmental authorities expected to be positive Public expected to be positive	The incineration plant should comply with national standards and regulations regarding emissions Possibility for sustainable use of waste, e.g. exploiting energy from incineration	Requires external experts Requires external transport of construction materials	Teaching programs for a new technology Education of personnel	High implementation costs Low - moderate operational costs Existing MSW landfill closure costs	Site location to be decided	
B	**A**	**C**	**C**	**C**	**B**	**B/C**
Solution 2: Construction of a new MSW						
Project owner sceptical Local administration sceptical Environmental authorities positive Public expected to be positive	Modern technology to meet current and future environmental requirements	Requires some external experts	Education of personnel	Mediocre implementation costs Low operational costs Existing MSW landfill closure costs	Site location to be decided	
B	**A**	**B**	**A**	**B**	**B**	**A/B**
Solution 3: Upgrading existing MSW						
Project owner prefers this solution Local administration positive Environmental authorities sceptical Public expected to be positive	Reconstruction/upgrading shall meet current regulations regarding health, safety and environment Short-term solution and not sustainable	Local experts can implement the reconstruction/upgrading	Education of personnel	Low implementation costs Low operational costs No costs for MSW landfill closure costs	Same location	
B	**B**	**A**	**A**	**A**	**A**	**A**

Social liability
All of the 3 suggested solutions provide challenges for obtaining complete stakeholder liability.

The public are expected to be positive towards all 3 solutions, since they all provide improvements for the general health and environmental situation of Vorkuta.

The project owner and local administration have expressed sceptical opinions of solution 1 and 2 due to financial, technical and institutional considerations.

The environmental authorities are sceptical towards solution 3 – reconstruction of existing MSW due to the environmental considerations. The environmental authorities are positive towards solutions 1 and 2 as both provide solutions that will meet the current and future environmental requirements.

Environmental liability
Solutions 1 and 2 include performing an environmental impact assessment, which will map the current and future requirements and further determine the environmental liability of the solution in question. Both solutions provide opportunities for MSW treatment sites of high environmental standards. The 2 solutions shall include plan for proper decommissioning of the existing MSW landfill.

Solution 3 has to be designed to meet current environmental regulations. Reconstruction of the existing landfill is not expected to obtain as high environmental standards as solutions 1 and 2. Reconstructing the existing MSW landfill is a short-term solution (15 years).

Technical liability
The implementation of an incineration plant requires technical expertise and construction materials that are currently not present in Vorkuta. A high level of incineration plant technology exists internationally, practical experience of implementing incineration plants in Russia are however low. The implementation of solution 1 hence depends on significant involvement of international experts.

The construction of a new MSW landfill partly requires external technical expertise. A high level of qualifications within the modern technology of constructing landfills to meet high environmental, health and safety standards exists nationally and internationally. The implantation of solution 2 will require involvement of external technical experts.

The reconstruction of the existing MSW landfill is feasible to implement for local and regional experts.

Capacity liability
Solution 1 involves implementing a completely new technology in Vorkuta and hence has to provide with the highest level in capacity building. The implementation of solution 1 will require education of staff to an expert level within operation and maintenance of an incineration plant. In addition the staff should receive training in environment, health and safety for working in an incineration plant. Solution 1 should also provide a training program for the closure of the existing MSW landfill.

Solutions 1 and 2 provide similar technologies and hence a similar capacity building program. Both solutions shall provide the staff with education to an expert level within operation and maintenance of a landfill, and in addition environment, health and safety.

Solution 2 shall also provide a training program for the closure of the existing MSW landfill.

Financial liability
Cost estimates of implementation of the 3 solutions have been made in chapter 5. Solution 1 is by far the most expensive to implement and solution 3 provides the lowest implementation costs. In addition to the implementation costs, solutions 1 and 2 shall provide costs for the proper decommissioning of the existing MSW landfill.

An assessment of implementation costs compared to the environmental, safety and health gains of the 3 solutions has not been undertaken.

Legal liability
Solution 3 does not involve construction works at an external site and landfill certificate already exists. There are no legal liability issues for solution 3.

Prior to design of solutions 1 and 2, a site of location shall be certified by the local administration. In addition both solutions have to obtain certificate for incineration and landfill operation, respectively.

4.2.3 Recommendations of the most appropriate technology

Based on the screening and preliminary assessments and evaluation of the 3 suggested technical solutions, the most appropriate technology at the given time and situation is solution 3 – reconstruction of the existing MSW landfill.

The reconstruction of the existing MSW landfill currently provides the most viable approach regarding the financial, capacity and social liabilities. In addition the solution meets the current environmental requirements.

The reconstruction of the existing MSW landfill does however not provide a long-term sustainable approach for municipal waste treatment as the solutions 1 and 2 do. The lifetime of the reconstruction works is 15 years, at which point alternative municipal waste treatment solutions have to be reviewed.

In order to integrate more environmental and sustainable waste treatment technologies in the future, it is suggested that the project owner, the local and republican administrations and other stakeholders in the operational period of solution 3 make preparations for alternative waste treatment technologies. This could include organising and preparing for waste sorting and recycling in Vorkuta and further preparations for institutional implementation and capacity building.

Since solution 3 is currently assessed as the most appropriate technology for improving the environmental, health and safety situation regarding the municipal waste treatment technology in Vorkuta, the following technical, financial and investment assessments are solely made for solution 3.

The project has been included in the List of Activities presented by the Vorkuta Administration for the republican programme "Wastes", the project value is 7 800 thousand roubles against the 2008 prices. (Items 1.1 and 3.2.1 of the List of Activities presented by the Vorkuta Administration for the republican programme "Wastes")

4.2.4 Future volumes of solid waste in Vorkuta

The main supplier of MSW to the landfill is the population living in the residential districts of the city: Zheleznodorozhny, Shakhtersky, Zavodskoy residential quarter, and the settlement of Sovetsky.

The total number of population in these 4 districts and the development in population in the period 2003 – 2008 is illustrated in Table 5 below.

Table 5: Population number and annual development in the Vorkuta city districts of Zheleznodorozhny, Shaktersky, Zavodskoy and the settlement of Sovetsky.

Year	Population	Annual development
2003	133 500	-
2004	130 100	-2,6 %
2005	127 500	-2,0 %
2006	123 800	-3,0 %
2007	120 100	-3,1 %
2008	116900	-2,7 %

As illustrated in Table 5, there has been a decrease in the population of 2.0 – 3.0% the past 5 years. This trend is expected to continue with an annual population decrease rate of approximately 2 %. According to the Vorkuta City Administration, it is forecasted that in next 15 years the population will have decreased to 75 750 people. For this reason, no new residential house constructions are planned.

In 2009 on behalf of Vorkutaremstroi, the architecture, design and land use planning company OOO Modulor, developed a landfill reconstruction design (Chapter 4.3). The design was based on the expected volume of municipal solid waste for disposal for the following 15 years. The estimation of the expected volume was made based on the following assumptions:

- Design-basis population: 96 300 people (average population the coming 15 years)
- Designed landfill operation period: 15 years
- Rate of MSW accumulation: 1.4 m³/person/year taking into account public buildings and tenants (Sanitary Treatment and Cleaning of Populated Areas. Reference book. Moscow, Stroiizdat, 1885).

The total MSW accumulation in the 15 year period is estimated using the following formula:

$$V = H \times N \times T \qquad (4.2.1)$$

where:

H – The number of population
N – The rate of MSW accumulation for 1 person including public buildings and tenants
T – The designed landfill operation period

Inserting the estimated parameters in (4.2.1) gives the following calculation:

$$V = 96\,300 \times 1.4 \times 15 = 2\,022\,300 \text{ m}^3$$

Hence, it is estimated that the landfill will receive an additional 2 022 300 m³ of MSW in the coming 15 years (2009 till 2024) and the technical design solutions are based on this estimate.

4.3 Proposed technical solution

In 2009 OOO Modulor developed a landfill reconstruction design on behalf of Vokutaremstroi. The following description of proposed process solution is based on the design of OOO Modulor and information supplied by Vokutaremstroi. A map of the planned construction measures is given in **Ошибка! Источник ссылки не найден.**.

The reconstruction of the existing MSW landfill in Vorkuta entails the following works:

- New method of waste disposal to significantly decrease the number of landfill fires and prevent exposure to waste degradation emissions and smell
- Construction of collecting ditch and wells to prevent unacceptable dispersion of waste and degradation products into the environment
- Construction of a fence (earth deposit) to close-off the landfill from intruders
- Environmental monitoring program

4.3.1 Construction scope required for the project implementation

Construction of collecting ditch and wells
The collecting ditch will be constructed along the perimeters of the small and large land plots (**Ошибка! Источник ссылки не найден.**). The collecting ditch (trench) is designed for collection and diversion of storm and flood water to a lower area. The ditch will be up to 2 meters deep based on the area relief.

To collect surface water (rain and melt water) precast concrete wells excavated 0,5 meters inwards will be installed at both land plots in a trench at a lower part of the collecting ditches. It is proposed to fabricate the wells of the rings with a diameter of 700 mm and height of 1.5 m.

Construction of embankment around the landfill
The landfill will be fenced with a soil embankment extracted during construction of the collecting ditch and laid on its edge as a solid bank up to 2 meters high.

Environmental monitoring installations
The environmental monitoring program entails the drilling of boreholes for monitoring of the level, temperature and quality of ground water. Six boreholes in total, four at the large land plot, and two at a small land plot (**Ошибка! Источник ссылки не найден.**). The section of all wells up to the monitored water-bearing horizon will be covered with a bore casing, and a screen filter will be installed in the middle of the water-bearing horizon. In order to protect facilities for sampling from surface contamination, the bore casing of the wells will be elevated 1 meter above the ground surface and covered with wooden plugs.

To analyze the quality of surface water, two stations (one at each lake) will be constructed, located on two lakes neighbouring the MSW landfill (**Ошибка! Источник ссылки не найден.**).

4.3.2 Proposed process solution for disposal of existing waste and further operation of the landfill

The objective of implementing a new method of waste disposal at the landfill is to reduce the landfill fires, prevent formation of polluted leachate and run- off water, and hence reduce the exposure/dispersion of waste and degradation products to the surrounding environment.

In order to reduce landfill fires, the disposal methodology relies on a technology of packing the waste with several insulating layers of soil. The insulating layers provide permafrost conditions in the waste, i.e. a constant lower temperature, hence reducing the degradation process (production of methane) and frequency of landfill fires.

The permafrost conditions in the waste will reduce the mitigation of pollution in the waste, both through water and air. The top insulating layer will in addition reduce the amount of percolation water and hence reduce the amount of leachate water.

The landfill area is divided into sections – cells. The large land plot is divided into 368 cells each with a dimension of 10×30 m, the small land plot is divided into 66 cells, with dimensions of 20×10 and 10×10 m.

The construction of each cell is illustrated in Figure 4.

Figure 4: The construction of 2 neighbouring cells.

The base of each cell is constructed by cutting the topsoil layer with a bulldozer. Subsequently the base is levelled and compressed by a road roller.

Each cell shall have 2 levels of compressed waste. The lowest level shall have a total height of 2.25 m and the top level shall have a height of 2.0 m. The waste is either delivered by waste trucks (new waste) or moved from neighbouring areas (existing waste) and distributed along the cell in thin layers 0.25 m thick with further compression by a 14 t bulldozer. The removal of waste from one cell by pushing existing waste to neighbouring cells will be made by a bulldozer.

When the cell is filled with MSW up to 2.25 m high, the waste shall be covered with an intermediate insulating layer of 0.25 m. The second level of waste shall be covered with

an insulating finishing layer of 0.5 m. Subsequent to the completion of a cell, perennial grass will be planted.

The insulating layers consist of soil excavated during the construction of the collecting ditch and base of the cells. In addition soil from spoil heaps of the nearest mines shall be utilised. Data on the chemical composition of soil from the mine dumps is however not available and shall be received during project implementation by the assistance of OAO Vorkutaugol.

The soil for insulating layers will be moved by a bulldozer.

In addition to changing the thermal characteristics of the waste, the insulating layers provide covering of the waste and protect neighbouring areas from the dispersion of MSW light fractions by wind and will prevent the penetration of insects on the surface during the summer period.

Different operations to implement this project can be done in parallel, i.e. one cell can be used to take out and move the existing waste, another cell at a distance from the first one can be used for base formation, the third cell can be used for formation of waste layers, etc.

The main works for the MSW landfill operation are presented in Figure 5 below.

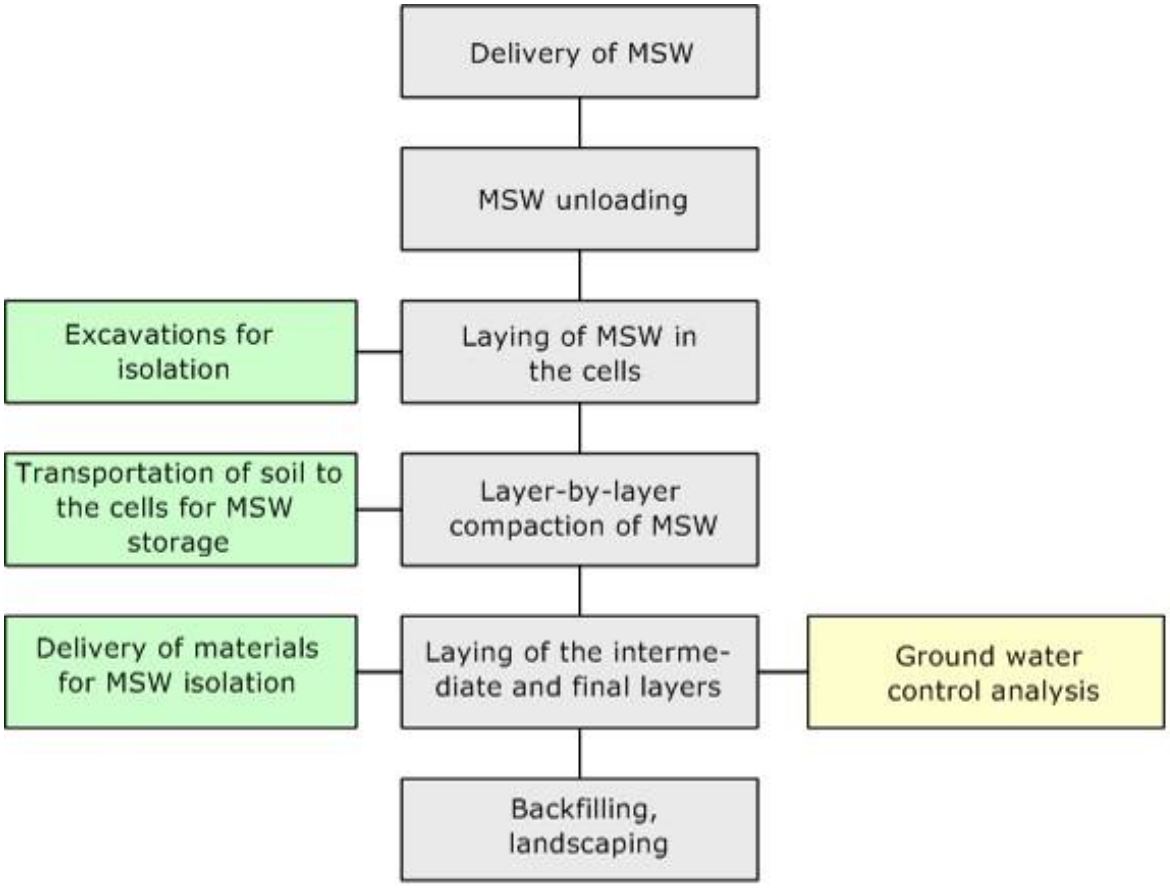


Figure 5: Main works for the MSW landfill operation

4.3.3 Environmental monitoring program

The objective of the environmental monitoring program is to monitor whether the waste treatment at the MSW landfill meets the environmental requirements. The environmental monitoring program will hence serve as basis for initiating further actions/work to prevent unacceptable impacts on the environment.

The MSW landfill reconstruction design envisages monitoring the condition of:

- Ground and surface water in the area of the landfill
- Atmospheric air
- Soil

OOO Vorkutageologiya shall perform arrangement and implementation of monitoring of subsoil condition during the operation of the MSW landfill under a separate contract with the operating company. The object of the survey is the soil, ground waters and surface of the water reservoirs (lakes and sewage water of the collecting ditch) which will be sampled at the network of monitoring stations established within the framework of the project, located within the boundaries of the MSW landfill.

The monitoring of level, temperature and quality of the ground waters should be performed regularly at the established monitoring boreholes in order to observe the possible pollution of the ground waters and monitor their condition.

The water from the land surface (rain and melt water) shall be monitored from the reinforced concrete wells installed in the trench of the bottom part of the collecting ditches at the landfill.

The water from the surface of the lake shall be monitored at the two surface water monitoring stations located on the two lakes adjacent to the MSW landfill.

The monitoring of the soil and atmospheric air shall be performed by the territorial department of Rospotrebnadzor in the Komi Republic in Vorkuta under a separate contract for laboratory surveys which will take account of the frequency of sampling and performance of the appropriate surveys.

List of guidance regulatory documents for sampling, scope of survey and assessment thereof:

1. Air in populated areas and working zones
   - GOST 17.2.3.01-86 Atmosphere. Air Quality Control Regulations for Populated Areas;
   - GOST 12.1.005-88 Working Zone Air;
   - GN 2.1.6.1338-03 Maximum Concentration Limits of Air Pollutants in Atmosphere Air of Populated Areas;
   - GN 2.2.5.1313-03 Maximum Concentration Limits of Air Pollutants in Atmosphere Air of Working Zones;
2. Soil
   - SanPiN 2.1.7.1287-03 Sanitary and Epidemiological Soil-Quality Requirements;
   - GN 2.1.7.2041-06 «Approximate Concentration Limits of Chemical Substances in Soil;
   - GN 2.1.7.2041-06 Maximum Concentration Limits of Chemical Substances in Soil;
3. Sewage water

- GOST R 51592-2000 Water. General Requirements for Sampling;
- SanPiN 2.1.5.980 Hygienic Requirements to Surface Waters Protection;
- GN 2.1.5.1315-03 Maximum Concentrations Levels of Chemical Substances in Water Bodies Used for Drinking and Domestic and Recreation Purposes;
- GN 2.1.5.2307-07 Approximate Concentrations Levels of Chemical Substances in Water Bodies Used for Drinking and Domestic and Recreation Purposes.

4.3.4 Description of the equipment required for implementation of the project and further operation

The following equipment is needed for implementation of the project:

Bulldozer 82-96 l/sec – 2 pcs.
Excavator, ladle capacity 0.25 m³ - 2 pcs.
Dump trucks, capacity 5.25 – 5.8 Te. (delivery distance – up to 10 km within the town, up to 25 km. (Zavodskoy residential quarter, Settlement Sovetsky).

The equipment mentioned above is available at the operating company.

4.4 Design evaluation

Based on the current design description and the supplied data, the Consultant has evaluated the design and has given recommendations and suggestions for optimising the design and attracting international investors. The recommendations are summarised in Table 6 and described in detail in the following.

Table 6: Recommendations for the current design

Topic	Issue	Recommendations
Collecting ditch	The collection ditch is placed on the outer side of the embankment	1) Place the ditch on the inner side of the embankment
	No treatment of the water in the ditch	1) Treatment of water prior to discharge into waterbody
Neighbouring lake	Dispersion of waste into lake	1) Circumvent the lake
Leachate water	Reduce amount of percolation water	1) Inclined slopes of 1:3 or 1:4
		2) Reduce base area
Insulating layers	Ensure sufficient amount of soil or other insulating material	1) Possibilities for using fly ash
		2) Possibilities for using clean construction waste
Excavation in deposited waste	Risk of explosions due to high content of methane	1) Map methane gas in the landfill
Environmental monitoring	Optimise monitoring program	1) Monitor methane levels in landfill
Educational program	The design does currently not include educational program	1) Include educational program in the design
Global warming	Effects of global warming on the landfill design has not been assessed	1) Continuous monitoring of thermal condition of waste
		2) Global warming impact assessment
Waste management in Vorkuta	Short-term solution; not sustainable	1) Develop sustainable waste management system in Vorkuta
		2) Establish waste sorting system
		3) Evaluate various long-term and sustainable solutions

Based on the volume of existing waste and expected future amount of waste and the landfill dimensions, the design demands that the waste shall be compressed to at least 1/9 of its original volume.

Collecting ditch
The collecting ditch is in the design plans placed on the outer side of the embankment, so run-off water and leachate water will be prevented from directly discharging into the ditch. The objective of establishing the ditch is to collect polluted run-off and leachate water and prevent it from dispersion into the environment. In order for the collecting ditch to fulfil this objective it is recommended that the ditch be placed on the inner side of the embankment. This will in addition prevent contact with contaminated material for unauthorised local people.

The ditch will help monitor run-off and leachate water but will not improve the quality of the water. Prior to discharging the ditch water into surrounding waterbodies, treatment of the water to acceptable levels according to republican and federal legislation is recommended.

Neighbouring lake
Based on aerial photographs of the site, the waste is transported to a small lake north-east of the landfill. In order to ensure the environment and limit dispersion to the lake it is suggested that the lake be circumvented.

Leachate water
In order to reduce the amount of leachate water dispersed from the landfill, the amount of water percolation and run-off water contact with the waste must be reduced.

Three measures will reduce the amount of percolation water:
1. Functional topsoil cover
2. Small base area
3. Stable and sufficiently inclined slopes

The contact between run-off water and the waste will be prevented by measure 1 – functional topsoil cover.

The current design includes establishing a functional topsoil cover, but does not include measures 2 and 3.

Reducing the area of the landfill will reduce the amount of water percolating the landfill. This measure entails increasing the height of the landfill. A geotechnical survey to determine whether this measure is relevant to include in the technical design should be conducted.

Implementing stable and sufficiently inclined slopes will reduce the amount of rain and melt water percolating the landfill. The disposal of waste in the cells of the landfill is recommended to result in stabilised slopes of maximum inclination 1:3 in the direction of the intercepting ditch.

Insulating layers
For the insulating layers the design suggests the use of soil excavated during the establishment of the collecting ditch, and soil from mining spoil heaps. The establishment of the collecting ditch will produce approximately 5.000 – 10.000 m^3

soil. Most of this soil is expected to be used for the establishment of the embankment fencing the landfill.

Based on the current dimensions of the landfill, the insulating layers will comprise approximately 90.000 m^3 soil. Due to the large amount of soil it is suggested that the design includes a survey to determine the allocation of demanded soil and should also include evaluation of alternative insulating material. Fly ash from local power plants comprises a good substitute with good insulating capabilities. Technical and environmental details of the fly ash have to be studied.

Excavation in deposited waste
The technical design includes excavations of the deposited waste. The continuous burning spots in the landfill indicate content of gas. Undertaking excavation in areas of high gas content entails risk of explosion. It is hence recommended to undertake environmental investigations to measure the concentrations of gas in the landfill prior to initialising excavation works.

Environmental program
The environmental monitoring program does not include measurement of gas levels in the landfill. It is suggested that regular measurements of the gas content in the landfill are conducted.

Educational program
The current design does not include educational training program for employees and workers. It is recommended that this be included in the project design.

Prior to project implementation employees and workers at the landfill should be provided with information about the project content, objectives and progress plan.

At this early stage it is also suggested to commence the education and training of relevant employees and workers. The education and training programs should enable the staff to perform implementation, operation and maintenance works at the landfill.

The education and training programs should also include teachings of environment, health and safety regarding the required work at the landfill.

Global warming
The design is based upon insulating the waste and inducing permafrost conditions in the waste. This entails that degradation of waste will be limited and the landfill will remain a potential source of pollution for many years to come.

The World is currently undergoing global warming. As Vorkuta is situated in the border between discontinuous and continuous permafrost, the impact of global warming could entail melting of the permafrost.

The melting of permafrost entails, among others, the following risks for the landfill:

1. Thawing causing geotechnical instability of the landfill
2. Increase in the degradation processes
3. Increase in gas content
4. Increase in leachate transportation/dispersion

It is recommended that the project design includes a survey of global warming impacts on the landfill, including action plans for measures to prevent global warming inducing unacceptable impacts on the environment. Assessments and evaluations of

the impact of global warming should be revised every 5 years in the operational period of the landfill. Future decommissioning of the landfill is also recommended to include assessments and action plans against negative environmental impacts of global warming.

Waste management in Vorkuta

The project design comprises a short-term solution for the MSW management in Vorkuta. Currently the reconstruction of the existing MSW landfill in Vorkuta accounts for the best solution for reducing the negative environmental impacts on the environment.

Since the solution is short-termed, it is recommended that the local administration initiates the process of analysing long-term and sustainable waste management solutions for Vorkuta. This should enable improvement of the existing waste management system during the next 15 years. Improvement measures include implementing methods of sorting the waste for recycling purposes.

5. PROJECT COST ESTIMATES

5.1 Capital costs

Calculation of the capital cost is approximate. It is assumed that detailed cost calculations will be performed during detailed design stage of the project.

Calculation of the capital cost has been based on the cost of available design documentation.

5.1.1 Reconstruction of the existing MSW landfill

The existing municipal landfill is situated outside of the Vorkuta residential area about 2 km from the Vorkuta River. The access at the landfill is restricted by a check point at which calculations of the waste transported to the landfill is performed. Today waste disposal does not include multilayer landfill formation with separate layers isolation. Leveling and compacting of wastes by a bulldozer is performed only.

The cost of reconstruction measures at the existing landfill is summarized in Table 7 below.

Table 7: Capital cost estimates for reconstruction of domestic waste landfill

Component	Cost of the component, EUR*
Levelling of the landfill base by a bulldozer	4 874
Transportation works	970 313
Excavation works	69 356
Excavation of intercepting ditch with ground levelling and compacting	14 605
Indirect expenses*	32 652
TOTAL	**1 091 800**

* 1 € = 44 руб

** Indirect expenses include general field, general utility, nonproduction, administrative expenses, contractor's profit and etc.

The main part of expenses (88 %) is transportation works because the distance of ground transportation is 22 km and the volumes of waste are large in order to perform multilayer landfill formation and isolation.

The capital cost estimates do not include fencing costs, which amount to approximately € 500 000 (**Ошибка! Источник ссылки не найден.**).

5.1.2 Construction of a MSW incineration plant

MSW incineration plant capital cost estimation is very approximate as there is no design documentation or feasibility studies available however Vorkutaremstroi has done a

preliminary calculation of implementation costs. According to the Consultant the cost evaluation is underestimated as it does not include the cost of subcontractors' services which may come to 30% of the project cost. Preliminary capital cost estimation is summarized in Table 8 below.

Table 8: Capital cost estimates for construction of incineration plant

Component	Cost, mln. EUR
Design works, field survey works and expertise	68 181
Construction works	9 022 727
TOTAL	**9 090 908**

* 1 € = RUR 44

5.1.3 Construction of a new waste landfill

The cost estimate for a new landfill construction is based on European examples with the following unit prices:

Construction of bottom liner: 40 – 70 €/m^2
Construction of top layers: 25 – 45 €/m^2
Development (design etc.): 4 – 7 €/m^2

Based on these prices and an assumed demand of approximately 12 hectares, the construction of a new landfill will cost 8 – 14 million €. The cost does not include decommissioning of the existing landfill.

5.2 Operational costs

Operational costs have been calculated as tentative assumptions. Operational costs of the incineration plant and new landfill has not been calculated.

5.2.1 Operational costs of waste landfill reconstruction

Operational costs of the landfill reconstruction project account for 569 227 € and are summarizes in Table 9.

Table 9: Operational costs of reclamation of domestic waste landfill

Position	Annual costs	
	thous. RUB	EUR*
Wages of personnel, taxes	4 565	103 746
Power	27	614
Water	24	545
Chemicals and materials	20 000	454 545
Maintenance and repairs of equipment	430	9 773
TOTAL	**25 046**	**569 227**

* 1 Euro = 44 roubles

The main part of the operational costs (80%) is soil/material for waste layers isolation. About 18 % of the operational cost includes taxes and wages of personnel.

5.2.2 Operational costs of waste landfill maintenance

Operational costs for landfill maintenance account to EUR 42 000. The list of cost components is summarized in Table 10.

Table 10: Annual cost servicing of landfill

Position	Annual costs	
	thous. RUB	thous. EUR*
Wages	1 200	27,3
Taxes	322	7,3
Fuels	154	3,5
Spares, materials	120	2,7
Depreciation	2,4	0,1
Chemical analyses	46,8	1,1
TOTAL	**1 844,4**	**41,9**

* 1 Euro = 44 roubles

The main operational cost is personnel wages that account for 65% of total operational costs.

6. PROJECT PRE-INVESTMENT ASSESSMENT

This chapter includes description of environmental and social assessments of the project. The project is located in Arctic zone of Russia. Climate conditions of this area require thorough study. That is why during project development it is necessary to take into account natural and environmental peculiarities, living conditions of the population, and also existing and possible bottlenecks which could appear during IP implementation.

6.1 Environmental assessment

Implementation of this investment project will allow reducing overall pollution load on the local environment as well as the global environmental impact. This project is one of the most perspectives for further implementation in terms of environmental impact and arrangement of ecologically clean territory for comfortable living environment of population.

The project implementation, introduction of multilayer waste disposal, intercepting ditch construction significantly reduce the impact of pollutants on the environment because the discharge of polluted ground and surface waters into the Vorkuta River and the Arctic Ocean will be reduced. So the implementation of this project will have significant positive effect in the Arctic region.

6.1.1 Existing environmental status in the IP area

Environmental Monitoring Programs at Landfill
Monitoring studies at the SDW site of MUE Vorkutaremstroy include permanent monitoring of air, soils and waste water. Sample points are illustrated in Annex 6.

Analyses air samples over overwhelmed site areas and at the edge of sanitary protection zone for compounds that characterize the process of biochemical degradation of solid domestic waste and that render the highest hazard are made on a quarterly basis.

The condition of soil cover is monitored according to chemical, microbiological, and radiological parameters. Among chemical parameters, content of lead, copper, cadmium, zink, mercury, and nitrates is analysed. Microbiological parameters include analysis of total bacterial counts and parasitology.

Waste water sampling occurs on the boundary of the landfill and is taken of surface water. More detailed information on the sampling of air, soil and waste water samples is given in Annex 6.

Check analyses are performed by Branch of FSHI Sanitary and Epidemiological Centre in the Republic of Komi in Vorkuta.

According to the monitoring data from 2008, there is no excess of specified quality standards of the environment (Table 11).

Table 11: Data on Environmental Situation near SDW Site Monitoring for 2008*

Parameter description	Actual data	Threshold limit value
Air, mg/m3		
Ammonia	<0,01	0,2
Hydrogen sulphide	<0,004	0,008
Carbon oxide	0,4	5,0
Soils, mg/kg		
Nitrate	1,38±0,28	130
Mercury	<0,1	2,1
Copper	3,4±0,85	33,0
Cadmium	<0,1	0,5
Lead	1,7±0,51	32,0
Zink	<0,1	55,0
Waste Water, mg/dm3		
PH	7,13±0,7	6,5… 8,5
Chlorides	4,2±0,5	350
Ammonia	0,22±0,02	1,5
Nitrite	0,049±0,01	3,0
Nitrate	0,41±0,08	45,0
Sulphates	35,5±7,1	500
Copper	0,096±0,022	1,0
Cadmium	<0,001	0,001
Lead	0,003±0,001	0,01
Zink	0,087±0,018	1,0
Mercury	0,0003±0,00008	0,0005
Oil products	0,093±0,06	0,1
Phenols	<0,001	0,001
Calcium	25,1±2,5	-
Magnesium	6,1	50

* Figures provided by MUE Vorkutaremstroy

Furthermore, a program for industrial environmental monitoring of SDW is developed at MUE Vorkutaremstroy. A permanent program execution control is being performed.

The purpose of the environmental monitoring program is to specify order, frequency and list of observations of the environment required to create a database which will allow to monitor and forecast changes of the ecosystem in time and space as well as to develop actions on prevention, reduction and removal of adverse environmental impact.

Industrial environmental monitoring under the waste management includes:

- Everyday visual inspection of areas for waste and conformity of waste management procedures to the requirements of the law;
- Monitoring over exterior view and sanitary condition of the area for production and consumption waste;
- Specification of bulk of generated waste in conformity with the license issued;
- On-going inspection of availability and maintenance of recorded data on operational displacement of waste and documents confirming acceptance, delivery and location of waste;

- Recording and accounting stipulated by the law within production and consumption waste management.

Monitoring of waste management is performed by the persons assigned by the Order of the company.

Field observations and registered impact in the local community
At the site inspection in June, a rather unsystematic and somewhat chaotic disposal of waste was observed at the landfill. Registered smell was moderate, which was assessed of being mainly due to the low temperature around 0°C and night temperatures down to 8°C. The surface of the landfill was relatively dry and solid. Landfill fires were not observed at the site inspection. Landfill personnel however confirmed that there were several sources of minor fires inside the waste layers.

The local community has audited complaints against the landfill operation, mainly due to the summer fires with intensive smoke and smell discharge in the direction of nearby residential areas. In addition, downstream settlements have observed plastic and paper waste carried by the river current.

Specific environment of the landfill results in the permafrost ground conditions and average annual temperature of -6.6°C that leads to natural waste conservation. This has very negative effect during instant summer warming in July-August when the whole mass of the wastes collected during 9-10-month winter starts to decay and leads to a vast spread of infection carrier insects. Besides, when snow is melting in late May or early June it flushes the waste off the landfill and drags it outside of the landfill border because the landfill does not have an intercepting ditch and the mass of snow accumulated during winter is quite significant.

Because of the violations in the landfill operation order and formation the landfill contains several fire sources that lead to air pollution by combustion products. Adverse weather conditions and certain wind directions bring the smell and smoke of the landfill to residential areas of the city. Firefighting measures performed by the landfill personnel do not have considerable effect because fire sources are usually located in deeper waste layers.

6.1.2 Dispersion routes

Geology and hydrogeology
Vorkuta is located in the Bolshezemelskaya tundra in the Pechora Region in boundary of continuous discontinuous permafrost. According to Vorkutageology the topsoil layer in the Vorkuta region consists of loamy and peat sediments.

Underlying the topsoil layer is quaternary and Permian deposits. The quaternary deposits mainly consist of boulder loam with rare sand layers and have thickness of 20 – 60 m. The Permian deposits consist of alternating of siltstone, mudstone and the prevailing sandstone.

The permafrost underlies the insulating topsoil layer with a thickness of 60 – 70 m. In the area of discontinuous permafrost some of the quaternary deposits could be thawed and in hydraulic contact with water in local taliks flowing towards the River. In areas of continuous permafrost the quaternary deposits are frozen.

Suprapermafrost water is located 10 – 20 m below the ground level. The suprapermafrost are created by rain and melt water due to the low percolation capabilities of permafrost. The suprapermafrost water has flow direction towards Vorkuta River.

The permafrost layer limits the vertical percolation of water to deeper ground water aquifers. Due to the low percolation capabilities of the permafrost local subsurface ground water (not an aquifer) or ponds may be formed in the topsoil active layer.

Surface water recipients
The nearest surface water recipient is the Vorkuta River, located approximately 2 km west of the landfill. The Vorkuta River has outlet in the Pechora River.

Contaminated material from the landfill has dispersion routes via runoff water and local ground water to the Vorkuta River.

Air
Dispersion routes via air are dependent on the season. In general the dispersion of contaminants from the landfill is limited in the winter period due to the surface temperature and snow covering.

In the summer period dispersion routes include wind transport of dust and gas emissions from the landfill. Dust disperses contaminated particles and bacteria to the surrounding area, including the suburbs and city of Vorkuta. Emissions from the landfill include carbon dioxide and methane from the degradation process in the landfill, and contaminated gas and particles from the landfill fires.

Influence of climate change on the dispersion routes
Climate changes are anticipated to cause a rise in the mean annual air temperatures of up to several degrees over much of the Arctic. Climate changes above ground are often dampened below ground due to the insulating effects of vegetation, organic material and snow cover. In discontinuous permafrost regions, such as Vorkuta, where temperatures are within a few degrees of thawing, permafrost is likely to disappear as a result of ground thermal changes. The time for degradation is uncertain and may take several decades.

The degradation of permafrost in areas where the ice content in the ground is high is associated with physical impacts such as soil instability, formation of thawing ponds and increasing drainage to surface water recipients.

The physical impacts of climate change may cause the following impacts on the dispersion routes of the landfill:

- Increase in the vertical dispersion to deeper ground water aquifers
- Increase in formation of thawing ponds
- Increase in direct drainage to Vorkuta River
- Soil instability (creep/slope failure) causing increase in emissions of carbon dioxide and methane, and increase in landfill fires due to the geotechnical instability

An assessment of the impact of climate change on permafrost at the landfill is necessary in order to determine whether adaption methods will be required.

6.1.3 Preliminary environmental risk assessment

The preliminary environmental risk assessment is based on existing environmental monitoring data and registered observations at and surrounding the landfill site.

The existing data is not sufficient in determining the qualitative or quantitative environmental impacts at the landfill, e.g. assessing the current discharge from the landfill has not been possible.

Current assessed environmental impact

Human health

Risk 1: Direct contact with the waste
Currently the public have access to the landfill. Both authorized landfill personnel and public intruders have direct contact with the waste as airborne particles/dust, waterborne particles/pollutants/waste and solid waste.

Through the direct contact with the waste, the authorized landfill personnel and the public intruders are exposed to bacteria, dust/particles, emission products and hazardous contaminants, including carcinogenic components.

It has not been possible to assess the quantitative impact this exposure has on the human health of the affected people.

Risk 2: Contact with dispersed waste and degradation products
Contact with dispersed waste occurs when the waste is dispersed via air and water. People affected by contact with the dispersed waste include the public in the dispersion areas along the Vorkuta River bank and settlements within the air particle dispersion zone.

Through the contact with the dispersed waste and degradation products the local people are exposed to bacteria, dust/particle contaminants and hazardous contaminants, including carcinogenic components.

It has not been possible to assess the quantitative impact the exposure has on the human health of the affected people.

Dispersion to the environment

Dispersion via airborne particles and emissions
Dispersion of airborne contaminated particles and hazardous pollutants occurs through emissions and transport of dust/particles.

The dispersion of airborne particles and emissions primarily occur in the summer period. In the winter period the dispersion of airborne particles and emissions are limited due to the lower temperatures and snow cover. In the summer period during dry weather, the transport of dust/particles increases and pollutants are dispersed in a larger area surrounding the landfill.

Due to degradation processes in the landfill, emissions of carbon dioxide and methane occur. These emissions are, however, assessed limited due to the slow and limited degradation processes in the landfill.

During and subsequent to landfill fires emissions of carbon dioxide and other greenhouse gases occur. The landfill fires not only affect the local/regional environment through the dispersion of pollutants, but also impact the global environment. Internationally there is an increasing focus on emission of greenhouse gases and their effect on climate change and global warming.

Environmental investigations for assessing the environmental impacts of particle/dust dispersion from the landfill and emissions of greenhouse gases subsequent to landfill fires have not been undertaken. It is hence not possible to quantify the environmental impacts of the dispersion of airborne particles and air pollution from the landfill.

Dispersion of pollutants via water resources
Dispersion of pollutants from the landfill via water routes occurs through transport of runoff water and leachate.

The vertical dispersion (percolation) of leachate water to deep ground water aquifers is limited due to the characteristics of permafrost. Due to the low drainage/percolation through the permafrost, local leachate ponds or subsurface ground water may occur. The dispersion of leachate water from these depends on the drainage capabilities of the topsoil (active) layer and the hydraulic contact with Vorkuta River.

Waste and degraded products have been observed in Vorkuta River, dispersed by the runoff water. There have been no environmental sampling/monitoring of the river and the quantitative environmental impact on the local/regional ecosystem is unknown.

Implementation period – assessed environmental impact

In general the environmental impacts in the implementation period are similar to the current situation. In the following, focus is on the assessed deviations.

During project implementation some negative environmental impacts are expected. It is for instance planned to use additional cargo vehicles and use the existing vehicles intensively. The long-term environmental effects of the implementation are however considered to outweigh the temporary impact.

Human health

In the table below, impacts for the human health in the implementation period is summarised.

Table 12: Overview of the consequences, risks and preventive measures for impact on human health in the implementation period

Description	Consequence/impact	Affected people	Probability/ risk	Preventive measures
Increase in direct contact with the waste	Increase in health hazard	Employees and workers	**High**	HSE plan for employees and workers
	Increase in health hazard	Unauthorized people	**Medium**	Close off the landfill for unauthorized people
Smell	Increase in health hazard	Employees, workers and unauthorized people	**Medium**	HSE plan for employees and workers
Excavating in deposited waste	Explosions due to methane	Employees and workers	**High**	Measure and map the content of methane in the waste prior to implementation
Dust and particle	Increase in exposure to	Employees, workers	**Low**	Moisten the waste

dispersion	dust and particles in the air dispersion zone	and local people/settlements		
Increase in machinery and vehicles on the site	Increase in exposure to air pollution and particles	Employees and workers	**High**	HSE plan for employees and workers
Fires	Exposure to air pollution and particles	Employees, workers and local people/settlements	**Same level as current level**	-
Waterborne waste	Exposure to bacteria and hazardous contaminants/particles	Settlements along the Vorkuta River	**Same level as current level**	-

Dispersion to the environment

In the table below, impacts for the environment in the implementation period is summarised.

Table 13: Overview of the environmental impact, risk and preventive measures in the implementation period

Description	Consequence	Affected environment	Probability/ risk	Preventive measures
Airborne particles/dust	Increase in dispersion of airborne particles and dust	Environment in the air dispersion zone	**Low**	Moisten the waste
Increase in use of vehicles and machines	Increase in air pollution and particle emissions	Local, regional and global environment	**High**	Assess the environmental impact Particle filters on vehicles/ machines Environmentally friendly use of vehicles/machines
Change in the hydraulic contact between leachate water and Vorkuta River	Increase in dispersion of leachate water to Vorkuta River	Vorkuta River	**Low**	Supervision of leachate ponds/ local ground water during implementation
Degradation process	Emission of carbon dioxide and methane	Local environment	**Same as current level**	-
Landfill fires	Emission of carbon dioxide and greenhouse gasses	Local, regional and global environment	**Same as current level**	-

As illustrated in the tables above the significant impacts of project implementation are:

- Increase in the exposure to waste by the employees/workers at the landfill
- Increase in use of vehicles/machines at the landfill
- Risk of excavating waste deposits with high levels of methane

In order to limit the exposure of the employees and workers to the waste, dust, particles and degradation, a preventive measure is to undertake a health, safety and environment (HSE) plan.

In order to prevent explosions due to excavation in areas with high levels of methane, a preliminary mapping of gas content in the landfill is recommended.

Operational period – assessed environmental impact and environmental benefits

The operational period of the landfill is expected to be 15 years. In Table 14 below, the health and environmental risks of the operational phase are listed. Included in the table are also the planned preventive measures and expected environmental benefits.

The impacts of climate change are not included in the assessment, but are presented in the next chapter.

Table 14: Environmental benefits of the implemented measures

Description	Affected people/environment	Preventive measure	Environmental benefit
Human health			
Contact with waste, dust/ particles and degradation products	Employees	- Covering the waste - HSE plan	Reduced health hazards for employees
	Unauthorised people	- Establishing fence around landfill	Reduced/eliminated health hazards for unauthorized people
	Local people	- Covering the waste - Establish ditch around landfill	Reduced health hazards for local people (reducing dispersion)
Dispersion into the environment			
Dust and particle dispersion	Local environment	- Covering the waste	Reduced dispersion and impact on the environment
Landfill fires	Local, regional and global environment	- Covering the waste - Multilayer disposal - Environmental monitoring of air	Reduced/ landfill fires and greenhouse gas emissions
Degradation processes	Local, regional and global environment	- Covering the waste	Reduced degradation and impact on the environment
Ground water/leachate water	Vorkuta River	- Covering the waste - Slope (limiting leachate) - Establish ditch around landfill - Environmental monitoring of Vorkuta River	Reduce dispersion of leachate water via ponds and local ground water to Vorkuta River
Run-off water	Vorkuta River	- Covering the waste - Slope (reducing contact with waste) - Establish ditch around landfill - Environmental monitoring of Vorkuta River	Reduce contact between run-off water and waste. Reduce dispersion of waste and degradation products to Vorkuta River

When implementing the project of reconstruction the Vorkuta landfill it will be possible to reduce the negative influence of the landfill on the environment significantly by creating an intercepting ditch and introducing a multilayer waste disposal.

A multilayer waste disposal will provide the reduction of contact surface between buried waste and atmosphere and will reduce the biogas discharge as a result of waste decay and also source of internal waste burning.

Creation of an intercepting ditch will reduce the contaminated wastewater discharge to the Vorkuta river and consequently to the Arctic Ocean that leads to significant reduction of environmental effect in the whole Arctic region.

The implementation of the special managerial procedures, such as access to the landfill for authorized vehicles only, control the composition of the wastes, prevention of the unauthorized persons from access to the landfill will allow reducing the risk of possible waste inflammation at the landfill.

In order to meet the current and future environmental requirements it is proposed that the environmental monitoring plan is reviewed every 5 years. The review should include evaluations of climate change and the expected impacts.

Decommissioning of the landfill – assessed environmental impact

The operational period of the landfill is expected to terminate in approximately 15 years. At this point the landfill will be decommissioned.

Assuming the ecological and climatic conditions remain unchanged, and the implemented measures have been supervised and updated every 5 years in the operational period, the environmental impacts of the closure includes the degradation processes in the landfill and the dispersion of waste/degradation products from the landfill.

Due to the insulating effects of layer covering of the waste and hence persisting low temperatures in the waste, the degradation processes are limited. Due to the implemented measures in the implementation stage, the dispersion of waste and degradation products are limited. Annual environmental monitoring of the landfill site should continue after the closure of the landfill.

Climate change may have significant physical and environmental impacts on the landfill dispersion routes and degradation.

A climate change leading to prolonged increases in annual temperatures will result in the degradation of permafrost in Vorkuta. At the landfill the degradation of permafrost may lead to the following physical impacts:

- Formation of thawing/leachate ponds
- Formation of shallow ground water aquifers
- Increased vertical percolation of water
- Increased degradation and increased amount of methane (increased risk of fires)
- Geotechnical instability of the landfill

The physical changes may have negative environmental impacts. The alteration of dispersion routes along with the geotechnical instability of the landfill may lead to an increase in the dispersion of waste and degradation products to Vorkuta River. An increase in degradation will lead to an increase in carbon dioxide emissions and methane production in the landfill, which increases the risk of fires.

In order to meet the challenges appropriated by climate change, it is suggested that the environmental monitoring of the landfill site is associated with assessment of impacts of climate changes in the Vorkuta Region.

6.2 Social Assessment

6.2.1 Stakeholder identification

The following stakeholders have been identified in the project:

- Employees at the landfill

- Contractors/workers at the landfill
- Local settlements
- Local intruders at the landfill
- The general public in Vorkuta
- The Municipal Administration in Vorkuta
- The Komi Republic Government

6.2.2 Social analysis

Thorough social interviews of all stakeholders have not been made. The following social analysis is based on opinions/assessments of the project owner and the local and republican administrations, and further on the general socio-economical situation in Vorkuta.

During pre-investment studies preparation the studies developer had meetings with Vorkuta municipal administration, the Komi Republic Ministry of mineral resources and environment representatives and project owner (MUE Vorkutaremstroy) and all of them emphasized environmental and social importance of this project.

Current situation
The concerns of the stakeholders regarding the current situation at the landfill is summarised in the table below.

Table 15: Social concerns regarding the current situation at the landfill

Concerns	Stakeholder
Health of employees/workers at the landfill	Employees, workers, Municipal Administration of Vorkuta
Health of intruders	Intruders, Municipal Administration of Vorkuta
Health of local settlements	Local settlements, Municipal Administration of Vorkuta
Environmental concerns	Municipal Administration of Vorkuta, The Komi Republic Government
Regulatory concerns	Municipal Administration of Vorkuta

The existing landfill concerns the Vorkuta municipal administration and population. People who live close to the landfill are worried because under some weather and wind conditions there is smell of burning in some residential areas. As there is no waste pre-separation it can lead to the discharge of toxic components discharge to the environment.

The flushing of the waste into the Vorkuta River by surface waters is also a concern for people of downstream villages and settlements.

The negative impact on environment and people will tend to increase unless urgent measures are taken.

The importance of the landfill reconstruction has led to Vorkuta municipal administration initiative to submit this project to the Komi Republic Ministry of mineral resources and environment and include it in the regional target program "Waste". Due to economic situation in Republic Ministry of Economic Development of Komi Republic has decided that adoption of the programme with a start date in 2010 is not reasonable.

Implementation period
In the implementation period, an increase in transport and use of vehicles/machinery at the landfill is expected.

In general, the same concerns as listed in Table 15 apply for the implementation period. In the table below, more specific concerns related to the implementation work are listed.

Table 16: Social concerns regarding the implantation period at the landfill

Concerns	Stakeholder
Increase in exposure to the waste	Employees, workers
Increase in air pollution due to increase in use of vehicles and machinery	Municipal Administration of Vorkuta, The Komi Republic Government
Increase in level of noise due to increase in use of vehicles and machinery	Employees, workers, local settlements (neighbours)
Close off landfill	Intruders

Operational period
In the operational period the concerns listed in the current situation and implementation period are eliminated. A general positive attitude of the stakeholders is expected.

Due to the hazardous characteristics and amount of waste, a general concern regarding health and environment is expected during the operational phase. As long as the landfill is operated in accordance to the project plan and regulatory requirements, these concerns are not expected to have significant social impacts.

Closure of the landfill
When the operational period of the landfill terminates, a general concern regarding future health and environmental risks is expected due to the amount and content of waste at the site.

In order for these concerns to remain insignificant in regards to social impacts, continuous environmental monitoring programs and procedures in case of unintentional dispersion of waste should be undertaken. Depending on the development in climate change during the operational period of the landfill, a climate change assessment should be undertaken.

6.2.3 Social benefits of project implementation

The implementation of the landfill reconstruction project will lead to the following social benefits:

- Significant reduction of waste burning and subsequent toxic fumes discharge;
- Significant reduction of the Vorkuta River pollution by wastewater and flushed wastes that will lead to better environment for downstream inhabitants;
- Significant reduction of bio-gas discharge during waste digestion and its influence to the operational personnel;
- The reconstruction of the landfill will lead to the formation of vegetation on its surface that is very positive in the trans-Arctic conditions;
- It is possible to reduce the level of disease incidence rate and improve the standards of living in Vorkuta.

Employment of new personnel will be restricted during reconstruction implementation and will stay constant during landfill operation.

6.3 Stakeholders participation/involvement

Stakeholder participation in the project is essential for communicating the social benefits of the project to stakeholders.

During pre-investment studies preparation the consultant has taken measures to inform the public about the project. In June 2009 the local television company broadcasted an interview with the NPA-Arctic manager I.Senchenya who described the project activities and plans.

The stakeholders and community were informed about the IP implementation prior to the project implementation and were able to learn about the project and this Report to introduce remarks and comments. In October the Administration of Vorkuta municipality posted a press release about the IP on the web-site (http://www.mayor.vorkuta.ru), and it was also published in a local Vorkuta newspaper Zapolyarie (dated 22.10.09). Moreover, in the middle of November this year information about the project was presented on the Ministry of Natural Resources and Environment web-site (www.mpr.rkomi.ru). Some delay in the press-release publication at the Ministry web-site was caused by the replacement of minister thereof.

More detailed information about the project is available in the offices of: the Customer – NPA-Arctic, the Project owner – Administration of Vorkuta, MUE Vorkutaremstroy and the Consultant – Ramboll Barents. This was organized for the IP owner to be able to define possible concern of the acknowledged community and stakeholders at the early stage of the project implementation.

Comments from the Ministry of Natural Resources and Environment of the Komi Republic and MUE Vorkutaremstroy were received. All comments are positive and do not require any update of the PIN. No public comments were received.

7. PROJECT FINANCIAL VIABILITY

This chapter covers the financial justification for the implementation of the proposed landfill recultivation measures. The data collected for the previous chapters have been analyzed and also economic justification is presented.

The project financial assessment is based on the financial results of MUE Vorkutaremstroy. Since the IP owner has changed, the update of the project financial data will be required at following stages of the project.

7.1 Objectives and approaches of economic evaluation

The main goal of the evaluation is to determine financial viability and financial efficiency of the investment project. After financial evaluation the financial viability and cover of expenditure that lead to the decision about the investment project implementation reasonability.

The reasonability evaluation is based on comparison of the current situation and expected situation after project implementation. Current situation is also considered for possible future increase in waste volumes and landfill territory.

In general household waste management in Vorkuta is badly organized and situation is getting worse every year. If this investment project fails to be implemented we can expect this trend to develop further.

When evaluating the project it becomes clear that there are no direct financial savings after project implementation because there is no fuel or energy or material saving results. Other factors and effects are also considered such as environmental and social influence. In this connection the economic benefits were not evaluated in money equivalent.

7.2 Financial position of MUE Vorkutaremstroy

The project holder of the landfill project is Vorkutaremstroy. The Balance Sheets (BS) and Income Statements (IS) of Vorkutaremstroy were analysed to verify the financial status of the organisation and possibility to assume loan financing and capacity to pay the loan back.

Vorkutaremstroy has many other activities and waste management represents only a small part of the operations. The largest share of profit is received from construction work and waste management representing only 1.2% of the profit.

The BS and IS were received from Vorkutaremstroy from the last 3 years and the first quarter of the year 2009. The BS and IS are presented in EUR (1 EUR=44 RUB) in Tables 17, 18, 19. The year 2006 is not comparable for the other years and was not considered fully in the analysis.

Table 17: Income Statement of Vorkutaremstroy, EUR

Income Statement

Income Statement	Unit	2006	2007	2008	2009, 1st Q
Receipts and expenditures in general activities					
Products, works and services sales proceeds (netto) (minus VAT, excises and similar copulsory payments)	EUR	56 864	1 598 432	1 689 295	115 841
Net value of goods and services sold	EUR	-55 341	-1 365 909	-1 405 727	-62 023
Gross Profit	**EUR**	**1 523**	**232 523**	**283 568**	**53 818**
Commercial expenditures	EUR	-45	-21 932	0	0
Management costs	EUR	0	-182 545	-211 000	-49 386
Sales Profit (loss)	**EUR**	**1 477**	**28 045**	**72 568**	**4 432**
Other receipts and expenditures					
Interest receivebls	EUR	0	0	591	568
Interest due	EUR				
Revenues from participation on other companie	EUR				
Other revenues	EUR	0	100 068	3 000	0
Other costs	EUR	-432	-128 023	-57 182	-4 477
Profit (loss) before taxes	**EUR**	**1 045**	**91**	**18 977**	**523**
Deferred tax assets	EUR				
Deferred tax liabilities	EUR				
Current income tax	EUR				
Suplementary indicators	EUR				
Income tax and other obligatory payments	EUR	0	0	-18 886	0
Net Profit (loss)	**EUR**	**1 045**	**91**	**91**	**523**
Permanen taxable liabilities	EUR	0	0	0	1 045

Between the years 2007 and 2008 the revenues of Vorkutaremstroy have increased slightly in nominal terms. However, if the 18% inflation is considered, the revenues have declined. The effect of the waste management cannot be separated from the other activities in the Income Statement.

The revenues and costs of Vorkutaremstroy have been in balance during the last years and the organisation has made no profits or losses.

Table 18: Balance Sheet of Vorkutaremstroy, EUR

Balance Sheet

ASSETS	Unit	2006	2007	2008	2009, 1st Q
Fixed Assets					
Fixed assets	EUR	45 864	211 795	507 818	492 295
Other fixed assets	EUR				
Total Fixed Assets		**45 864**	**211 795**	**507 818**	**492 295**
Current Assets					
Inventories	EUR				
stocks, materials and other similar valuables	EUR	0	41 886	38 341	44 000
finashed commodity and good for resale	EUR	136	198 545	259 182	284 545
expenditures of future periods	EUR	1 318	153 795	315 091	328 523
Receivables (payments expected to receive more tha	EUR				
Receivables (payments expected to receive in 12 mo	EUR	31 455	608 341	769 091	783 523
Short term financial investmneets	EUR	32 205	45 455	47 727	2 273
Cash assets	EUR	0	38 750	274 773	12 500
Other current assets	EUR				
Total Current Assets	**EUR**	**65 114**	**1 086 773**	**1 704 205**	**1 455 364**
TOTAL ASSETS	**EUR**	**110 977**	**1 298 568**	**2 212 023**	**1 947 659**

LIABILITIES	Unit	2006	2007	2008	2009, 1st Q
Equity and reserves					
Equity capital	EUR	2 341	2 341	2 341	2 341
Undivided profit (ucovered loss)	EUR	48 864	395 636	714 864	715 386
Total Equity Capital	**EUR**	**51 205**	**397 977**	**717 205**	**717 727**
Long term liabilities					
Borrows and loans	EUR				
Defererd tax liabilities	EUR				
Other long-term liabilities	EUR				
Total long-term liabilities	**EUR**	**0**	**0**	**0**	**0**
Current Liabilities					
Borrows and loans	EUR				
Bills payable	EUR	59 773	900 591	1 404 568	1 229 932
Arrears of dividents	EUR				
Deferred income	EUR	0	0	90 250	0
Reserves for future expenditures	EUR				
Other current liabilities	EUR				
Total Current Liabilities	**EUR**	**59 773**	**900 591**	**1 494 818**	**1 229 932**
Total Liabilities	EUR	**59 773**	**900 591**	**1 494 818**	**1 229 932**
TOTAL EQUITY CAPITAL AND LIABILITIES	**EUR**	**110 977**	**1 298 568**	**2 212 023**	**1 947 659**

Vorkutaremstroy does not have long term loans.

Table 19: Analysis of working capital, EUR

Working capital	Unit	2006	2007	2008
Working capital in the end of the year				
Receivables	EUR	31 455	608 341	769 091
Bills payable	EUR	59 773	900 591	1 404 568
Working capital compared to				
Products, works and services sales proceeds (netto) (minus VAT, excises and similar copulsory payments)	EUR	56 864	1 598 432	1 689 295
Net value of goods and services sold	EUR	55 341	1 365 909	1 405 727
Rotation times of working capital categories				
Receivable, average payment time	Days	202	139	166
Bills Payable, average payment time	Days	394	241	365

Working capital of Vorkutaremstroy was, as regards to receivables and bills payable, analysed. There was not enough information available to analyze inventory and its turnover.

The collection time of receivables between 2007 and 2008 was between 139 and 166 days which is about 5 months. Long collection times are typical in Russia. The payment time of bills payable during the same period was between 8 to 12 months. Receivables may include large amounts of receivables which will be never received. Uncollected and not received receivables may, if large amounts exists, lead organisation to serious financial problems.

7.3 Project financing

7.3.1. Financial analysis of IP

The ability of Vorkutaremstroy to cover the investment, operation and the financing costs of the proposed investment program was analyzed. The maximum loan amount, which Vorkutaremstroy is able to cover, was estimated. The capital costs for reconstruction of the landfill and operational costs of reclamation of the landfill are both treated below like investment costs (Table 20).

The project costs are covered by using international loan, international grant and local financing.

The details of the proposed investment program are presented earlier in this document.

Table 20: Capital costs and operational costs of reclamation of landfill, EUR

Capital and operation costs of reclamation of landfill by category	2011	2012	2013	Total
Capital cost of reconstruction of landfill	545 900	545 900	0	1 091 800
Operational costs of reclamation of landfill	189 742	189 742	189 742	569 227
TOTAL	**735 642**	**735 642**	**189 742**	**1 661 027**

The financial data and other information for the financial analysis was received from the accounts of MUE Vorkutaremstoy, by interviewing management of Vorkutaremstroy and by making estimates by using previous experience of the consultant.

The financial analysis was made by using the following assumptions:

- The investments are made between the years 2011 and 2013.
- The landfill investment time is assumed to be 15 years and the cash flow analysis was made for the period 2011 – 2025.
- The conditions for the international financial institution (IFI) loan are assumed to be:
  - 15 year maturity including 3 year grace period;
  - disbursement period is 3 years;
  - the loan is nominated in EUR;
  - interest rate is 7%
  - there are no other costs related to the loan (possible administration and commitment related fees should be estimated).
- All the monetary figures are in the constant 2009 money value.
- Exchange rate used is 44 RUB/EUR.
- Depreciation of assets was made by using straight line method and by assuming 11 years depreciation time. Depreciation was calculated only for capital costs for reconstruction of the landfill.
- Income tax rate was assumed to be 20% and the property tax rate 2.2%. Estimates of the other taxes were not received from the management of Vorkutaremstroy. VAT rate is 18% - however, VAT is not a cost for Vorkutaremstroy, hence the tariff rates are presented without VAT.
- 20 % of the operational costs of the landfill maintenance are assumed to be fixed costs and 80% variable. The annual costs of the landfill maintenance are presented in the Table 10.

By using the assumptions above and by assuming gradual 30% increase in waste tariff the maximum loan amount Vorkutaremstroy is able to cover, with its revenues, was found to be EUR 565 000. The loan amount is about 34% of the total financing needs of the investments, see Table 21. The grant share is assumed to be 20%, which is typical in IFI financed investment projects. Positive cash flow every year throughout the analysis period was used as a criterion for the maximum loan amount Vorkutaremstroy is able to take.

In order to reach the 30% tariff increase level from the 2009 tariff level the tariff should be increased in 2011 with 0,0 %, in 2012 with 9,1%, in 2013 with 9,1% and in 2014 with 9,2%.

Table 21: Financing Schedule by Financier and Year, EUR

Financial sources of IP	2 011	2 012	2 013	Total	Share of the loan, %
International funds, loan	250 118	250 118	64 512	564749	34%
Grant	147 128	147 128	37 948	332205	20%
Equity	338 395	338 395	87 281	764072	46%
TOTAL planned investment	**735 642**	**735 642**	**189 742**	**1661027**	**100%**

* Change in particular years of project implementation will require adjustment of financial indicators of the project.

The results of the cash flow analysis are presented in the in Table 22 and the Figure 6. The waste tariff increase scenario used is presented in the Figure 7.

However, if the criterion for a feasible financing schedule is positive cumulative cash flow each year, the maximum possible loan is higher about 42% of the total investment i.e. EUR 698 000.

In Annex 8 to the report the following tables are given:
- Operations – waste generation and tariff revenues, 2011 – 2025;
- Income Statements, 2011 - 2025
- Cash Flow Table for Financial Planning, 2011 – 2025;

Table 22: Cash flow table for the proposed investment plan 2011 – 2019, EUR

Cash Flow Table for Financial Planning										
Cash inflow	**Unit**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Financial resources	EUR	735 642	735 642	189 742	0	0	0	0	0	0
Sales revenue	EUR	108 956	115 721	122 906	130 656	127 194	123 823	120 542	117 348	114 238
TOTAL inflow	**EUR**	**844 598**	**851 363**	**312 648**	**130 656**	**127 194**	**123 823**	**120 542**	**117 348**	**114 238**
Cash outflow		0	0	0	0	0	0	0	0	0
Investments and Oper.Cost of Reclam. of L	EUR	735 642	735 642	189 742	0	0	0	0	0	0
Operating costs (excl. Depreciation)	EUR	41 909	41 021	40 156	39 314	38 494	37 696	36 919	36 163	35 427
Debt. Services, Interest+fees	EUR	17 508	35 017	39 532	36 238	32 944	29 649	26 355	23 061	19 766
Debt. Services, Repayments	EUR	0	0	0	47 062	47 062	47 062	47 062	47 062	47 062
Taxes	EUR	10 900	8 830	7 353	7 547	5 494	3 455	1 429	-583	-2 583
TOTAL outflow	**EUR**	**805 960**	**820 510**	**276 784**	**130 161**	**123 994**	**117 862**	**111 765**	**105 702**	**99 673**
Cash Balance	**EUR**	**38 638**	**30 854**	**35 864**	**495**	**3 200**	**5 961**	**8 777**	**11 645**	**14 566**
Cumulative cash Balance	EUR	38 638	69 492	105 356	105 852	109 052	115 013	123 789	135 435	150 000

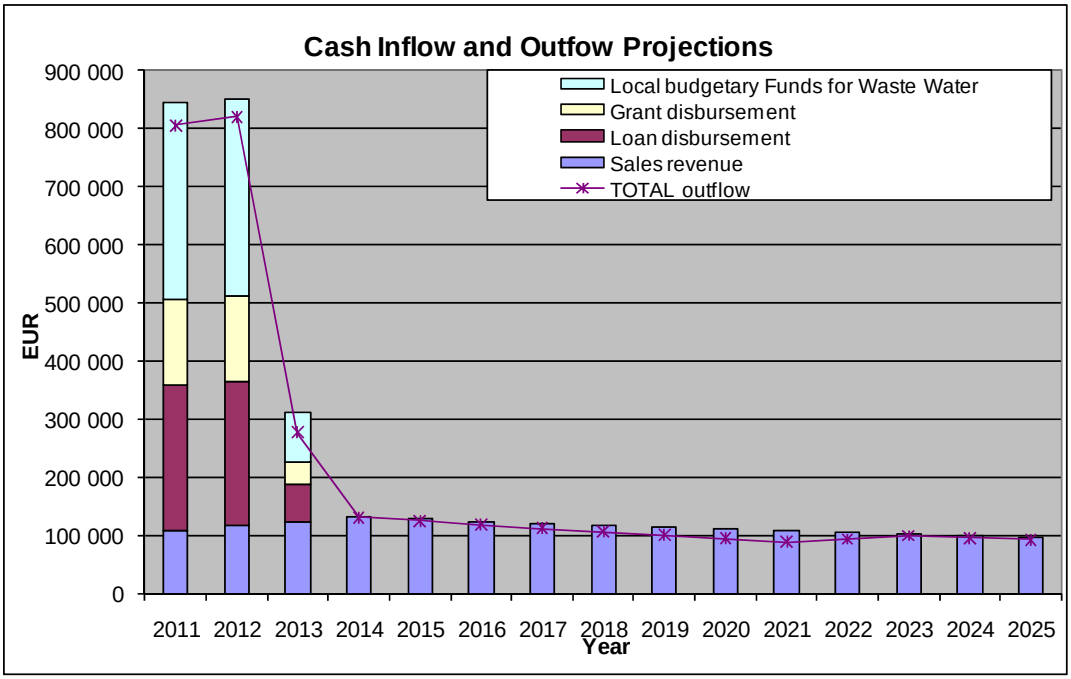


Figure 6: Cash inflow and outflow projection

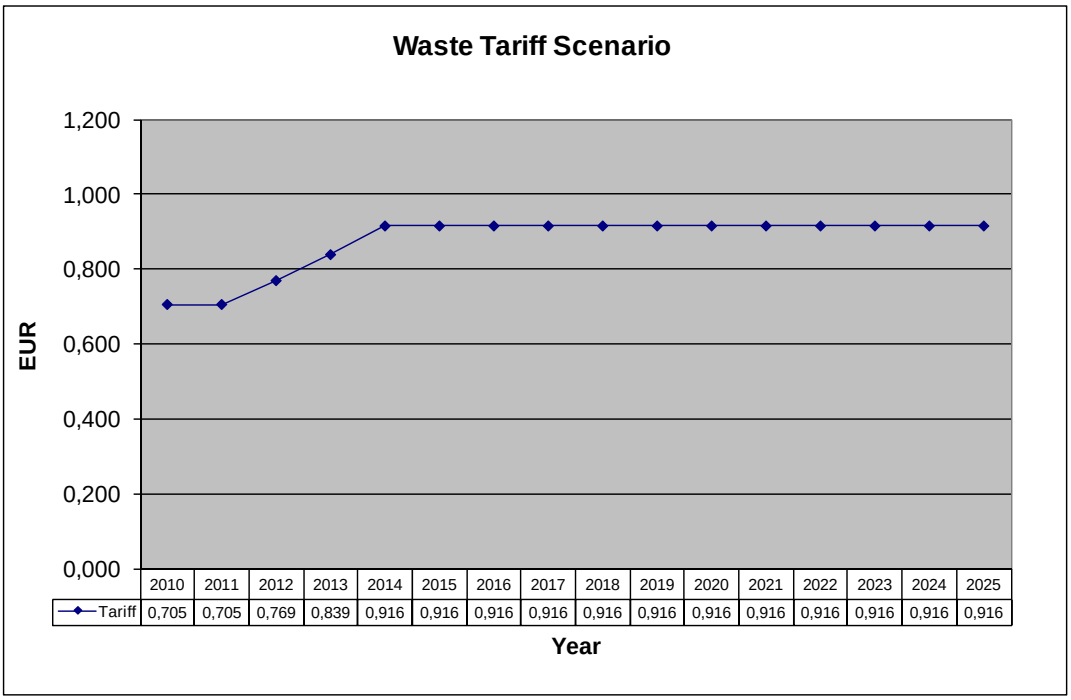


Figure 7: Waste tariff projections to cover the costs of the investment plan (the tariff in 2010 is assumed to be the same as in 2009)

With the EUR 565 000 or 34% IFI loan and the tariff increase schedule the cash inflow and outflow is in balance (with EUR 500 to 20 000 annual surplus) until the loan repayment ends in the year 2025.

Profitability of IP

The financial profitability of the project has not been analyzed, because the project does not generate cost savings or additional revenues. The financial returns are negative. However, the economic benefits like improved health of people and better environment

provide justification for the project. The economic benefits have not been estimated. A cash flow analysis was made for the project in order to analyze the ability of the project to generate revenues to finance the project with IFI loan.

Sensitivity analysis

The sensitivity of the maximum possible loan amount Vorkutaremstoy can take was tested by assuming:

- tariff stays on the year 2009 (2010) level and there is no increase during the project period, which is effectively same as about 23% decrease in tariff revenues (between 2011 and 2014 decrease is less than 23%).
- increase in operating costs by 23%.
- increase in interest rate by 23%, which is the same as increase from the interest rate 7% to 8,61%.

The analysis yielded the following results:

Item	Maximum possible loan in EUR	Maximum possible loan, % of the investment*
Base case: assumed 30% tariff increase	565 000	34%
No 30% tariff increase = 23% decrease in tariff revenues	382 000	23%
Operating costs increase by 23%	498 000	30%
Increase in interest rate by 23%	515 000	31%

If the sales revenues (tariff level) decrease by 23%, only 23% of the investment can be financed by the loan. The cash flow is most sensitive to the changes in sales revenues. If operating costs increase by 23% or interest rate increases by 23% maximum possible loan amount decreases much less than with lower sales revenues (tariff level).

The maximum loans are higher than the ones indicated above, if negative cash flow is accepted and previous year cash surplus is used to cover the negative cash flow in the following years.

Assessment of the financial analysis of IP

At present Vorkutaremstroy does not have any long term loans. The collection time for receivables is long and may include receivables which will not be received.

The total financing needs for investment is EUR 1,661 million. When waste tariff increases gradually 30%, by using cash flow analysis, a feasible maximum loan was found to be 34% of the financing needs or EUR 565 000 loan, if it is required that there is positive cash flow every year. The rest of the financing is either grant or local financing. Grant percentage could be 20%, which is typical in IFI financed projects, and local financing 46%. If only positive cumulative cash flow is required for every year the maximum loan amount is higher, about 42% of the investment i.e. EUR 698 000.

A feasible tariff increase schedule was found to be 0.0% in 2011, 9.1% in 2012, 9.1% in 2013 and 9.2% in 2014.

The feasible maximum loan amount is most sensitive in changes in sales revenues (tariff level) and much less sensitive to changes in interest rate and operating costs.

Several of the financial input figures are not yet estimated well enough and the results of the cash flow analysis might change in some degree when better estimates are used.

7.3.2. Planned project co-financing

It is not possible to describe the specific project co-financing today but Vorkuta municipal administration expressed interest in the following co-financing plan:

- Investor grant – 50% ≈ 500 000€;
- Project owner financing - 30% ≈ 300 000€;
- Vorkuta municipal budget financing - 20% ≈ 200 000€.

As the project implementation is planned for 3 years the project owner and municipal administration will be likely to provide part financing for the project. In case the project is included in the priority list of the Komi Republic Target Program "Waste Management" it will be co-financed from the republican budget.

7.3.3. Possible sources of financial support from stakeholders

As mentioned earlier the project does not have direct economic effect as existing facilities and equipment will continue to be used. However there are some possibilities for the local investment attraction for the project implementation. Possible Russian financing sources:

- MUE Vorkutaremstroy own financing funds.

a) Prevention, restraint and penalties for illegal waste disposal outside of the landfill territory. This will increase the volume of the waste disposal at the landfill and therefore increase income generation from the official waste disposal.

According to MUE Vorkutaremstroy about 20% of the waste generated in Vorkuta is illegally disposed in tundra areas outside of Vorkuta.

In chapter 4.2.2 the following data were taken for calculations:

Expected population – 116 900 same as in 2008;

Waste limits for 1 person including community buildings and tenants (Sanitary Cleaning Reference. Moscow. Stroyizdat. 1985) – 1.4 m^3.

Therefore in 2008 illegal waste disposal included

$$116\,900 \times 1.4 \times 0.2 = 32\,732\ m^3.$$

Waste disposal tariff is 31.02 RUR for 1 m^3 and

$$32\,732 \times 31.02 = 1\,015\,346\ RUR,$$

that is, provided complete legal waste disposal is reached the project owner will receive additional 1 015 346 RUR (23 000 EUR).

b) Increase of the tariff rates for waste disposal is very unpopular measure but the project will hardly reach profitability without it.

Preliminary increase of the tariff rates will be 30%. Today tariff rate is 31.02 for 1 m^3. In case Vorkuta municipal council allows 30% increase of the tariff rate the project owner will receive additional 1 523 thousand RUR or 34 thousand EUR (Table 23).

Table 23: Income calculations after 30% tariff rate increase

Volumes of waste in 2008; m^3	Tariff rate; RUR	Payments for waste disposal in 2008; thousand RUR	Increased tariff rate; RUR	Increased payments for waste disposal; thousand RUR	Expected income increase; thousand RUR
163 660	31,02	5 077	40,33	6 600	1 523

Financial component of this project cannot be considered separately from environmental component because the project implementation will significantly reduce the risk of technological disasters such as large-scale wastewater discharge into the Vorkuta River, big fires at the landfill, disease break-outs etc. Prevention of these accidents will be much more cost effective.

So, payments possibilities are connected with organizational measures of waste disposal.

- Private investment. Attraction of private investment is doubtful as return of investment will take a long time.

- Municipal budget. Municipal budget for 2010 does not provide financing of this project and it is doubtful it can be co-financed by municipality.

- Komi Republic budget. Republican target program "Waste management has been developed in Komi republic and it had to be adopted in 2009 but due to economic crisis it was not adopted and its adoption was postponed for indefinite time. Vorkuta MSW project is one of the priorities of this program and if it is adopted the project will definitely receive republican financing.

Additional consultations have been made to clarify existing possibilities of the IP financial support from involved authorities and the project owner, as well as to identify potential International Financing Institutions.

The Ministry of Natural Resources of the Komi Republic has not confirmed a possibility to provide financing for the IP implementation from the republican budget. As mentioned above, the republican programme "Waste" was twice rejected and adoption of the programme is postponed for an indefinite period due to a complicated economic situation after autumn 2008. However, the Ministry has confirmed its extreme interest in the IP implementation. The Ministry provides assistance in promoting this project and searching potential financing sources (Annex 9). In May 2010 the Ministry of Natural Resources of the Komi Republic sent a letter to the Deputy Minister of Economic Development of the Russian Federation S.S. Voskresensky expressing their interest in implementation of the NPA-Arctic project Phase 2 and proposing to include

this IP into Phase 2. On 28 May 2010 the Deputy Head of the Komi Republic I.A. Pozdeev had a working meeting with the Manager of the Northern Dimension Environmental Partnership Jaakko Henttonen where promising projects were discussed, and I.A. Pozdeev proposed that this IP should be included for financing within NDEP as one of the top-priority projects for the Komi Republic. The Ministry of Natural Resources holds frequent consultations with the Vorkuta City Administration to identify possibilities of the project co-financing from the municipal budget. Such consultations were held in April 2010, the next round is planned for the end of June 2010.

The Vorkuta City Administration has confirmed that they are taking all possible actions to develop the project and find financing (Annex 10). The Administration is developing the project financing plan. The draft Comprehensive Investment Plan for Vorkuta has been developed within the Programme of Modernization of One-Company Towns and describes 9 investment projects, including this IP. The Plan is under approval in the Ministry of Economic Development of the Komi Republic. The procedure for allocating funds is not established yet. The decision concerning adoption of the Plan is planned for July 2010. The Vorkuta City Administration hopes that adoption of the Comprehensive Plan will allow identifying possibilities of co-financing of this IP from all possible sources, including higher budget levels. At the same time the City Administration proposes to revise, if possible, the grant share to make it up to 50%, since the financing possibilities of the project owner and the municipal budget are quite limited.

MUE Poligon has confirmed its interest in the project implementation (Annex 11). The enterprise was established only in March 2010 and will start provision of SDW reception and disposal services from the 1st of August, therefore the enterprise does not have its own funds to finance the project. The management of the enterprise also notes that it is almost impossible to obtain a license for an old landfill as it is located in the territory where it could have never been created subject to the modern standards (small lakes and streams are located in the territory of the landfill). Therefore now the enterprise is searching for a land plot for a new SDW landfill construction. On the assumption of the aforesaid, expansion of the project framework will possibly be needed, i.e. abandonment and rehabilitation of the existing landfill and construction of a new one, which will increase the cost of this IP. Neither municipality nor the enterprise has the necessary funds as the enterprise works under the tariffs of 2008 and does not perform any other commercial activity bringing profit, as MUE Vorkutaremstroi did. MUE Poligon is interested in the investments as it is not able to close the old landfill and construct a new one without municipal, regional and federal or third party support.

Possibilities to attract international financing sources were considered besides Russian investments. Consultations with IFI - International Finance Corporation (IFC), European Bank for Reconstruction and Development (EBRD), the Global Environment Facility (GEF Earth Fund), Northern Dimension Environmental Programme (NDEP), NEFCO, UNEP, and the Nordic Investment Bank (NIB) showed that large credit organizations such as EBRD and NDEP believe that financing of this IP is possible subject to the appropriate conditions.

EBRD expressed its interest in the project implementation in Vorkuta having noted that the bank does not finance projects of private companies. The bank experts are ready to meet personally with the representatives of the enterprise and authorities to discuss the project details (Annex 12).

NDEP provides financing for the projects developed by international financing institutions using financial schemes combining loans and grants (Annex 13). NDEP is open to consider possibility to project financing in the form of grants based on the proposals from IFIs. NDEP has forwarded the message to partner institutions: NIB and NEFCO. NDEP also noted that it is ready to continue negotiations under this IP in case of assurance from the Komi Republic about unconditional support of the IP and relevant guarantees.

The project information was delivered to the NEFCO representatives (Henrik Forsstrom, Senior Adviser) and arouse interest and readiness to consider the final project documentation. The city of Vorkuta is included in the list of environmental hot spots of the Russian part of the Barents region. Therefore NEFCO pays particular attention to the implementation of projects in Vorkuta which will contribute to removal of Vorkuta from the hot spots list, and continuation of negotiations with them seems promising from this point of view.

7.4 State support

The project owner and municipal administration have developed several measures to improve situation in the waste management in Vorkuta. In 2008 "Plan of efficiency increasing measures for waste management" was developed and it included also the landfill recultivation project but with underestimated cost because cost estimate was not performed at that time.

In 2009 Komi Republic Target Program "Waste Management" was developed and municipal administration initiated introduction of the landfill project into this program, however approval of the programme is postponed for an indefinite period of time.

In January 2011 Ministry of Nature of the Komi Republic intends to start the development of strategy and programme for waste handling in the Komi Republic. NEFCO has confirmed co-financing for this type of work (Annex 14).

Besides this project has been selected as priority for development of regional pre-investment studies (

Annex 6 1)

Therefore the project will be supported by Vorkuta municipal administration and Komi Republic government.

7.5 Legal or other types of restrictions for Russian and foreign investors

The project will be implemented on the territory without any restrictions. Russian and foreign investors can participate in co-financing of the project.

8. PROJECT IMPLEMENTATION STATUS AND ARRANGEMENTS

8.1 Present situation

Vorkuta municipal administration and the project owner MUE Vorkutaremstroy (now MUE Poligon) are interested in the project implementation and emphasised their interest during pre-investment studies meetings in Vorkuta.

Today the project is in the starting phase. Nevertheless first steps towards its implementation have already been done: Vorkuta municipal administration indicated the project as priority when including it into the Republican Target Program "Waste Management; MUE Vorkutaremstroy in 2009 ordered the design documentation on their own account.

Further development has been suspended due to a number of coinciding reasons. Currently MUE Vorkutaremstroy does not have a license to operate the landfill, so the company will not be able to obtain the approval of the design documentation. Construction works at the landfill cannot be started until the approval of the design documentation is granted.

Another reason is the economic crisis of autumn 2008 that did not allow Vorkuta municipal administration to co-finance this project as part of the Target Regional Program "Waste Management" because all municipal programs were suspended due to the critical financial situation.

8.2 Project implementation plan

The project implementation will include several stages:

1. receiving a loan or grant;
2. tender documents preparation and tender procedures;
3. design documentation preparation and approval;
4. contract negotiation;
5. production and procurement;
6. construction and recultivation works;
7. personnel education;
8. landfill maintenance and monitoring the project's economic efficiency.

The project implementation schedule is presented in Table 23 with beginning of 2010 as the start point. If the financing plan will be changed the project implementation plan will also demand corrections with fixed implementation intervals. The duration of implementation will be 3 years from the start of contract negotiation till the project completion.

It is necessary to consider severe climate conditions of Vorkuta when developing the project implementation plan. It is only possible to perform construction works and recultivation from June to September.

Table 24: Project implementation schedule

	Description of works	2010	2011	2012	2013
1	Component of the project implementation				
2	Project management				
3	Intercepting ditch construction and wastewater monitoring wells construction				
4	Well drillings for underground water monitoring				
5	Wastewater monitoring stations construction				
6	Waste disposal using new technology according to the design.				

This project implementation plan is very approximate and depends on possible investor because MUE Vorkutaremstroy and Vorkuta municipal administration cannot afford financing this project on their own account.

8.3 Organizational measures/key-points of decision-making

Prior to the project start it is necessary to perform the following organizational measures:

- MUE Poligon should obtain all necessary permits and licence for waste management and landfill maintenance activities.
- To prepare a financing plan meeting the requirements of a foreign investor and the possibilities of municipality and the project owner.
- Vorkuta municipal administration should plan co-financing of the project from the municipal budget in 2011-2013.
- The government of the Komi Republic should plan to co-finance the project from the republican budget.
- MUE Poligon should agree and approve tariff increase on solid wastes disposal by including investment component in it for project implementation.
- MUE Poligon should upgrade the existing design documentation or prepare new design documentation according to the selected technical measures and obtain necessary approvals and permits.

8.4 Own resources of MUE Vorkutaremstroy for project implementation

MUE Vorkutaremstroy owns all necessary machinery equipment for the project implementation during time schedule presented in chapter 8.3. To reduce the project implementation time it will be necessary to involve other participants for ground materials transportation to the landfill.

MUE Vorkutaremstroy personnel are capable to implement this project because they have experience of maintenance of the existing landfill.

8.5 Project organization structure

MUE Vorkutaremstroy is the owner of the project and possible future loan receiving party.

To enhance project implementation efficiency and to use the experience of project development in the north-west of Russia the following project organization structure is proposed (Figure 8).

The obligatory requirement for IFI-financed international projects is also an independent project manager.

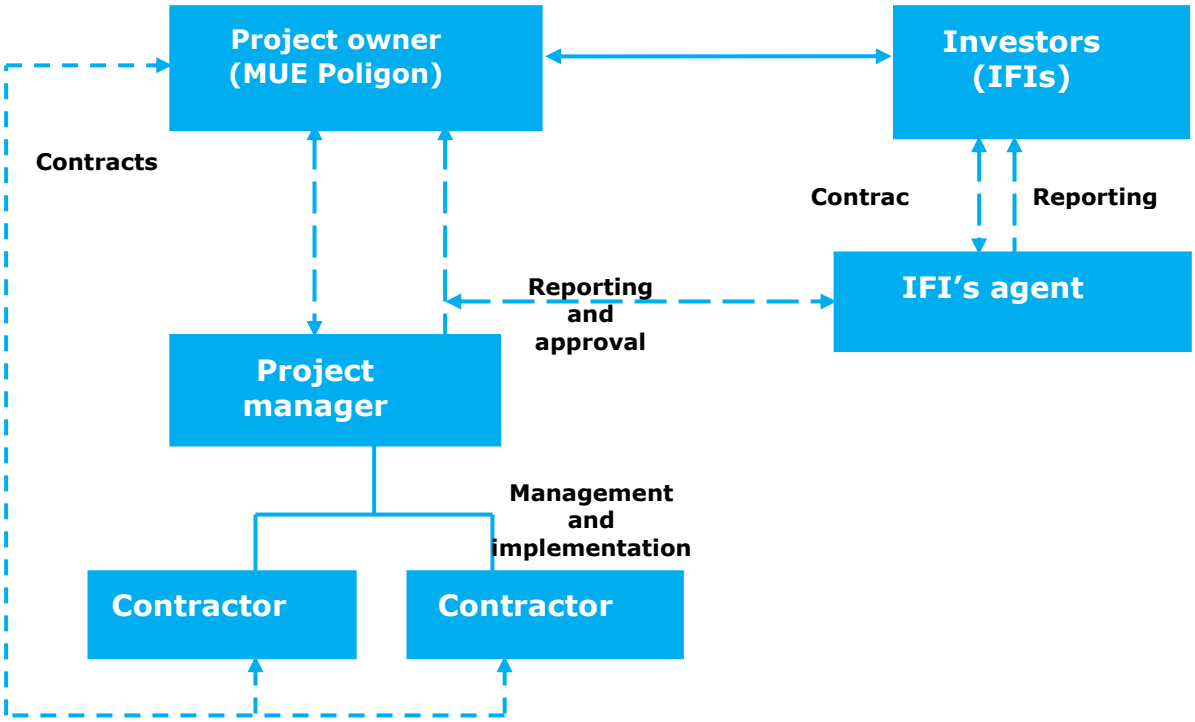


Figure 8: Example of possible project organization chart with possible participation of IFIs.

The project organization chart can be slightly altered in case of changes in project participating parties and the like.

The managing function will belong to the Project Manager whose responsibilities will include daily project progress monitoring at every project stage. Main responsibilities include:

- to coordinate and approve project activities;
- to coordinate work on the project;
- to insure the project reports comply with the requirements;
- to organize conference meetings covering the project progress;

- to prepare the documents for the project financing management;
- to coordinate procurement and contractors' activities;
- to approve and control project expenses;
- to control contractors' activities;
- to coordinate changes in the project plan.

The owner of the project MUE Vorkutaremstroy is responsible for the project realization in accordance to the contracts with the investor and contractors; performs co-financing of the project, and bears the financial and legal liabilities for the project.

Vorkuta municipal administration acts as a project sponsor, controls the progress of the project, co-finances the project and bears the legal and financial liabilities in case the project owner fails to fulfil its responsibilities.

Selection of contractors is based on tender procedures. The candidates should confirm their technical, organizational and financial abilities by documents (necessary license is obligatory, company registration etc). The winner of the tender is awarded a contract with the Employer.

Tender committee is formed according to the Employer's decision and using its personnel with the approval of the municipality administration. Representative of the Project Manager has advisory vote only aiming to make an impartial assessment of the tender procedure.

During project realization the participants should follow the requirements of the Russian legislation, federal standards, industry requirements and standards, other requirements regulating investment and construction activity.

9. ASSESSMENT OF RISKS AND JUSTIFICATION OF SELECTION

This chapter contains preliminary risks assessment and selection justification. As the project is at the starting stage specific information is limited for the project. Preliminary assumptions are based on collected information, basic knowledge of the field and professional experience in similar projects.

9.1 Risks evaluation

Project evaluation includes the following investment risks assessment:

- Technological risk
- Implementation risk
- Financial risk
- Legislative risk
- Responsibility risk

Environmental and social risks are not included in this chapter. Their evaluations were presented in Chapter 6.

Technological risk
Technological risks are restricted in the project as the proposed technology of waste disposal with multi-layer waste compacting in permafrost conditions already have been developed in Eastern Siberia. Successful experience of similar technology can be found also in Norilsk.

Implementation risk
Time frame for the project has not been determined yet because the first task is to find an investor. During calendar plan preparation it will be necessary to consider sever climate conditions that will allow implementing construction and recultivation works during 4 month of the year only (July-September).

It is necessary to consider companies with similar project experience as a Main Contractor for the project.

Considering possible effect of the financing crisis and on the basis of economic efficiency it is possible to sign turnkey contracts with subcontractors and suppliers.

Financial risk
Developing financial crisis can lead to insufficient project financing and higher project implementation cost.
To reduce financial risk it is reasonable to search for external financing sources in the form of grants or loans providing for more preferential terms than in usual practice.

Besides, to minimize financial risk it is necessary to initiate the introduction of the project in the Komi Republic target program "Waste Management" with respective financing before the next year republican and municipal budgets are adopted.

Also Vorkuta municipal administration and the project owner discussed possible increase of the waste tariff by adding an investment component into tariff. This measure will not be popular but will allow for significantly reducing the financial risk.

Legislative risk
There are no obstacles for the project implementation in the Russian legislation. The project owner does not have license and this can be a legal risk but MUE "Poligon" has already applied for the licence.

Responsibility risk
The owner of the project has been determined and will bear the legal and financing risk.

To reduce the responsibility risk Vorkuta municipal administration must act as a sponsor of the project implementation and provide guarantees by adding special articles into the next year municipal budget to cover possible loan.

9.2 Selection justification

Modernizing and re-cultivating the landfill for municipal solid waste in Vorkuta has been proposed and supported by the Komi Republic Ministry of Natural Resources and Environment and also by the Vorkuta municipal administration. From a local and republican point of view, the landfill is considered as a significant source of negative environmental impact in the Komi Republic, and in particular in the Vorkuta area. Due to the large amount of deposited waste, the landfill will continue to pose a potential risk of dispersing hazardous pollutants into the environment. The project provides measures for encapsulating the potential pollution preventing and reducing the dispersion of hazardous pollutants. The project should be regarded as part of an integrated approach for current encapsulation of hazardous pollutants and ensuring future capacity building and development of alternative measures to prevent future dispersion of hazardous pollutants from the deposited waste to the marine environment. The negative environmental impacts also contribute negatively to the social situation in Vorkuta and the social aspect is therefore considered as a positive side effect of modernizing the landfill.

The implementation of the project entirely meets the objectives and goals as pertaining to the environmental safety provided by the fundamentals of the state policy of the Russian Federation in the Arctic for the period until 2020 and subsequently (approved by the President of the Russian Federation as of 2008), as well as the Strategic action plan for the environmental protection of the Arctic zone of the Russian Federation (approved by the Marine Board under the Government of the Russian Federation as of June 19, 2009). According to SAP-Arctic Vorkuta is included in the ranged list of priority hot spots on the territory of Arctic zone of Russian Federation.

Reducing the pollution from the landfill to the aquatic environment is in line with the overall purpose of the NPA project. It can be discussed, whether the implementation of the IP will have any effect in reducing the pollution to the Arctic marine environment. However, the existing landfill may be seen as a local source of pollution to the aquatic environment, a source that is associated with increased risks in a climate change perspective. With this in mind, the justification of implementing the landfill modernization as an investment project is reasonable, and can be seen as a concrete result of republican and local priorities in protecting the Arctic environment.

10.CONCLUSION

The development of pre-investment study for modernisation of the municipal landfill in Vorkuta has demonstrated that there is significant support from the project owner and the local administration for modernising the local landfill. Considerations have been given to other approaches to modernisation of the solid waste management in Vorkuta (see Table 4 in chapter 4.2.2) however, due to high implementation costs and an associated lack of commitment from the local administration, alternative approaches were abandoned in the early phase of the pre-investment study.

Environmental & social aspects
In this report it is provided argumentation for that implementation of the IP will have a positive environmental and social impact for the Vorkuta community. Furthermore, implementation of the project will contribute to reduce the environmental risks related to future effects of global heating and potential impacts related to future leachate control and distribution patterns.

Administrative & technical aspects
The main administrative aspects which has to be solved prior to the stage of full investment analysis and planning for project implementation, is for MUE Poligon to obtain the required permits and licence as landfill operator. In this respect a closer dialogue between the project owner and the permitting authorities would be required and the operator permit must be seen in light of the planned changes in the waste management will introduce.

When it comes to technical aspects it is important that the comments to the design concept given in Table 6 in Chapter 4.4. Due to the lack of experience with modern landfill management in the Vorkuta Region, the importance of securing the IP implementation with staff having adequate background and experience is important. Initiating proper training for local staff is addressed as a required measure for IP implementation.

Financial aspects
The financial aspect of the project is the most challenging part of the project due to the pressed economic situation in the Vorkuta area. The contribution from the project owner is based on incomes from tariffs. A feasible tariff increase schedule was found to be 0% in 2011, 9.1% in 2012, 9.1% in 2013 and 9.2% in 2014. The feasible maximum loan amount is most sensitive in changes in sales revenues (tariff level) and much less sensitive to changes in interest rate and operating costs. The uncertainties in the actual increase in estimated tariff revenues is considerable and support or guarantees from local and republican administration may therefore become required in order to initiate the project.

Conclusive recommendation
The IP has significant support in the local and regional administration. In order to overcome the financial uncertainties related to project implementation, it is suggested to continue with a full scale investment plan where the Republic authority is brought into negotiations with international financing institutions, in particular with those that expressed their interest in funding the project.

ANNEXES

Annex 1: Letter of MINPRIRODA of Komi Republic with request to include this IP for PINS development, dated of 11.02.2009

**МИНИСТЕРСТВО
ПРИРОДНЫХ РЕСУРСОВ
И ОХРАНЫ ОКРУЖАЮЩЕЙ
СРЕДЫ РЕСПУБЛИКИ КОМИ
(МИНПРИРОДЫ РЕСПУБЛИКИ КОМИ)**

**КОМИ РЕСПУБЛИКАСА
ПРИРОДАСА ОЗЫРЛУНЪЯС, ВӧР-ВА
ДА СЫНӧД ВИДЗАН МИНИСТЕРСТВО**

Интернациональная ул., д.157,
г.Сыктывкар, ГСП-2, 167982
тел. 24-07-44, факс 44-13-90
e-mail: mprrk@rkomi.ru
mprrk@mail.ru

11.02.2009г. № 05—13-

На № _____

ООО "Ramboll Storvik"

филиал в г.Сыктывкаре
старшему консультанту
Урюпинскову А.И.

В рамках реализации Проекта ЮНЕП (Программа ООН по окружающей среде)/ГЭФ (Глобальный экологический фонд) «Российская Федерация – поддержка Национального плана действий по защите арктической морской среды», Министерство природных ресурсов и охраны окружающей среды Республики Коми предлагает включить для проведения прединвестиционных исследований следующие проекты:

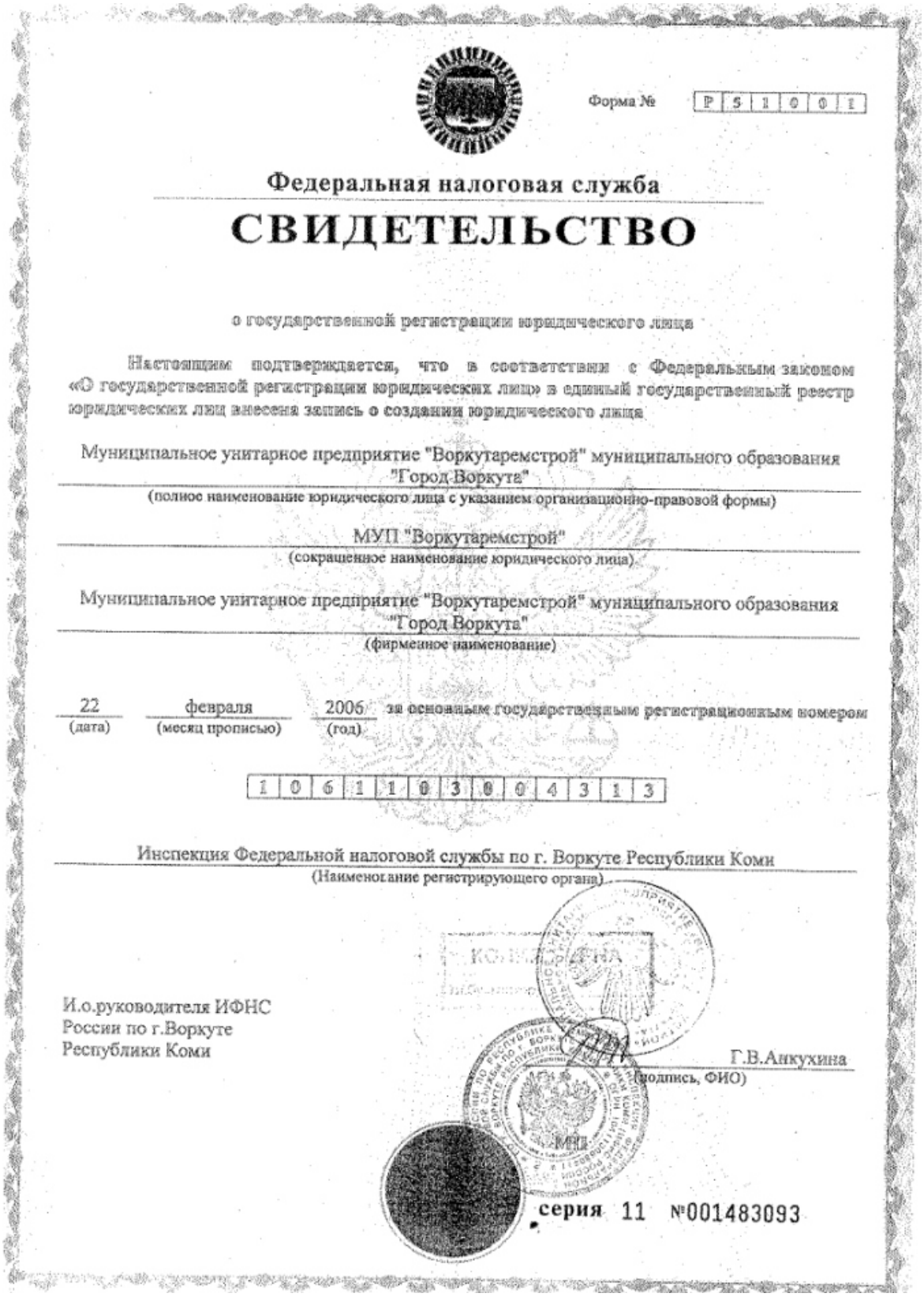
1. Утилизация твёрдых бытовых отходов в г.Воркута, Республика Коми;
2. Модернизация системы очистки сточных вод в г.Воркута, Республика Коми;
3. Сбор, транспортировка и термическое обезвреживание опасных отходов лечебно-профилактических учреждений Республики Коми.

Реализация вышеперечисленных проектов приведёт к значительному улучшению экологической обстановки в заполярном городе Воркуте, и в Арктическом регионе, в целом.

Министр А.П.Боровинских

Тюпенко Т.И.
28 80 67

Annex 2: MUE VORKUTAREMSTORY Registration Certificate



Форма № Р 5 1 0 0 1

Федеральная налоговая служба

СВИДЕТЕЛЬСТВО

о государственной регистрации юридического лица

Настоящим подтверждается, что в соответствии с Федеральным законом «О государственной регистрации юридических лиц» в единый государственный реестр юридических лиц внесена запись о создании юридического лица

Муниципальное унитарное предприятие "Воркутаремстрой" муниципального образования "Город Воркута"
(полное наименование юридического лица с указанием организационно-правовой формы)

МУП "Воркутаремстрой"
(сокращенное наименование юридического лица)

Муниципальное унитарное предприятие "Воркутаремстрой" муниципального образования "Город Воркута"
(фирменное наименование)

22 (дата) февраля (месяц прописью) 2006 (год) за основным государственным регистрационным номером

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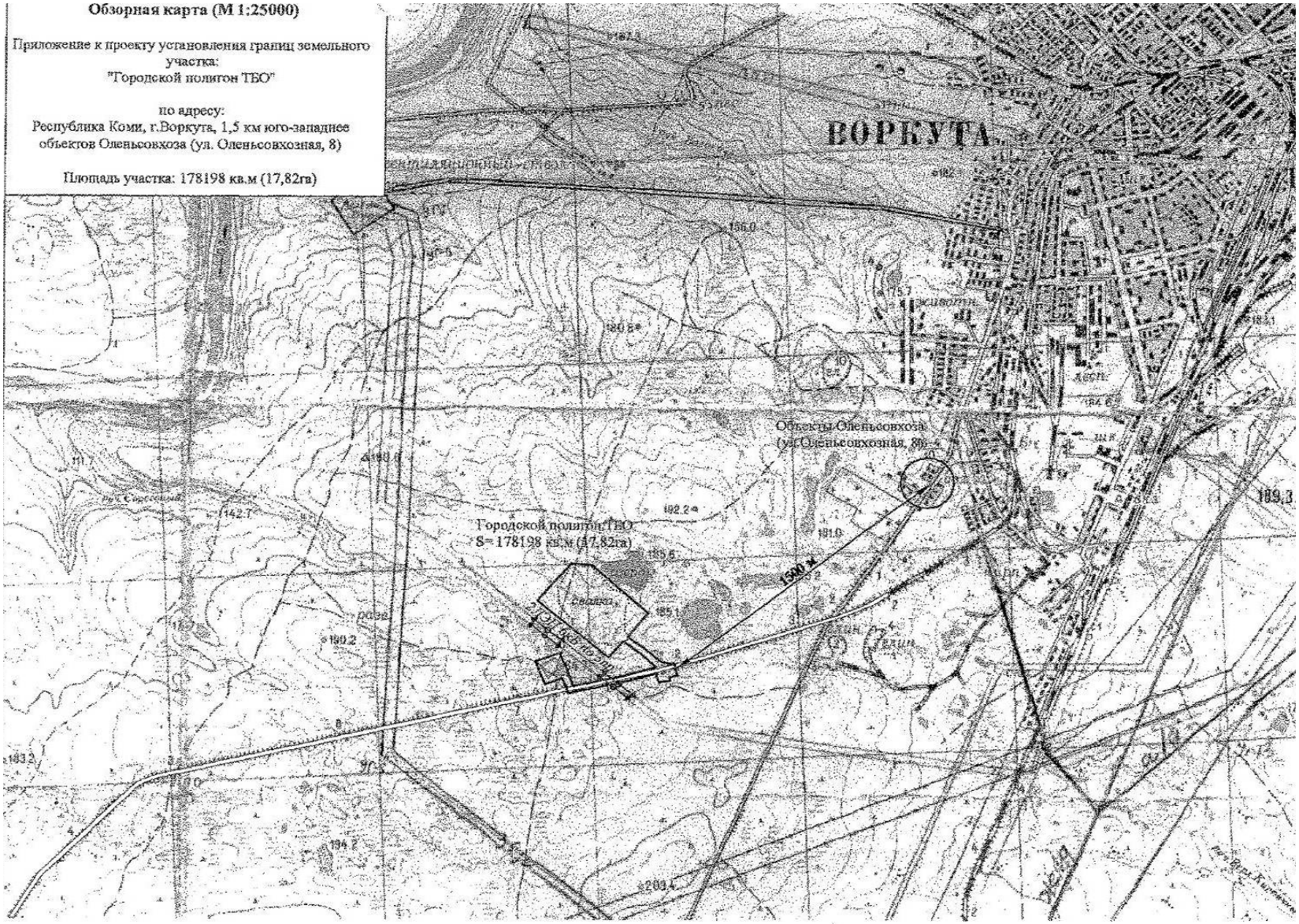
Инспекция Федеральной налоговой службы по г. Воркуте Республики Коми
(Наименование регистрирующего органа)

И.о.руководителя ИФНС России по г.Воркуте Республики Коми — Г.В.Анкухина
(подпись, ФИО)

МП

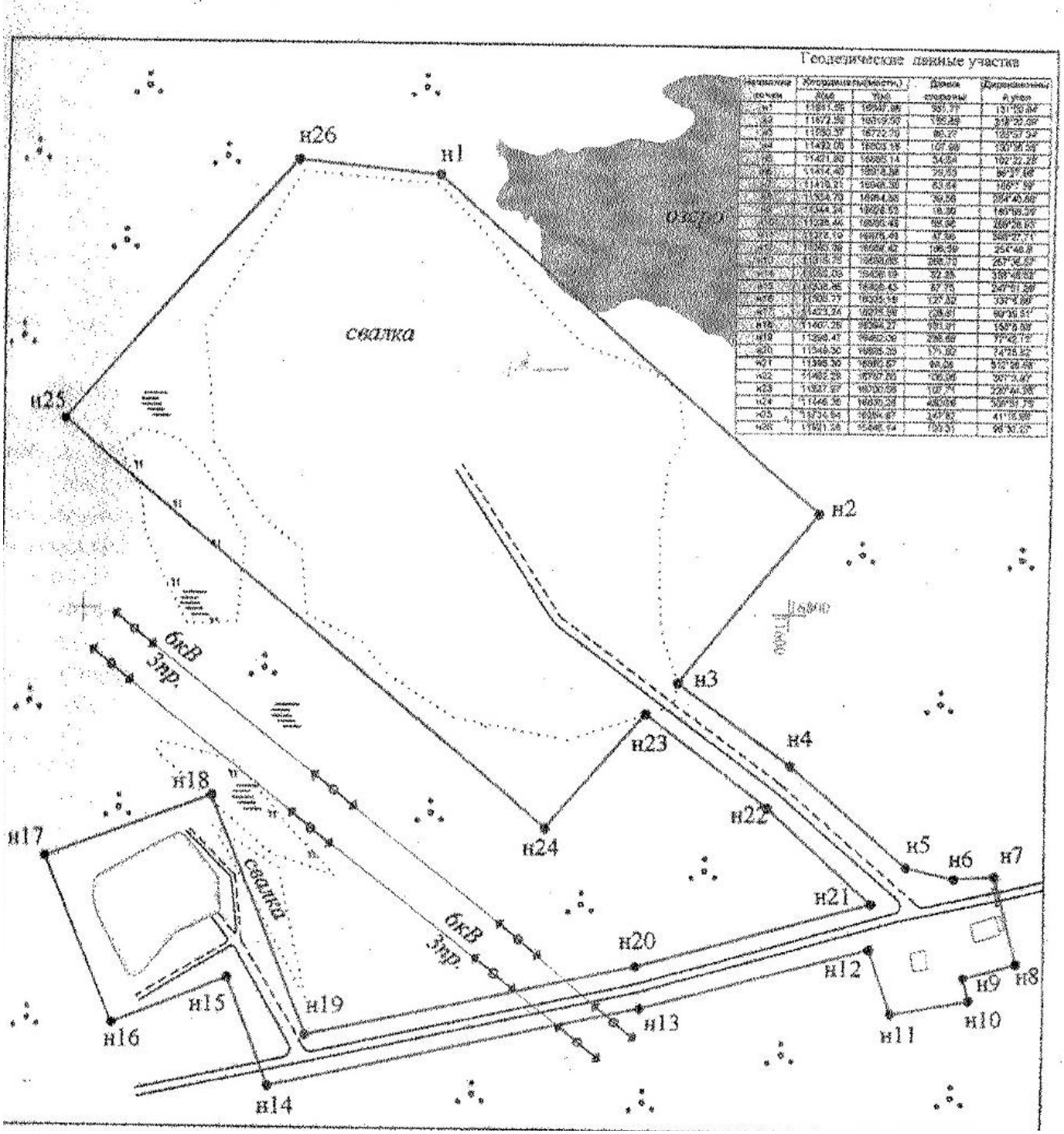
серия 11 №001483093

Annex 3: Sanitary protection Area Layout


Обзорная карта (М 1:25000)
Приложение к проекту установления границ земельного участка:
"Городской полигон ТБО"
по адресу:
Республика Коми, г.Воркута, 1,5 км юго-западнее объектов Оленьсовхоза (ул. Оленьсовхозная, 8)
Площадь участка: 178198 кв.м (17,82га)
ВОРКУТА
Объекты Оленьсовхоза (ул.Оленьсовхозная, 8)
Городской полигон ТБО
S= 178198 кв.м (17,82га)

Annex 4: MSW Landfill Layout within the Land Plot Borders

Адрес (местоположение): Республика Коми, г.Воркута, 1,5 км юго-западнее объектов Оленьсовхоза (ул.Оленьсовхозная, 8)
Общая площадь участка: 178199 кв.м.



Annex 5: Project Team Visit and Site Visit in Vorkuta, 2-4 June 2009

Photo 1. MSW Landfill, Vorkuta

Photo 2. MSW Landfill area, Vorkuta

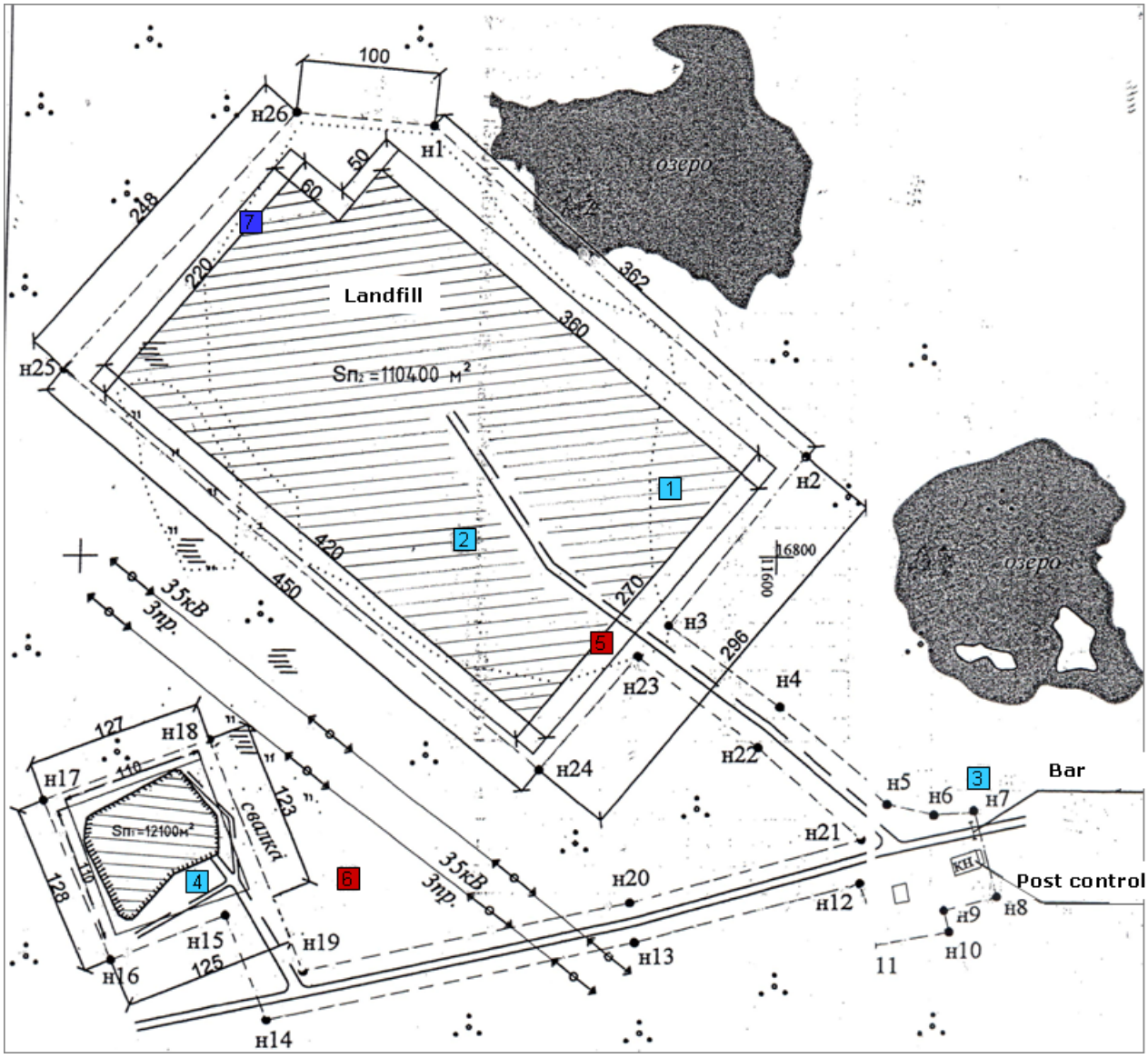
Photo 3. Delivery of Wastes to the Landfill

Photo 4. Levelling of Wastes by the Tractor

Photo 5. Meeting with Vorkutaremstroy management

Photo 6. Meeting with Deputy Head of Vorkuta Administration, A.L.Fyodorov

Annex 6: Sample scheme and monitoring data



Границы отвода земельного участка, размеры полигона ТБО
Lot lines, size of solid wastes landfill

Область заполнения полигона
Filled area of landfill

Место отбора проб атмосферного воздуха
Air sample

Место отбора проб почвы
Soil sample

Место отбора проб сточных вод
Waste water sample

Results of the Air, Soil, Surface Waters Samples Analysis

Air sampling results

Name of the index	MPC **, mg/m³	Measured concentration, mg/m³				
		2008			2009	
		27.03.	23.05.	11.09.	26.01.	28.04.
Air sampling from settlements*						
Sampling point	-	№ 3	№ 3	№ 3	№ 3	№ 3
Hydrogen sulfide	0,008	<0,004	<0,005	<0,004	‹0,004	<0,004
Ammoniac	0,2	<0.01	<0.01	<0.01	0,01	<0.01
Carbon monoxide	5,0	0,4	0,8	1,0	0,4	0,6
Air sampling from the landfill site**						
Sampling point		№ 2	№ 1	№ 1	№ 1	№ 1
Hydrogen sulfide	10,0	<5,0	<5,0	‹5,0	<5,0	<5,0
Ammoniac	20,0	<5,0	<5,0	‹5,0	<10,0	<10,0
Carbon monoxide	20,0	0,5	1,4	1,8	1,8	0,7

* Air sampling from settlements was performed at the border of sanitary protection zone at the 1,5 meters height from the surface in the sampling point №3 (see map in the Annex 6). Maximum Permissible Concentration of the pullutants is determined in the regulatory document «Maximum permissible concentrations of pollutants in air of the settlements » GN 2.1.6.1338-03

**Air sampling from landfill site was taken at the landfill for municipal solid waste disposal at 1,0 m height from the garbage surface at the working place (in the excavator's cabin) in sampling points 1 and 2 correspondingly (see map in the Annex 6). Maximum Permissible Concentration of the pullutants is determined in the regulatory document GN 2.2.5.1313-03 «Maximum permissible concentrations of pollutants in air around landfill"

Soil Sampling Results, 27.06.2008*

Measured indices	Research results	Sanitary standard	Unit of measurement
Radioogical research			
Specific activity of cesium -137	0,00	10 000	Bq/kg
Soil pollution density by cesium -137	0,00	-----	Bq/kg
Specific activity of radium- 226	20,43	10 000	Bq/kg
Specific activity of thorium- 232	10,92	1 000	Bq/kg
Specific activity of kalium - 40	191,15	100 000	Bq/kg
Effective specific activity of the natural radionuclides	51	------	Bq/kg
Parazitologic research			
Germs of geohelminthes	Not found	0	Eks./kg
Sanitary and hygienic research			
Hydrogen ion concentration	8,2		Unit. pH
Nitrates	1,38	130,0	mg/kg
Mercury	‹0,1	2,1	mg/kg
Copper	3,4	33,0	mg/kg
Cadmium	‹0,1	0,5	mg/kg
Lead	1,7	32,0	mg/kg
Zinc	‹1,0	55,0	mg/kg

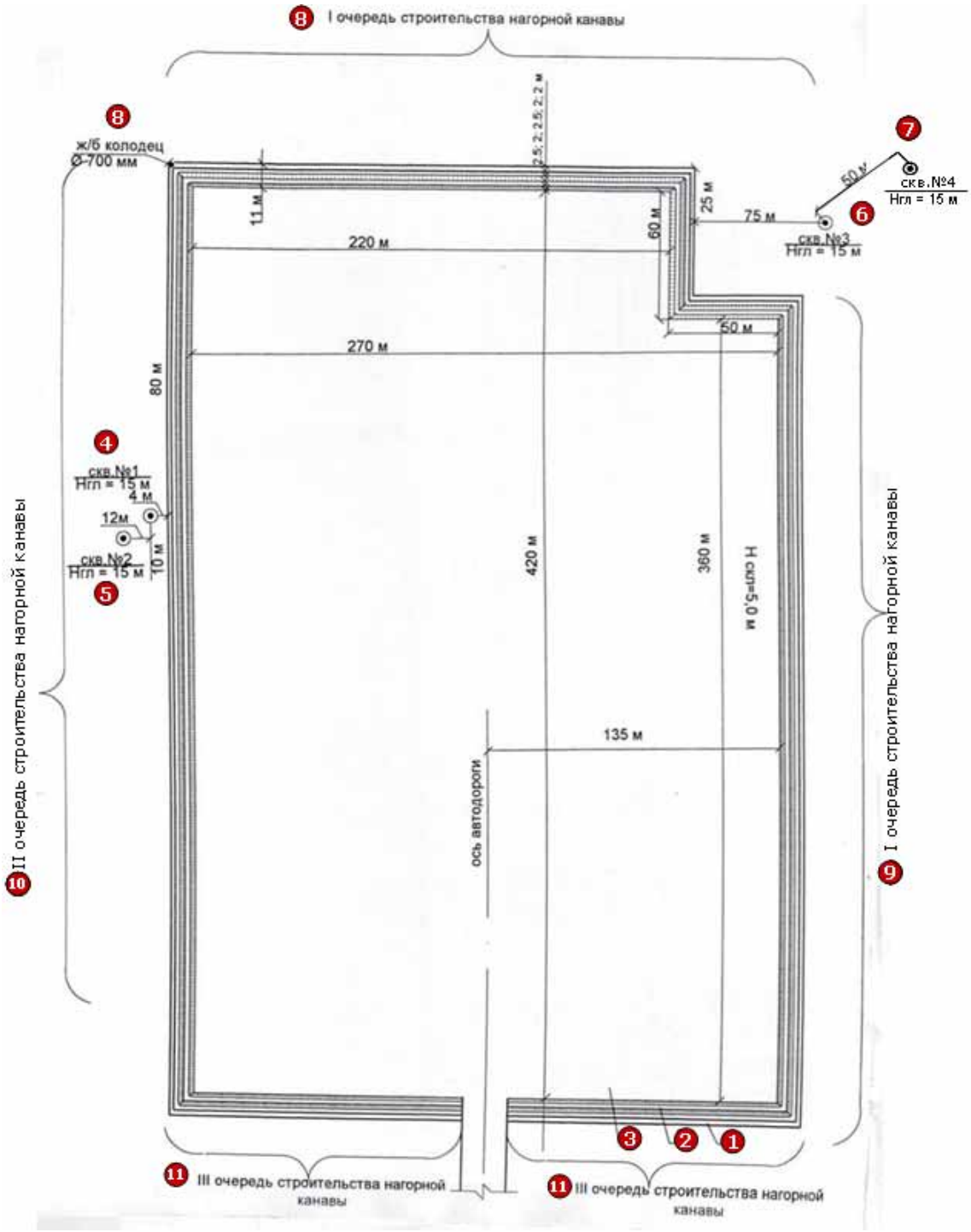
* Soil sampling was performed in 16.06.2008. Soil samples were taken at a 30-40 cm depth in the sampling point №5 (see map in Annex 6) next to landfill border. No samples were taken from the point № 6 near the closed minor landfill. Maximum Permissible Concentration of the pullutants is determined in the regulatory document SanPin 2.1.7.1287-03 "Sanitary and epidemiological requirements to soil quality".

Waste Water Sampling Results, 27.06.2008*

Measured Indices	Research results	Hygienic standard**	Unit of measurement
Sanitary and hygienic research			
Hydrogen ion concentration	7,13±0,7	within 6,5 – 8,5	Unit.pH
Chlorides	4,2±0,5	350	mg/dm³
Total water hardness	1,8±0,003	7,0	Mg-eq/ dm³
Ammoniac	0,22±0,02	1,5	mg/dm³
Nitrites	0,049±0,01	3,0	mg/dm³
Nitrates	0,41±0,08	45,0	mg/dm³
Sulphates	35,5±7,1	500,0	mg/dm³
Copper	0,096±0,022	1,0	mg/dm³
Cadmium	‹0,001	0,001	mg/dm³
Lead	0,003±0,001	0,01	mg/dm³
Zinc	0,087±0,018	1,0	mg/dm³
Mercury	0,0003±0,00008	0,0005	mg/dm³
Arsenic	0,0004±0,00009	0,01	mg/dm³
Oil products	0,093±0,06	0,1	mg/dm³
Phenol	‹0,001	0,001	mg/dm³
Calcium	25,1±2,5	--	mg/dm³
Magnesium	6,1	50,0	mg/dm³
Microbiological research			
CGB (coli group bacteria)	‹ 500	≤ 500	CFU/100 ml
Termotolerant bacteria	‹ 100	≤ 100	CFU/100 ml
Coliphage	‹ 100	≤ 100	CFU/100 ml
Parazitologic research			
Cysts of Lamblia, Germs, larvae of geohelminthes	Cysts of Lamblia, Germs, larvae of geohelminthes are not found	Absent in 10 litres of water	-

* Sampling was performed in 27.06.2008. Water samples were taken from the waste water running from the landfill for municipal solid waste disposal, in the sampling point №7 (see map in Annex 6). In 2009 waste water sampling was not performed. MUE "Vorkutaremstroy" did not submit the information required by the consultant on waste water analysis for the previous years. Landfill was transferred to MUE "Vorkutaremstroy" in 2008 and there are no reliable data for previous years available. Permissible Concentration of the pollutants is determined in the regulatory document SanPin 2.1.5.980-00 "Hygienic requirement to surface waters protection".

Annex 7: Catch ditch construction scheme



1. Catch ditch
2. Earth-deposit
3. Landfill
4. Well No. 1 (15 m depth)
5. Well No. 2 (15 m depth)
6. Well No. 3 (15 m depth)
7. Well No. 34 (15 m depth)
8. Ferroconcrete well
9. 1st stage of catch ditch construction
10. 2nd stage of catch ditch construction
11. 3rd stage of catch ditch construction

Amendment to Annex 7

Cost estimate for construction of fence arount the landfill for solid municipal waste disposal.

MUE "Vorkutaremstroy" submitted a cost estimate to construct a fence around the landfill. The estimate amounted to 20 380 519 roubles (or 452 900 EUR).

The following scope of works is included into the cost estimate:

- Clearing of the area
- Arrangement of the planarization levels
- Levelling of the areas
- Consolidation of the ground
- Borehole drilling
- Supplies
- Production of piles
- Construction
- Diverse.
- Salaries and operation of the machines.

Annex 8: Financial data 2011 – 2025

- Operations – waste generation and tariff revenues, 2011 – 2025;
- Income Statements, 2011 – 2025;
- Cash Flow Table for Financial Planning, 2011 – 2025.

OPERATIONS - WASTE GENERATION AND TARIFF REVENUES (excluding VAT)

Waste Generation Projection	Unit	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Population	Persons	110 391	107 466	104 618	101 845	99 147	96 519	93 961	91 471	89 047	86 688	84 390	82 154	79 977	77 858	75 794
Population Growth	%	-2,650 %	-2,650 %	-2,650 %	-2,650 %	-2,650 %	-2,650 %	-2,650 %	-2,650 %	-2,650 %	-2,650 %	-2,650 %	-2,650 %	-2,650 %	-2,650 %	-2,650 %
Waste generation per person (including also other waste producers)	m3/year	1,40	1,40	1,40	1,40	1,40	1,40	1,40	1,40	1,40	1,40	1,40	1,40	1,40	1,40	1,40
Waste generation	**m3/a**	**154 547**	**150 452**	**146 465**	**142 584**	**138 805**	**135 127**	**131 546**	**128 060**	**124 666**	**121 363**	**118 147**	**115 016**	**111 968**	**109 001**	**106 112**
Waste Tariff Revenues (excluding VAT)																
Waste Generation	m3/a	154 547	150 452	146 465	142 584	138 805	135 127	131 546	128 060	124 666	121 363	118 147	115 016	111 968	109 001	106 112
Tariff	EUR/m3	0,705	0,769	0,839	0,916	0,916	0,916	0,916	0,916	0,916	0,916	0,916	0,916	0,916	0,916	0,916
Investment Addition to Tariff	EUR/m3	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Total Revenues	**EUR**	**108 956**	**115 721**	**122 906**	**130 656**	**127 194**	**123 823**	**120 542**	**117 348**	**114 238**	**111 211**	**108 264**	**105 395**	**102 602**	**99 883**	**97 236**

OPERATIONS - WASTE GENERATION AND TARIFF REVENUES (excluding VAT)

Waste Generation Projection	Unit	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Population	Persons	110 391	107 466	104 618	101 845	99 147	96 519	93 961	91 471	89 047	86 688	84 390	82 154	79 977	77 858	75 794
Population Growth	%	-2,650 %	-2,650 %	-2,650 %	-2,650 %	-2,650 %	-2,650 %	-2,650 %	-2,650 %	-2,650 %	-2,650 %	-2,650 %	-2,650 %	-2,650 %	-2,650 %	-2,650 %
Waste generation per person (including also other waste producers)	m3/year	1,40	1,40	1,40	1,40	1,40	1,40	1,40	1,40	1,40	1,40	1,40	1,40	1,40	1,40	1,40
Waste generation	**m3/a**	**154 547**	**150 452**	**146 465**	**142 584**	**138 805**	**135 127**	**131 546**	**128 060**	**124 666**	**121 363**	**118 147**	**115 016**	**111 968**	**109 001**	**106 112**
Waste Tariff Revenues (excluding VAT)																
Waste Generation	m3/a	154 547	150 452	146 465	142 584	138 805	135 127	131 546	128 060	124 666	121 363	118 147	115 016	111 968	109 001	106 112
Tariff	000 RUB/m3	0,031	0,034	0,037	0,040	0,040	0,040	0,040	0,040	0,040	0,040	0,040	0,040	0,040	0,040	0,040
Investment Addition to Tariff	000 RUB/m3	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Total Revenues	**'000 RUB**	**4 794**	**5 092**	**5 408**	**5 749**	**5 597**	**5 448**	**5 304**	**5 163**	**5 026**	**4 893**	**4 764**	**4 637**	**4 514**	**4 395**	**4 278**

Income Statement

Income Statement	Unit	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Revenues																
Waste Revenues (excl.VAT)	EUR	108 956	115 721	122 906	130 656	127 194	123 823	120 542	117 348	114 238	111 211	108 264	105 395	102 602	99 883	97 236
Other Revenues	EUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL REVENUES	**EUR**	**108 956**	**115 721**	**122 906**	**130 656**	**127 194**	**123 823**	**120 542**	**117 348**	**114 238**	**111 211**	**108 264**	**105 395**	**102 602**	**99 883**	**97 236**
TOTAL OPERATING COSTS	**EUR**	**41 909**	**41 021**	**40 156**	**39 314**	**38 494**	**37 696**	**36 919**	**36 163**	**35 427**	**34 710**	**34 012**	**33 333**	**32 672**	**32 028**	**31 402**
Depreciation	**EUR**	49 627	99 255	99 255	99 255	99 255	99 255	99 255	99 255	99 255	99 255	99 255	49 627	0	0	0
OPERATING PROFIT	**EUR**	**17 420**	**-24 554**	**-16 504**	**-7 912**	**-10 554**	**-13 127**	**-15 632**	**-18 070**	**-20 443**	**-22 754**	**-25 003**	**22 434**	**69 930**	**67 854**	**65 834**
Interest and Other Costs																
Intererest due	EUR	17 508	35 017	39 532	36 238	32 944	29 649	26 355	23 061	19 766	16 472	13 177	9 883	6 589	3 294	0
Other costs	EUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Interest and Other Costs	**EUR**	**17 508**	**35 017**	**39 532**	**36 238**	**32 944**	**29 649**	**26 355**	**23 061**	**19 766**	**16 472**	**13 177**	**9 883**	**6 589**	**3 294**	**0**
ROFIT AND LOSS BEFORE TAXES	**EUR**	**-89**	**-59 571**	**-56 037**	**-44 150**	**-43 498**	**-42 776**	**-41 987**	**-41 130**	**-40 210**	**-39 226**	**-38 181**	**12 551**	**63 341**	**64 560**	**65 834**
Taxes and Fines	**EUR**															
Taxes	EUR	10 900	8 830	7 353	7 547	5 494	3 455	1 429	-583	-2 583	-4 570	-6 544	2 510	12 668	12 912	13 167
TOTAL TAXES AND FINES	**EUR**	**10 900**	**8 830**	**7 353**	**7 547**	**5 494**	**3 455**	**1 429**	**-583**	**-2 583**	**-4 570**	**-6 544**	**2 510**	**12 668**	**12 912**	**13 167**
Net Profit	**EUR**	**-10 989**	**-68 401**	**-63 390**	**-51 697**	**-48 992**	**-46 231**	**-43 415**	**-40 547**	**-37 627**	**-34 656**	**-31 636**	**10 041**	**50 673**	**51 648**	**52 667**

Income Statement

Income Statement	Unit	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Revenues																
Waste Revenues (excl.VAT)	'000 RUB	4 794	5 092	5 408	5 749	5 597	5 448	5 304	5 163	5 026	4 893	4 764	4 637	4 514	4 395	4 278
Other Revenues	'000 RUB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL REVENUES	**'000 RUB**	**4 794**	**5 092**	**5 408**	**5 749**	**5 597**	**5 448**	**5 304**	**5 163**	**5 026**	**4 893**	**4 764**	**4 637**	**4 514**	**4 395**	**4 278**
TOTAL OPERATING COSTS																
Depreciation	**'000 RUB**	2 184	4 367	4 367	4 367	4 367	4 367	4 367	4 367	4 367	4 367	4 367	2 184	0	0	0
OPERATING PROFIT	**'000 RUB**	**766**	**-1 080**	**-726**	**-348**	**-464**	**-578**	**-688**	**-795**	**-900**	**-1 001**	**-1 100**	**987**	**3 077**	**2 986**	**2 897**
Interest and Other Costs																
Intererest due	'000 RUB	770	1 541	1 739	1 594	1 450	1 305	1 160	1 015	870	725	580	435	290	145	0
Other costs	'000 RUB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Interest and Other Costs	**'000 RUB**	**770**	**1 541**	**1 739**	**1 594**	**1 450**	**1 305**	**1 160**	**1 015**	**870**	**725**	**580**	**435**	**290**	**145**	**0**
ROFIT AND LOSS BEFORE TAXES		**-4**	**-2 621**	**-2 466**	**-1 943**	**-1 914**	**-1 882**	**-1 847**	**-1 810**	**-1 769**	**-1 726**	**-1 680**	**552**	**2 787**	**2 841**	**2 897**
Taxes and Fines	**'000 RUB**															
Taxes	'000 RUB	480	389	324	332	242	152	63	-26	-114	-201	-288	110	557	568	579
TOTAL TAXES AND FINES	**'000 RUB**	**480**	**389**	**324**	**332**	**242**	**152**	**63**	**-26**	**-114**	**-201**	**-288**	**110**	**557**	**568**	**579**
Net Profit	**'000 RUB**	**-484**	**-3 010**	**-2 789**	**-2 275**	**-2 156**	**-2 034**	**-1 910**	**-1 784**	**-1 656**	**-1 525**	**-1 392**	**442**	**2 230**	**2 273**	**2 317**

Cash Flow Table for Financial Planning																
Cash inflow	**Unit**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Financial resources	EUR	735 642	735 642	189 742	0	0	0	0	0	0	0	0	0	0	0	0
Sales revenue	EUR	108 956	115 721	122 906	130 656	127 194	123 823	120 542	117 348	114 238	111 211	108 264	105 395	102 602	99 883	97 236
TOTAL inflow	**EUR**	**844 598**	**851 363**	**312 648**	**130 656**	**127 194**	**123 823**	**120 542**	**117 348**	**114 238**	**111 211**	**108 264**	**105 395**	**102 602**	**99 883**	**97 236**
Cash outflow		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Investments and Oper.Cost of Reclam. of L	EUR	735 642	735 642	189 742	0	0	0	0	0	0	0	0	0	0	0	0
Operating costs (excl. Depreciation)	EUR	41 909	41 021	40 156	39 314	38 494	37 696	36 919	36 163	35 427	34 710	34 012	33 333	32 672	32 028	31 402
Debt. Services, Interest+fees	EUR	17 508	35 017	39 532	36 238	32 944	29 649	26 355	23 061	19 766	16 472	13 177	9 883	6 589	3 294	0
Debt. Services, Repayments	EUR	0	0	0	47 062	47 062	47 062	47 062	47 062	47 062	47 062	47 062	47 062	47 062	47 062	47 062
Taxes	EUR	10 900	8 830	7 353	7 547	5 494	3 455	1 429	-583	-2 583	-4 570	-6 544	2 510	12 668	12 912	13 167
TOTAL outflow	**EUR**	**805 960**	**820 510**	**276 784**	**130 161**	**123 994**	**117 862**	**111 765**	**105 702**	**99 673**	**93 675**	**87 708**	**92 789**	**98 991**	**95 297**	**91 631**
Cash Balance	**EUR**	**38 638**	**30 854**	**35 864**	**495**	**3 200**	**5 961**	**8 777**	**11 645**	**14 566**	**17 536**	**20 556**	**12 606**	**3 610**	**4 586**	**5 605**
Cumulative cash Balance	EUR	38 638	69 492	105 356	105 852	109 052	115 013	123 789	135 435	150 000	167 536	188 092	200 698	204 308	208 894	214 499

Cash Flow Table for Financial Planning																
Cash inflow	**Unit**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Financial resources	'000 RUB	32 368	32 368	8 349	0	0	0	0	0	0	0	0	0	0	0	0
Sales revenue	'000 RUB	4 794	5 092	5 408	5 749	5 597	5 448	5 304	5 163	5 026	4 893	4 764	4 637	4 514	4 395	4 278
TOTAL inflow	**'000 RUB**	**37 162**	**37 460**	**13 757**	**5 749**	**5 597**	**5 448**	**5 304**	**5 163**	**5 026**	**4 893**	**4 764**	**4 637**	**4 514**	**4 395**	**4 278**
Cash outflow																
Investments and Oper.Cost of Reclam. of L	'000 RUB	32 368	32 368	8 349	0	0	0	0	0	0	0	0	0	0	0	0
Operating costs (excl. Depreciation)	'000 RUB	1 844	1 805	1 767	1 730	1 694	1 659	1 624	1 591	1 559	1 527	1 497	1 467	1 438	1 409	1 382
Debt. Services, Interest+fees	'000 RUB	770	1 541	1 739	1 594	1 450	1 305	1 160	1 015	870	725	580	435	290	145	0
Debt. Services, Repayments	'000 RUB	0	0	0	2 071	2 071	2 071	2 071	2 071	2 071	2 071	2 071	2 071	2 071	2 071	2 071
Taxes	'000 RUB	480	389	324	332	242	152	63	-26	-114	-201	-288	110	557	568	579
TOTAL outflow	**'000 RUB**	**35 462**	**36 102**	**12 178**	**5 727**	**5 456**	**5 186**	**4 918**	**4 651**	**4 386**	**4 122**	**3 859**	**4 083**	**4 356**	**4 193**	**4 032**
Cash Balance	**'000 RUB**	**1 700**	**1 358**	**1 578**	**22**	**141**	**262**	**386**	**512**	**641**	**772**	**904**	**555**	**159**	**202**	**247**
Cumulative cash Balance	'000 RUB	1 700	3 058	4 636	4 657	4 798	5 061	5 447	5 959	6 600	7 372	8 276	8 831	8 990	9 191	9 438

Annex 9: Letter of Minpriroda RK on project support dated 22.06.2010

ОТ: МИНПРИРОДЫ РК ТЕЛ: 22 ИЮН. 2010 13:42 СТР1

МИНИСТЕРСТВО
ПРИРОДНЫХ РЕСУРСОВ
И ОХРАНЫ ОКРУЖАЮЩЕЙ
СРЕДЫ РЕСПУБЛИКИ КОМИ
(МИНПРИРОДЫ РЕСПУБЛИКИ КОМИ)

КОМИ РЕСПУБЛИКАСА
ПРИРОДАСА ОЗЫРЛУНЪЯС, ВӦР-ВА
ДА СЫЫӦД ВИДЗАН МИНИСТЕРСТВО

Интернациональная ул., д.157,
г.Сыктывкар, ГСП-2, 167982
тел. 24-07-44, факс 44-13-90
e-mail: mprrk@rkomi.ru
mprrk@mail.ru

22.06.2010г. № 05-13-937
На № _____

Генеральному директору
ООО «Рамболь Баренц»

С.Е.Маковеевой

Уважаемая Светлана Евгеньевна!

Министерство природных ресурсов и охраны окружающей среды Республики Коми информирует Вас о ситуации по двум инвестиционным проектам в г.Воркуте: «Модернизация полигона твердых бытовых отходов в г.Воркута, Республика Коми» и «Модернизация системы водоотведения в г.Воркута, Республика Коми», по которым были выполнены прединвестиционные исследования.

22.03.2010г. Минприроды РК направило письмо с информацией по проектам Главе городского округа – руководителю администрации МО ГО «Воркута» В.Л.Буловскому, а 20.04.2010г. получило ответ от первого заместителя руководителя администрации МО ГО «Воркута» А.А.Кочергина (копию письма прилагаем).

В мае 2010г. Минприроды РК подготовило ответ заместителю министра экономического развития РФ С.С.Воскресенскому о заинтересованности в осуществлении второго этапа проекта «Реализация стратегической программы действий по охране окружающей среды Арктической зоны РФ» и предложило включить для реализации оба вышеуказанных проекта.

28.05.2010г. заместитель Главы РК И.А.Поздеев провел рабочую встречу с представителем программы Природоохранного партнерства Северного измерения ЕБРР г-м Хенттоненом, на которой обсуждались перспективные проекты для финансирования. Оба проекта также были предметом обсуждения на данной встрече. Минприроды РК планирует проведение в ближайшие дни встречи с представителями МО ГО «Воркута» по обсуждению дальнейшего финансирования проектов. Результаты встречи будут сообщены Вам дополнительно.

И.о.министра С.Л.Гераймович

Annex 10: Letter of Vorkuta Administration on project support dated 20.04.2010

Министру природных ресурсов и охраны окружающей среды РК

М.В. Некипеловой

КОМИ РЕСПУБЛИКА
"ВОРКУТА" КАР КЫТШЛӦН МУНИЦИПАЛЬНӦЙ ЮКӦНСА АДМИНИСТРАЦИЯ

РЕСПУБЛИКА КОМИ
АДМИНИСТРАЦИЯ МУНИЦИПАЛЬНОГО ОБРАЗОВАНИЯ ГОРОДСКОГО ОКРУГА "ВОРКУТА"

169900 Республика Коми, г. Воркута, пр. Ленина, 7
факс 62151 тел. 3-71-25, факс 3-72-76,
E-mail: admvorkuta@vorkuta.ru

20.04.2010 № 05-1904
На 05-13-339 от 22.03.2010 года

В отношении финансирования инвестиционных проектов

ул. Интернациональная, д.157, г. Сыктывкар, ГСП-2, 167982

Уважаемая Марина Валерьевна!

В связи с полученной информацией о планируемом включении в пакет приоритетных инвестиционных экологических проектов для арктической зоны двух проектов, относящихся к г. Воркуте, а именно «Модернизация полигона твердых бытовых отходов в г. Воркута, Республика Коми» и «Модернизация системы водоотведения г. Воркута, Республики Коми» сообщаем, что в настоящее время нами разрабатывается схема финансирования данных проектов.

В рамках реализации программы модернизации моногородов, подготовлен проект комплексного инвестиционного плана г.Воркута, в который вошли 9 инвестиционных проектов, в том числе и проект по модернизации полигона ТБО, что позволит определить возможности софинансирования данного проекта из всех возможных источников в т.ч. вышестоящих уровней бюджетов.

В части требований иностранного инвестора компании «Рамболь Строюнг» в частности предлагаемой ими схемы финансирования (46% - собственник проекта, 34% - заем, 20% - грант), считаем, что доля софинансирования в виде гранта должна быть пересмотрена до возможности до 50%, как предлагалось ими ранее, в противном случае в виду ограниченных возможностей как собственника проекта, так и местного бюджета, инвестиционные проекты не смогут быть реализованы на предложенных иностранным инвестором условиях.

Первый заместитель руководителя администрации муниципального образования городского округа «Воркута» А.А.Кочергин

Министерство природных ресурсов и охраны окружающей среды Республики Коми
Входящий № 05-13-999
«15» 04 2010 г.

Исп. 3-71-07

Annex 11: Letter of MUE Poligon on project support dated 27.05.2010

Муниципальное
унитарное предприятие
«Полигон»
МО ГО «Воркута»
(МУП «Полигон»)
169900, РК, г. Воркута, в.Пивменков, 2В
Тел./факс: (82151) 7-20-33, 7-21-14
E-Mail: mup.poligon@mail.ru
ОГРН 1101103000240
ИНН/КПП 1103002033/110301001
р/с: №40702810360000000661 в
ФОАО Коми рег. Банк «Уктабанк»
к/с. № 30101810300000000754
в РКЦ г. Воркуты, БИК: 048718754

Исх.№ 26 от 27.05. 2010г.

«Рамболь Баренц»

Блинову.В.А.

Портовый проезд, д. 21

г. Мурманск 083038

Россия

На Ваше письмо исх № 67 от 23.03.2010 г. о «Прединвестиционных исследованиях объектов в Воркуте» можем сообщить следующее:
МУП «ВоркутаРемСтрой» вела с Вами переписку по данному вопросу в течении длительного времени, отправила Вам большое количество документации без всякого видимого результата. В течении последнего года МУП «ВоркутаРемСтрой» провела большую работу по приведению документации по полигону ТБО в соответствие с действующим законодательством. Были разработаны и согласованы паспорта опасных отходов, получены свидетельства о классе опасности отходов для окружающей природной среды.

Получено Заключение об установлении класса опасности токсичных отходов производства и потребления (СП 2.1.7.1386-03)

Разработан и согласован Проект нормативов образования отходов и лимитов на их размещение (ПНООЛР).

Проведена санитарно – эпидемиологическая экспертиза деятельности по сбору, транспортировке и размещению опасных отходов.

Сделан проект организации и благоустройства санитарно-защитной зоны полигона ТБО.

Сделан проект реконструкции полигона ТБО.

Сделан проект рекультивации полигона ТБО.

Но, к сожалению получить лицензию на полигон ТБО до сих пор не получилось.

Полигон ТБО используется несколько десятков лет, он давно переполнен, к тому-же расположен он на местности, на которой по современным нормам его никогда бы не разрешили открыть (расположение на территории полигона мелких озёр и ручьёв). Поэтому лицензию на этот полигон получить скорее всего не удастся. Его надо закрывать и рекультивировать.

Постановлением администрации №430 от 29.03.2010 г. было создано новое предприятие – МУП «Полигон». С 01.05.2010 г. нам был передан в аренду земельный участок, на котором расположен полигон ТБО. В данный момент мы рассчитали тарифы и теперь ждём утверждения городского совета. Через месяц после утверждения тарифов мы сможем оказывать городу услуги по приёму и размещению ТБО на полигоне. Это будет с 01.08.2010 г.

В данный момент мы подыскали земельный участок для размещения нового полигона ТБО. Сейчас согласовываем этот участок со всеми заинтересованными сторонами и контролирующими органами.

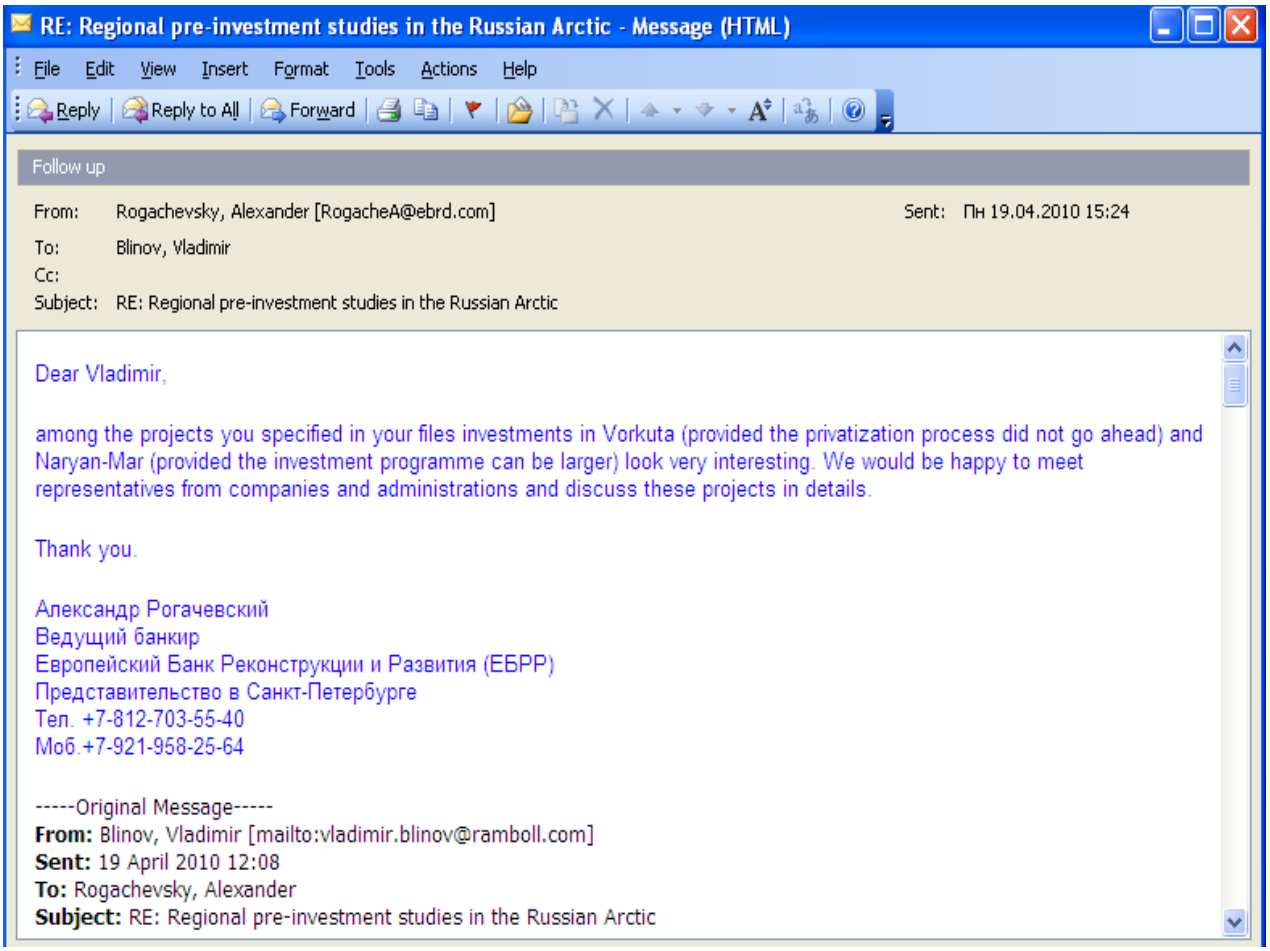
Рекультивация старого полигона и строительство нового требует больших материальных вложений. У города таких денег нет. МУП «Полигон» будет работать по тарифу, который позволит выплачивать зарплату рабочим и платить налоги. (В середине года мы не могли хотя бы немного повысить тарифы, поэтому подали действующий сейчас, который не менялся с 2008 г.)

МУП «ВоркутаРемСтрой» кроме полигона занималась и другими видами деятельности – строительные работы, дорожные работы и поэтому смогла за свой счёт сделать документацию, что составило около 1 млн. руб.

МУП «Полигон» такой возможности не имеет. Мы заинтересованы в инвестициях, так, как без помощи муниципальных, федеральных властей либо сторонних инвестиций не сможем закрыть старый полигон и построить новый.

Директор МУП «Полигон» _____ Дьячишин А.И.

Annex 12: Letter of EBRD on project support dated 19.04.2010



RE: Regional pre-investment studies in the Russian Arctic - Message (HTML)

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Follow up

From: Rogachevsky, Alexander [RogacheA@ebrd.com] Sent: Пн 19.04.2010 15:24

To: Blinov, Vladimir

Cc:

Subject: RE: Regional pre-investment studies in the Russian Arctic

Dear Vladimir,

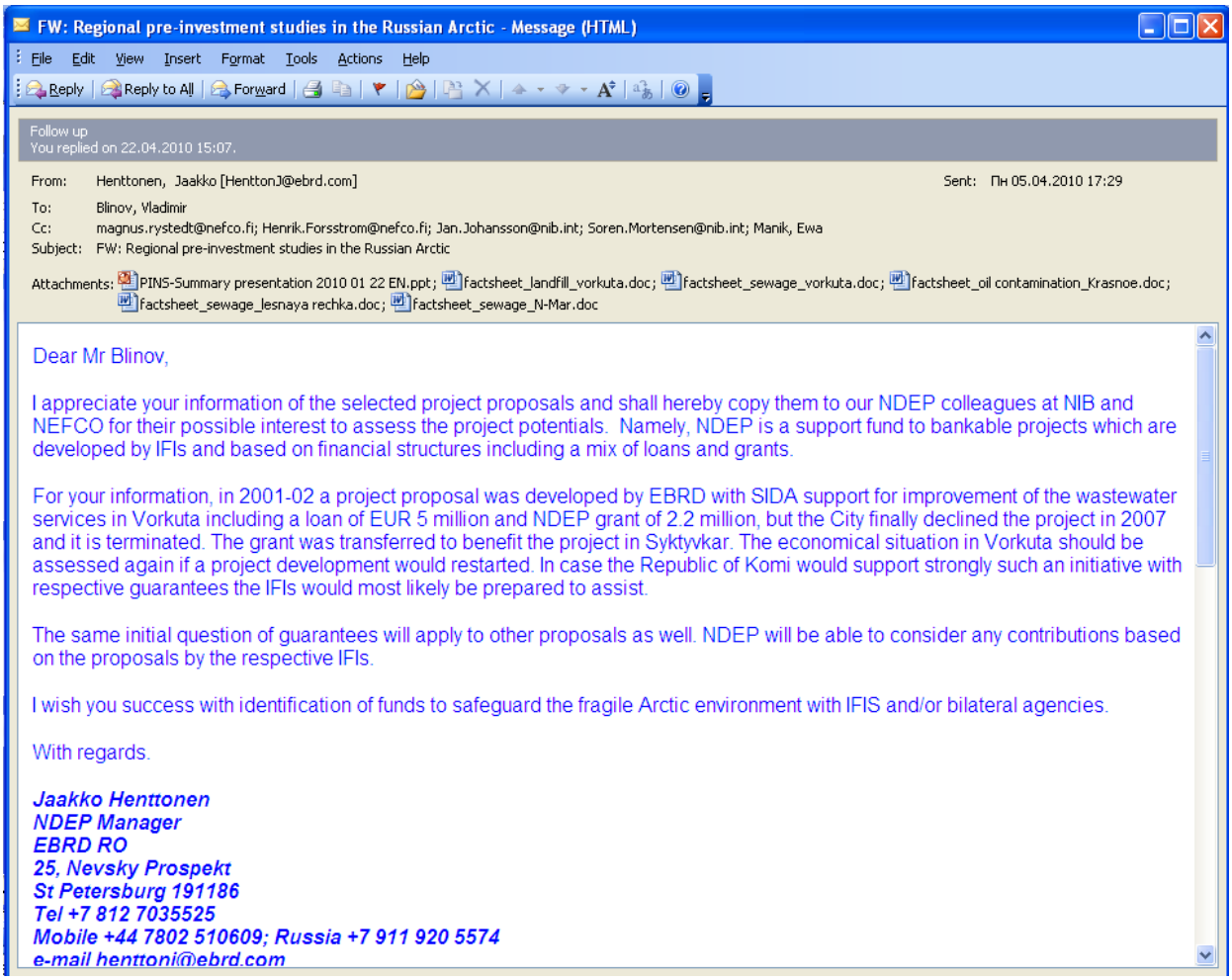
among the projects you specified in your files investments in Vorkuta (provided the privatization process did not go ahead) and Naryan-Mar (provided the investment programme can be larger) look very interesting. We would be happy to meet representatives from companies and administrations and discuss these projects in details.

Thank you.

Александр Рогачевский
Ведущий банкир
Европейский Банк Реконструкции и Развития (ЕБРР)
Представительство в Санкт-Петербурге
Тел. +7-812-703-55-40
Моб.+7-921-958-25-64

-----Original Message-----
From: Blinov, Vladimir [mailto:vladimir.blinov@ramboll.com]
Sent: 19 April 2010 12:08
To: Rogachevsky, Alexander
Subject: RE: Regional pre-investment studies in the Russian Arctic

Annex 13: Letter of NDEP on project support dated 05.04.2010



FW: Regional pre-investment studies in the Russian Arctic - Message (HTML)

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Follow up
You replied on 22.04.2010 15:07.

From: Henttonen, Jaakko [HenttonJ@ebrd.com] Sent: Пн 05.04.2010 17:29

To: Blinov, Vladimir

Cc: magnus.rystedt@nefco.fi; Henrik.Forsstrom@nefco.fi; Jan.Johansson@nib.int; Soren.Mortensen@nib.int; Manik, Ewa

Subject: FW: Regional pre-investment studies in the Russian Arctic

Attachments: PINS-Summary presentation 2010 01 22 EN.ppt; factsheet_landfill_vorkuta.doc; factsheet_sewage_vorkuta.doc; factsheet_oil contamination_Krasnoe.doc; factsheet_sewage_lesnaya rechka.doc; factsheet_sewage_N-Mar.doc

Dear Mr Blinov,

I appreciate your information of the selected project proposals and shall hereby copy them to our NDEP colleagues at NIB and NEFCO for their possible interest to assess the project potentials. Namely, NDEP is a support fund to bankable projects which are developed by IFIs and based on financial structures including a mix of loans and grants.

For your information, in 2001-02 a project proposal was developed by EBRD with SIDA support for improvement of the wastewater services in Vorkuta including a loan of EUR 5 million and NDEP grant of 2.2 million, but the City finally declined the project in 2007 and it is terminated. The grant was transferred to benefit the project in Syktyvkar. The economical situation in Vorkuta should be assessed again if a project development would restarted. In case the Republic of Komi would support strongly such an initiative with respective guarantees the IFIs would most likely be prepared to assist.

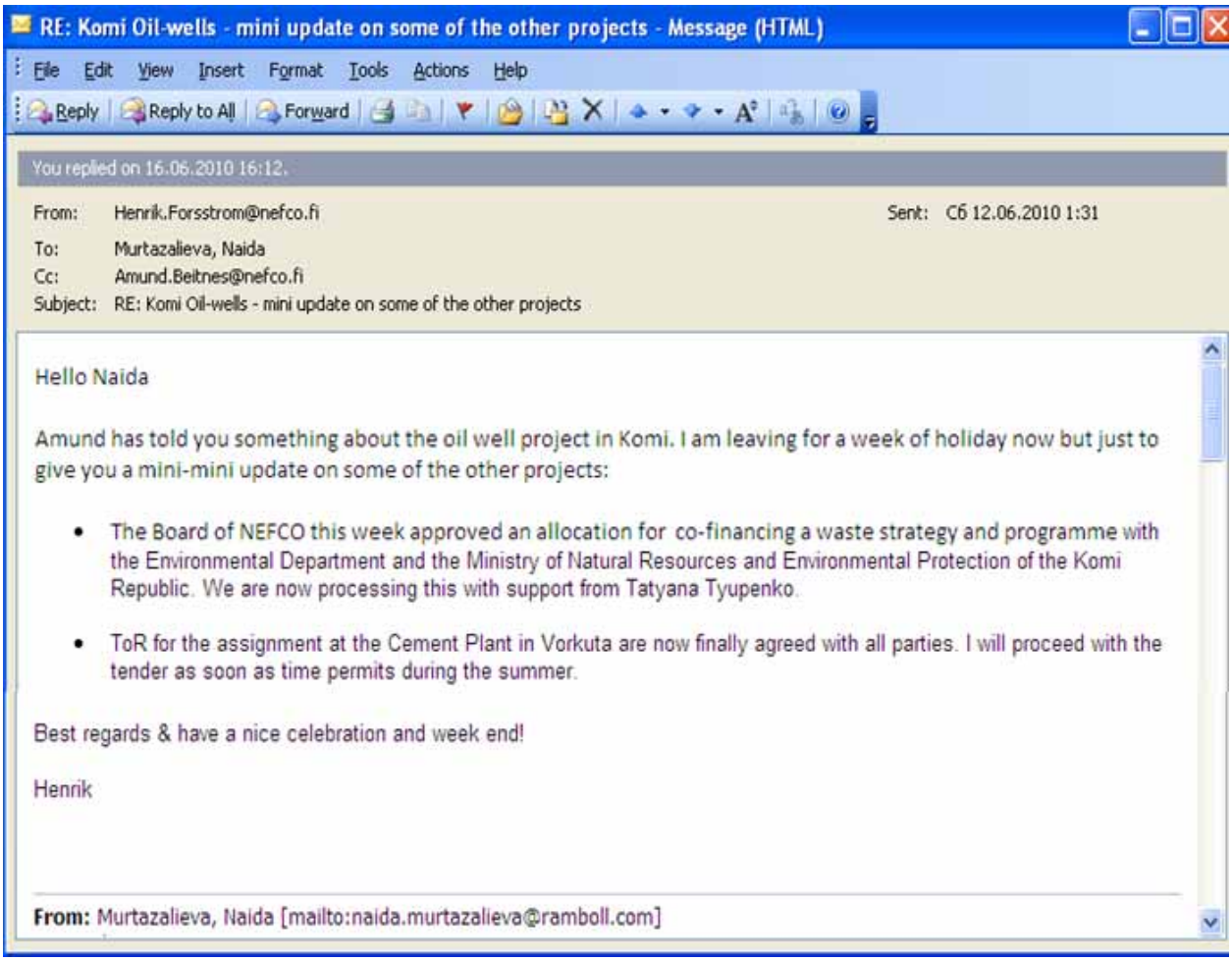
The same initial question of guarantees will apply to other proposals as well. NDEP will be able to consider any contributions based on the proposals by the respective IFIs.

I wish you success with identification of funds to safeguard the fragile Arctic environment with IFIS and/or bilateral agencies.

With regards.

Jaakko Henttonen
NDEP Manager
EBRD RO
25, Nevsky Prospekt
St Petersburg 191186
Tel +7 812 7035525
Mobile +44 7802 510609; Russia +7 911 920 5574
e-mail henttonj@ebrd.com

Annex 14: Extract of letter of NEFCO on project support dated 12.06.2010



RE: Komi Oil-wells - mini update on some of the other projects - Message (HTML)

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You replied on 16.06.2010 16:12.

From: Henrik.Forsstrom@nefco.fi Sent: Сб 12.06.2010 1:31

To: Murtazalieva, Naida

Cc: Amund.Beitnes@nefco.fi

Subject: RE: Komi Oil-wells - mini update on some of the other projects

Hello Naida

Amund has told you something about the oil well project in Komi. I am leaving for a week of holiday now but just to give you a mini-mini update on some of the other projects:

- The Board of NEFCO this week approved an allocation for co-financing a waste strategy and programme with the Environmental Department and the Ministry of Natural Resources and Environmental Protection of the Komi Republic. We are now processing this with support from Tatyana Tyupenko.
- ToR for the assignment at the Cement Plant in Vorkuta are now finally agreed with all parties. I will proceed with the tender as soon as time permits during the summer.

Best regards & have a nice celebration and week end!

Henrik

From: Murtazalieva, Naida [mailto:naida.murtazalieva@ramboll.com]