Environmental Assessment Report

Environmental Assessment Report for Project
“Coal complex “Vaninsky bulk terminal” of “Daltransugol” Limited Liability Company (LLC)”

Organization: Sibirian Coal Energy Company
Address:Moscow Derbenskaya naberegnaya
Job number:S&SC/0186

Company ”Siberian Coal Energy Company”
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Audit dates: 05 of July – 31 of July 2006

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1. GENERAL DESCRIPTION OF THE PROJECT

1.1 OVERVIEW OF THE PLANNED ACTIVITY. ALTERNATIVE VARIANTS.

"Daltransugol" Limited Liability Company (LLC) intents to create coal complex "Vaninsky bulk terminal" alongshore the Tatar Strait of Khabarovsk Territory in Vanino settlement which is a part of a compact group of small urban settlements (including Sovetskaya Gavan town, Oktyabrsky (Sovetskaya Gavan is a classifying section), Vanino, Maisky, Zavety Iljicha, Lososino settlements). This group arose in 40-50s of the XXth century as there was built Komsomolsk-on-Amur (Pivan station) - Sovetskaya Gavan railway leading to the Tatar Strait and appeared to be a traffic centre for cargo handling from the railway to ships. Vanino settlement founded in 1944 to dispatch passengers to Magadan was developed on the basis of oil terminal and Vanino-Kholmsk ferry service (Sakhalin island) and now is one of the major Russian ports in freight turnover in the Pacific Ocean.

Creation of the coal handling terminal within unbuilt area of Vanino settlement complies with specialization of this settlement and is aimed at developing the existing traffic centre. Production capacity of the terminal is planned to make 12 million tones a year. The forecasted number of employees of the complex is 344 people including 124 people for handling operations, 133 people for ancillary facilities and 27 people of office and management personnel. The required number of workers (including job sharing) is 446 people. Construction period is 45 months.

The coal handling complex comprises:

- waterside equipped with ship loaders;
- car unloading system including railway lines, unfreezing device, car dumpers, wagon balance, crushing plants, and car unloading system control unit;
- short-term coal storage equipped with belt conveyor system and coal piling and unpiling equipment;
- central control unit of the complex;
- chopper stations and conveyor galleries;
- sample taker;
- administration building;
- auxiliary and engineer support buildings and structures.

The port complex works year-round and twenty-four hours a day.

The complex supposes to perform operations according to the following technological schemes: gondola car-storage, storage-ship, storage-storage.

The complex is equipped with the following systems:

- automatic handling process control system;
- industrial television system, public address, telephone and radio communications systems;
- spay system for storage, car dumper, chopper stations and galleries;
- aspiration and dust-removal system (conveyor galleries, car dumpers, chopper stations, etc).

The engineering design presents and assesses 4 variants of handling mechanization schemes different in their berth and storage equipment:

Variant I: The storage is equipped with four combined stacker-reclaimers and the berth with two mobile rotary ship loaders.

Variant II: The storage is equipped with three stackers and two reclaimers and the berth with two mobile rotary ship loaders.

Variant III: The storage equipment is similar to variant I, the berth is equipped with four Agrico (USA) fixed rotary ship loaders.

Variant IV: The storage equipment is similar to variant II, the berth is equipped with three Agrico (USA) fixed rotary ship loaders.

Variant II is proposed as the main variant (fig.2).

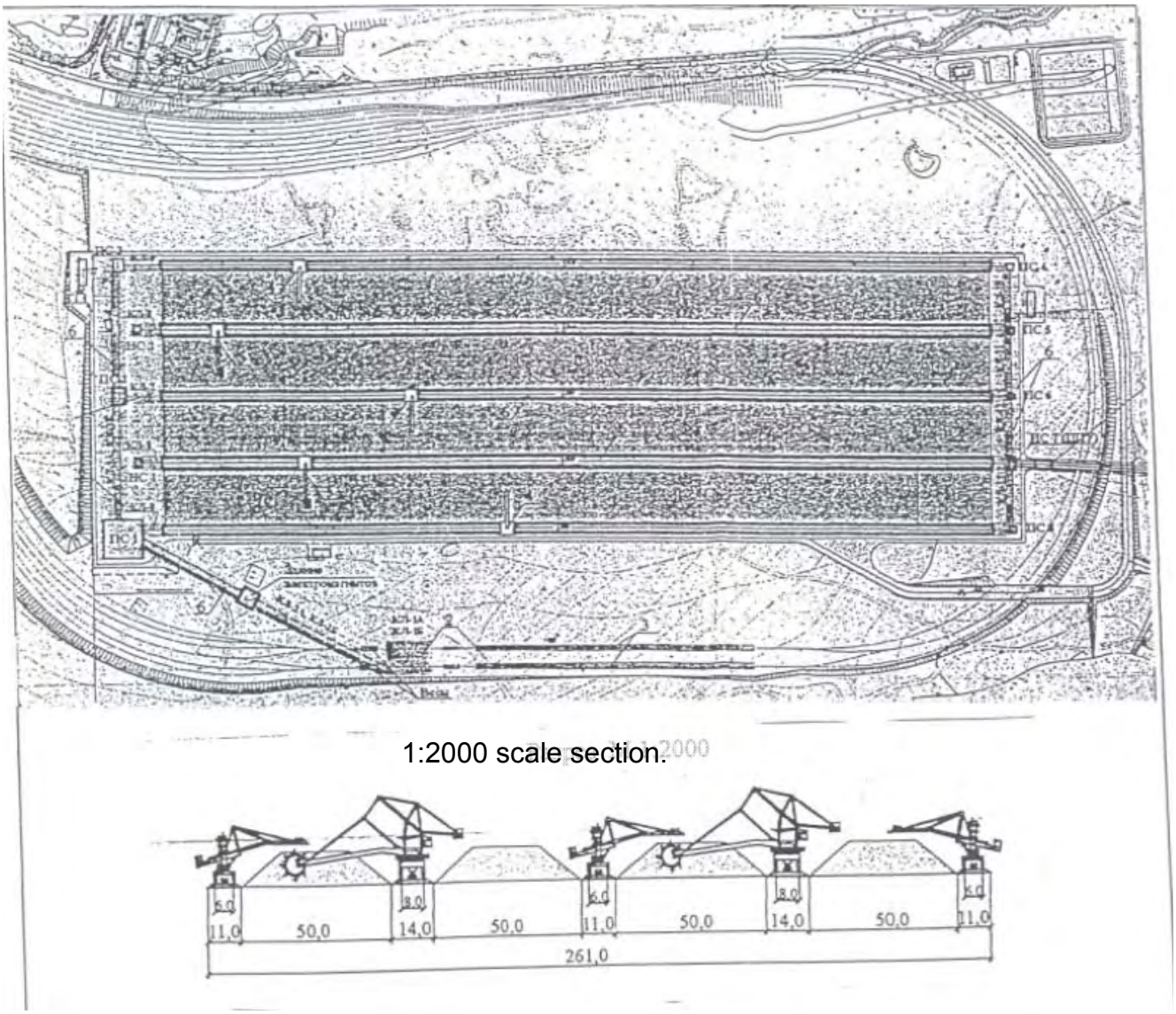


Figure 1. Coal handling mechanization scheme. Variant II.

Actions of workers who deliver cars for processing and unload them are coordinated by an operator of the central control unit of the complex and a dispatcher of a railway group.

Cars are delivered to every car dumper one-by-one with one locomotive.

When air temperature is positive, the locomotive pushes cars to a place where wheel holds are installed (directly for unloading).

In winter trains go to a car dumper only after they thaw out in the unfreezing device. The unfreezing device is a building with two compartments for 10 cars with gas radiant heaters each. Thaw period is 20 minutes.

Delivery, unloading and removal of cars are fully automated.

As accumulation tracks are filled, the control unit of the railway group receives an automatic signal to remove empty trains.

Coal is unloaded from cars into undercar bins. Then feeders bring coal from the bins to conveyors which transport it a chopper station. Conveyors are equipped with conveyor balance, metal finders and junk catching magnets. The chopper station has riddles and crushing equipment to obtain coal of the required grain size as requested by a consignee.

From the chopper station the conveyor system delivers coal to the storage or a ship. Chopper stations are closed buildings with processing equipment. They are 9 in number.

At the storage, coal is taken from car dumpers, piled by its grade, mixed and loaded to a ship. Coal is piled with stackers and unpiled and loaded to a ship with reclaimers (see fig.1, section). The storage capacity is 1000 tones. The storage plane size is 260 m x 765 m. This area houses four rows of 50 m wide piles, three submachine roads for stackers and two for reclaimers across its width. Besides, the storage is equipped with spray, snowing and fire-extinguishing systems and concrete bottoms for storm water disposal.

At the waterside maritime works of the complex comprise two berths: 20 m and 16 m in depth. The berths are positioned on both sides of the 350 m long cargo pier. The pier is located 300 m north of Muchukei-Dua Cape. Coast connection is provided with a 250 m long trestle which includes 95 m long and 10 m wide dam and three detached supports spaced at 63 m.

Ships are loaded with a mobile rotary ship loader.

Demand for services of port fleet ships will be met with the existing subdivision at Vanino port (Table 1).

Table 1. Port fleet ships

Class of ship	Amount	Purpose	Notes	
			Design capacity, h.p.	
			One towboat	Towboats involved into shunting operations with a ship
Docking tug	2	Provision of shunting and mooring operations	5000	10 000
Docking tug	2	Provision of shunting and mooring operations	2300	4600
Pilot boat	1	Delivery the Pilot to the transport boat		
Sewerage water collector	1	The collection of sewers and waste from boat		
Oil skimmer	1	The collection of waste from complex area		

The administration building incorporates offices for workers of the complex, welfare spaces, a canteen, a first-aid post, and rooms for officers of public supervisory authorities.

Stock room is to store supplies for facilities of the complex.

Repair and garage station includes car parking places, repair shops for maintenance and minor repairs of handling equipment and automobiles as well as office and welfare spaces.

Power is to be supplied from RAO UES. Besides, there is provided for "Caterpillar" emergency diesel-generator.

"Termax" boiler house consisting of two 2kW container-like units is projected to supply heat to facilities of the complex. There is also provided for "Caterpillar" emergency diesel-generator.

The complex is planned to be supplied with water from Muchke river. The project has single domestic, industrial and fire water line.

Utility fluids are discharged to household refuse processing plant "E-50" of 50 m^3/day output and "Aquarius" plant of 1 m^3/day output.

The project provides for collection, purification and disposal of effluents of surface water within the complex.

There are projected treatment facilities including governor settler, contact chamber, treated water tank, and pump filter house to purify effluents within the coal storage. Building of car dumpers has settlers where hydrocleaning water is discharged. Clarified water is then delivered to the run-around system.

There are projected treatment facilities to purify car parking and auto washing sewage under standard designs 503-6-9.86 and 503-1-21.83 accordingly. There are provided for treatment facilities developed by "Polykhim" enterprise to purify sewage waters within tank battery of liquefied hydrocarbon gas. Sewage waters from the boiler house and auto filling site are planned to be purified at treatment facilities of "Mekhanik" complex.

As per sanitary and epidemiological regulations "Design, construction, modernization and operation of enterprises, planning and development of populated areas. Sanitary protection zones, sanitary classification of enterprises, buildings and other objects" SanPiN 2.2.1/2.1.1.1200-03, the object in design fits into category "Open storages and coal handling areas" (paragraph 4.6) referred to the 2nd class sanitary hazard with sanitary protection zone being 500 m in standard size.

1.2 REGULATORY REQUIREMENTS APPLIED TO THE OBJECT IN DESIGN

Territory and water area of the coal terminal in design do not fall within direct effect norms of international contracts and conventions which do not meet requirements of the Russian legislation except for international convention for the prevention of pollution from ships MARPOL 1973/1978.

According to Appendix V to MARPOL 73/78 convention:

- marine disposal of all types of plastic materials is forbidden including synthetic ropes, fishing nets and plastic refuse bags;
- marine disposal of the following types of refuse is made as far as possible from the nearest coast but is anyhow forbidden if a distance to the nearest coast is:
  - less than 25 miles when buoyancy separation, finishing and packing materials are disposed;
  - less than 12 miles when food waste and other refuse are disposed including paper goods, rags, glass, metal, bottles, shards and similar waste. Marine disposal of such refuse is allowed if it is crushed or milled and disposal is made as far as possible from the nearest coast but is anyhow forbidden if a distance to the nearest coast is less than 3 miles. Such crushed or milled refuse must be riddled through 25 mm holes at most. When refuse is mixed with other waste which disposal suits other requirements, more strict requirements are applied.

These requirements apply to the planned activity according to federal law of the Russian Federation No.7-fz of 10.01.2002 "On Protection of Environment":

- standardization of permissible pollutant emissions and discharge (article 23);

- standardization of production and consumption waste generation and disposal (article 24);
- environmental impact assessment in project documentation (article 32);
- carrying out of state ecological expertise of the project (article 33) in conformity with federal law No. 174-fz of 23.11.95 "On Protection of Environment";
- taking of measures on protection of environment and restoration of natural resources during design, construction, commissioning and operation (article 34);
- creation and preservation of sanitary protection zones around the economic and other facilities (article 52);
- industrial environmental monitoring (article 67).

As to atmospheric air, influence of the planned activity is regulated by the following legal and normative acts:

1.RF federal law No. 96-fz of 4.05.1999 "On Protection of Atmospheric Air"

2.RF government regulation No. 183 of 02.03.2000 "On limits of emissions of hazardous (polluting) substances into atmospheric air"

3.National standard GOST 17.2.3.02-78. Nature protection. Atmosphere. Regulations for establishing permissible emissions of noxious pollutants from industrial enterprises.

4.Calculation of concentration of hazardous substances contained in industrial emissions. OND-86. Gidrometeoizdat. USSR.

5.Sanitary and epidemiological regulations SanPiN 2.2.1/2.1.1.1200-03. Sanitary protection zones and sanitary classification of enterprises, buildings and other facilities.

6.SanPiN 2.1.6.1032-01. Hygienic requirements to atmospheric air quality assurance in populated areas.

7.Maximum permissible concentrations of atmospheric air pollutants in populated areas. GN 2.1.6.1338-03. As amended GN 2.1.6.1983-05.

8.Tentative safe exposure levels of atmospheric air pollutants in populated areas. GN 2.1.6.1339-03. As amended GN 2.1.6.1984-05.

9.Guidance on monitoring of air pollution sources. OND-90.

10."Guidance on air pollution monitoring". RD 52.04.186-89.

As to influence of the planned activity on water bodies, the following legal and normative acts are applied:

1.Water code of the Russian Federation No. 167-fz of 16.11.1995

2.RF federal law No. 155-fz of 31.07.98 "On inland sea waters, territorial sea and adjacent zone of the Russian Federation"

3.RF government regulation No. 1504 of 19.12.96 "On development and approval of standards of maximum permissible harmful impacts on water bodies"

4.RF government regulation No. 383 of 03.04.97 "On approval of rules for utilization of water bodies owned by the government"

5.Sanitary regulations SanPiN 2.1.5.980-2000. Hygienic requirements to surface water protection. Water disposal in populated areas.

6.SanPiN 2.1.4.1074-01. Drinking water. Hygienic requirements to water quality of centralized water supply systems. Quality control.

7.General list of maximum permissible concentrations and tentative safe exposure levels of hazardous substances for water of fishery water bodies. The USSR Ministry of Fisheries, 1990.

8.National standard GOST 17.1.1.01-77 "Nature protection. Hydrosphere. Utilization of water and water protection. Basic terms and definitions"

9.GOST 17.1.1.02-77 "Nature protection. Hydrosphere. Classification of water bodies"

10.GOST 17.1.1.03-86 (CMEA standard 5182-85) "Nature protection. Hydrosphere. Classification of water use"

11.Construction norms and regulations SNiP 23-01-99 "Construction climatology"

12.SNiP 2.04.01-85 "House water plumbing and drains of buildings"

Production and consumption waste management requirements are specified by:

1.RF federal law No.7-fz of 10.01.2002 "On Protection of Environment" (article 51)

2.RF federal law No. 96-fz of 4.05.1999 "On Protection of Atmospheric Air" (article 18)

3.RF federal law No. 89-fz of 24.06.1998 "On production and consumption waste"

4.RF government regulation No. 461 of 16.06.2000 "On development and approval of waste generation standards and waste disposal limits"

5.SanPiN 2.1.7.1322-03. Hygienic requirements to production and consumption waste disposal.

6.Order of RF ministry of natural resources No. 115 of 11.03.2002 "On approval of instructional guidelines for development of draft standards of waste generation and waste disposal limits"

7.Order of RF ministry of natural resources No. 786 of 02.12.2002 "On approval of federal waste classification catalog"

8.Order of RF ministry of natural resources No. 663 of 30.07.2003 "On amendments to federal waste classification catalog approved by order of RF ministry of natural resources No. 786 of 02.12.2002"

Atmospheric air quality in populated localities is regulated by the directive approved by resolution of RF Chief State Health Inspector No. 114 dated 30.05.2003, named “Maximum permissible concentrations of pollutants in atmospheric air in populated localities”, code GN 2.1.6.1338-03. These regulations shall be observed at the border of sanitary protection zone separating the enterprise site from residential area.

GN 2.1.6.1338-03 regulations contain 656 items of pollutants. Some of the substances which are typically emitted by machine-building plants producing domestic appliances are presented in table 1a.

Table 1a.

Ambient Air Conditions at Property Boundary, for General Application

(*micrograms per cubic meter*)

Pollutant	*Concentration IFC*	*Concentration GN 2.1.6.1338-03*	
Particulate matter Annual arithmetic mean (a.m.) Maximum 24-hour average (max)	50 70	50 00	Note: dust, undifferentiated by contents (except metals, organics)
Nitrogen oxides, NO a.m. Maximum 24-hour average (max)	- 150	60 400	
Sulfur dioxide, SO_2 Annual arithmetic mean Maximum 24-hour average	50 125	50 500	
NO_2 a.m. max	- -	40 85	
CO a.m. max	- -	3000 5000	

Acetone a.m. max	- -	 350 350

Continue of Table 1a.

Pollutant	*Concentration IFC*	*Concentration GN 2.1.6.1338-03*
Petrol a.m. max	- -	 1500 5000
benz(o)pyrene a.m.	-	 10^{-6} (0.1 mkg/100 cu.m)
HCl a.m. max	- -	 200 200
Co, Cd and compounds a.m.	-	 1
Mn and compounds a.m. max	- -	 1 10
Cu a.m.	-	 2
Ni a.m.	-	 1
Pb a.m.	-	 0.3
Phenols a.m. max	- -	 3 10
H_2SO_4 a.m. max	- -	 100 300
HNO_3 a.m. max	- -	 150 400

Water quality standards in bodies of water, specifying limitations in regard of waste waters composition, are regulated in RF by numerous normative legal acts, partly inherited from the USSR, partly updated, but keeping indices values established earlier (with additions). Russian water quality standards cover about 1200 names of substances.

The values of water quality standards differ depending on reservoir purpose and are regulated by different legal acts (table 1b)

Table 1b.
RF legal acts containing quantitative values of water quality standards

Reservoir purpose	Legal acts
Bodies of water of fishery purpose	"Consolidated list of maximum allowable concentrations and safe reference levels of harmful substances for water in fishery reservoirs". USSR Ministry of Fisheries, 1990
Bodies of water of household water and cultural-domestic water use	1."Maximum allowable concentrations of chemicals in bodies of water of household water and cultural-domestic water use", approved by resolution of RF Chief State Health Inspector, code GN 2.1.5.689-98 (with amendments as of 1999 and 2000).

	2.“Hygienic requirements to protection of surface waters”, approved by resolution of RF Chief State Health Inspector dated 22.06.2000, code SanPiN 2.1.5.980-00 3.“Hygienic requirements to water quality of centralized system of drinking water supply. Quality control”, approved by resolution of RF Chief State Health Inspector, code SanPiN 2.1.4.1074-01
Bodies of water of recreation use of water	“Hygienic requirements to protection of surface waters”, approved by resolution of RF Chief State Health Inspector dated 22.06.2000, code SanPiN 2.1.5.980-00

During interrelations with bodies of executive power in the field of environment protection, as a rule, the most stringent standards for water in fishery reservoirs are taken into consideration; almost all surface bodies of water in Russia, except swamps, are assigned to this category. For old (operating) enterprises, which are implementing measures for improvement of their water protection activity, less stringent standards may be imposed, but usually they are not milder than the standards for bodies of water of household water and cultural-domestic water use.

Water quality standards in regard of some common contaminants are presented in table 1c.

Table 1c.

Limits for Process Wastewater, Domestic Sewage, and Contaminated Stormwater Discharged to Surface Waters, for General Application

(*milligrams per liter, except for pH, bacteria, and temperature*)

Pollutant parameter	*Limit IFC*	Maximum permissible concentrations of pollutants and other water parameters for bodies of water pursuant to Russian legislation		
		Fishery purpose	Household water and cultural-domestic purpose	Recreational purpose
pH	6–9	6.5-8.5	6.5-8.5	6.5-8.5
BOD	50	3.0	2.0	4.0
COD	250	-	15	30
Oil and grease	10	0.05	0.7	no film permitted
TSS	50	+0.75 to natural background	+0.25 to natural background	+0.75 to natural background
metals				
Heavy metals, total	10	-	-	-
Arsenic	0.1	0.05	0.05	0.05
Cadmium	0.1	0.001	0.001	0.001
Chromium				
Hexavalent	0.1	0.001	0.05	0.05
Total	0.5	0.5	0.5	0.5
Copper	0.5	+0.0001 to natural background	1.0	1.0
Iron	3.5	0.1	0.3	0.3
Lead	0.1	0.1	0.03	0.1
Mercury	0.01	0.00001	0.0005	0.0005
Nickel	0.5	0.01	0.1	0.1
Selenium	0.1	+0.0016	0.01	0.01

Silver	0.5	to natural background -	-	-
Zinc	2.0	0.01	5.0	5.0
Manganese	-	0.01	0.1	0.1
Cobalt	-	0.01	0.1	0.1
Molybdenum	-	+0.0012 to natural background	0.25	0.25
Cyanide				
Free	0.1	0.05	0.1	0.1
Total	1.0	-	-	-

Pollutant parameter	*Limit IFC*	Maximum permissible concentrations of pollutants and other water parameters for bodies of water pursuant to Russian legislation		
		Fishery purpose	Household water and cultural-domestic purpose	Recreational purpose
Ammonia	10	0.39	1.0	1.0
Fluoride	20	0.75	1.5	1.5
Chlorine, total residual	0.2	0	0.3-0.5	-
Phenols	0.5	0.001	0.001	0.001
Phosphorus	2.0	0.1	3.5	-
Sulfide	1.0	0	0	0
Sulfates	-	100	500	500
Chlorides	-	300	350	350
Carbon bisulfide	-	1.0	1.0	1.0
Formaldehyde	-	0.01	0.05	0.05
Synthetic surfactants	-	0.1	0.5	0.5
Nitrates (in terms of nitrogen)	-	9.1	10.2	10.2
Nitrites (in terms of nitrogen)	-	0.02	0.83	0.83
Solid residual (total dissolved solids)	-	1000	1000-1500	1000-1500
Coliform bacteria	< 400 MPN/100 ml	-	<1000 MPN/100 ml	<500 MPN/100 ml
Temperature increase	< 3°C	+ 3°C to water temperature during the hottest month		

Note: MPN, most probable number.

a. The effluent should result in a temperature increase no more than 3°C at the edge of the zone where initial mixing and dilution takes place. Where the zone is not defined, use 100 meters from the point of discharge.

(-) – not specified

(0) – presence in water is forbidden

Permissible noise levels in course of production activity in RF are regulated by sanitary norms “Physical factors of production environment. Physical factors of environment. Noise at workplaces, in rooms of residential, public buildings and at the territory of residential sites”, approved by resolution of RF State Committee on sanitary and epidemiologic supervision No. 36 dated 31.10.1996 (code SN 2.2.4/2.18.562-96), which for the most part coincide with IFC requirements (table 1d).

Table 1d
Maximum allowable log equivalent (hourly measurements), in dB(A)

Receptor	IFC		SN 2.2.4/2.18.562-96	
	Day (07:00-22:00)	Night (22:00-07:00)	Day (07:00-23:00)	Night (23:00-07:00)
Residential, institutional, educational,	55	45	55	45
Industrial, commercial	70	70	75	70
Wards, cabinets in hospitals, sanatoriums	-	-	50	40
Territories adjacent to residential houses, buildings of polyclinics, rest homes etc.	-	-	70	60
Rest areas at the territories of hospitals	-	-	65	50
Hotels, boardinghouses	-	-	60	60

Requirements of Russian federal environmental legislation can be tightened by local regulatory authorities. Individual requirements to the coal terminal set by local authorities during project coordination are given in Table 2.

Table 2
Comparison of federal legislation requirements and local environmental requirements related to project "Vaninsky bulker terminal"

Factors	Federal legislation requirements (normative legal act)	Local project requirements (authority which established the requirement and the document)
Sanitary hazard class and size of sanitary protection zone	SanPiN 2.2.1/2.1.1 1200-03 – class II, 500 m	Khabarovsk interregional administration for process and ecological inspection. State ecological expert conclusion approved by order No. 768/P of 19.10.05 – class I, 1000 m
Air pollutants concentration at the border of sanitary protection zone	SanPiN 2.1.6.1032-01 - 1 MPC (maximum permissible concentration for each substance) according to GN 2.1.6.1338-03 and GN 2.1.6.1339-03	Khabarovsk interregional administration for process and ecological inspection. Letter No. 3731 of 19.08.05: •dust of all types - 0.25 MPC; •carbon oxide - 0.2 MPC; •sulfur dioxide - 0.2 MPC; •nitrogen oxides - 0.2 MPC; •benzpyrene - 0.4 MPC; •hydrocarbons - 0.1 MPC; •other specific substances - 0.2 MPC.
Project time of the hydroengineering works on the area of water realization	Not regulated	Amur basin authority for protection and restoration of fish resources and for fishery regulation. Review sheet of coal complex construction project. - from August till December

1.3 BRIEF DESCRIPTION OF CONSTRUCTION SITE

Construction site of the complex is located on west coast of the Tatar Strait between Muchukei-Dua Cape and an unnamed cape which is 4.5 km north-westward and is an entry cape of Muchke Bay north of Vanino Bay (fig.2).

Muchke Bay juts out into west coast of the Tatar Strait between the unnamed cape (conventional name Mayak) located 820-840 m north-west of Muchukei-Dua Cape and Aimyanky Cape. East and west coasts of the Bay are rocky, abrupt and are edged with above-water, under-water and drying stones. Coast of the bay top is flat, beachy and is partially dried. There is a dam alongshore which separates Muchke Bay from the lake of the same name which is now connected with the Bay with a shallow narrow channel.

Coast of the Tatar Strait adjacent to Muchke Bay is long made of high rocky steeps. Obtrusive capes are edged with large under-water and above-water stones.

The bay coast is bold at the entry capes. A ten meter isobath is 80-100 m off the coast within Muchke-Mayak and Muchke-Dua Capes. Depths decrease gradually to the top of the bay.

As to tectonics, the region belongs to Primorsk volcanic belt where the upper structural stage is a stratum of pliocene-quaternary basalts of sovgavan assise. The stage rock lies horizontally and flat.

Muchke Bay region is located within Soviet volcano-tectonic depression which bottom of basalts of sovgavan assise lies at 150-200 m below sea level. The region has quite distinct fractures of northeastern course; most fractures are buried under the stratum of pliocene-quaternary basalts.

Technogenic formations are off-site formations found in places of dirt road bed filling, existing piers, ground dumps of constructional excavations, trenches and old ruined buildings. Technogenic ground is accidental and local at the working site, composition of earth cover is changeable.

Marine and lagoonal marine deposits are distributed areally making coastlands of valley mouth, beach ridges, riprap at the foot of cliffs and covering bottom surfaces of the bay and strait. The working site abounds in fine and dust sands at the bottom of the bay, macrofragmental ground in coast interface region (gravelly pebble and boulder grounds) as well as coarse and gravel silts and sands exposed by some excavations as lentils and intercalations.

Alluvial and lagoonal alluvial deposits are distributed within the working site, Muchke river valley and great valley. By composition and mode of occurrence these are deposits of bed, bench and inundated lagoonal parts of alluvium which are presented by pebble gravelly ground, sands of various grain size, sandy clay, loams, and peat.

Alluvial and deluvial deposits and formations make surface of plateau-like shorefaces and are found in the bay waters under marine and alluvial deposits. By composition these are loams here and there changing to clay and rarely to sandy clay as well as to macrofragmental ground (gruss and detritus).

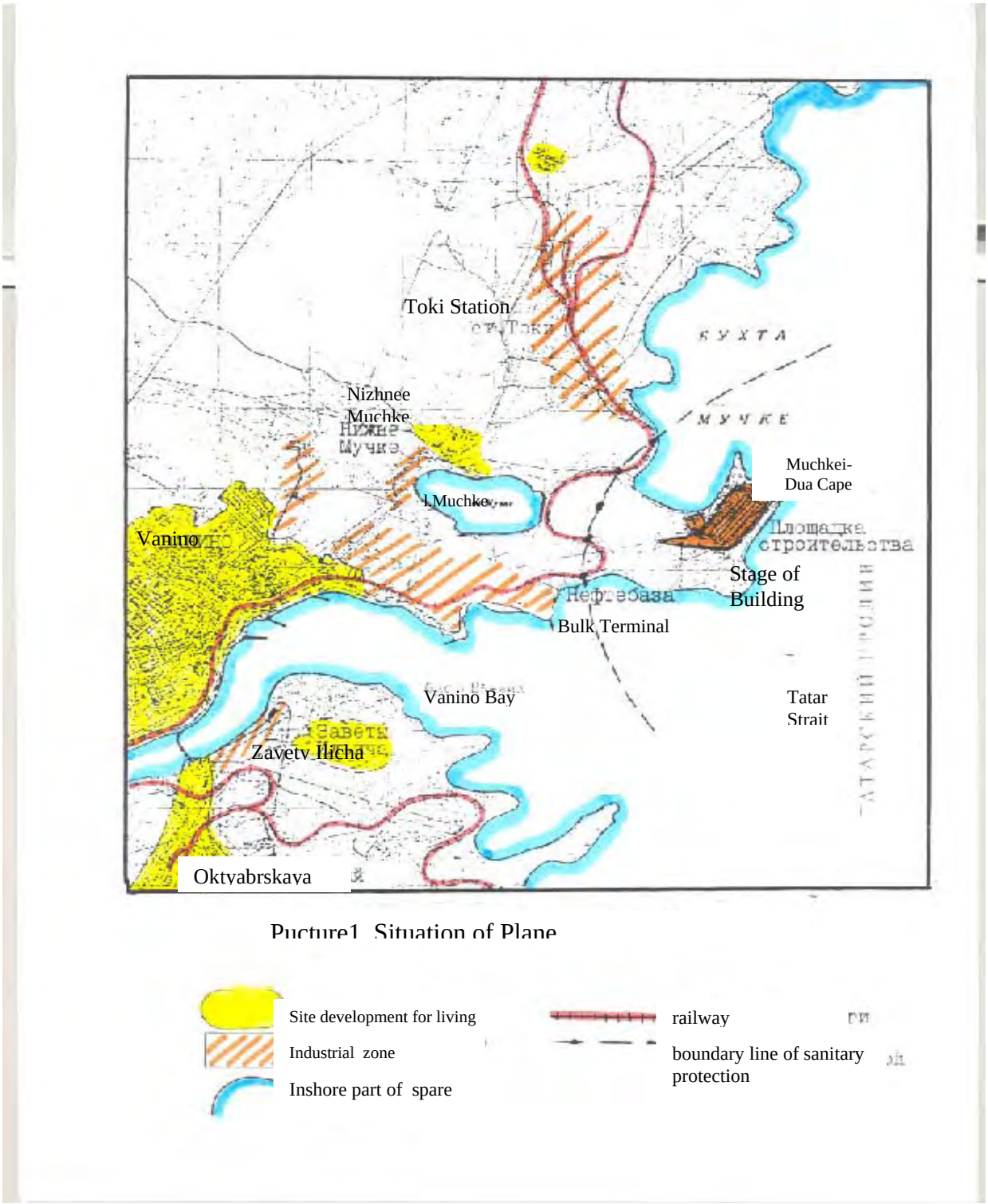
When assessing seismic behavior of the site it was found that SNiP II-7-81 referred Vanino port to 7-9 grade seismic zone. Due to geologic and geomorphologic conditions of the site onshore facilities area of the complex can have its seismicity reduced by 1 grade and waterworks area can have its seismicity either maintained or increased by 1 grade.

Lands by their designation belong to settlement lands.

Soil-plant layer covering surfaces of hillsides and coastal routes is 0.1-0.5 m thick.

There are no nidi of radioactive contamination within the construction site; gamma-radiation level at the surface does not exceed 12-17 microroentgens per hour.

Territory of the construction site is free and occupies coastal strip of Muchke Bay with a noticeable northerly surface slope. It consists of rocky ground and is bushy. Coast where the projected waterworks are to be located is flat with 10-15 m elevation ending with 45-90º cliffs. At the root of the cliffs there is a shoal, a strip of boulder-block bench with some basement rock yields as above- and under-water stones and small kekurs (160 m away in transit of the capes, 360 m away at the bend along the projected construction axis). According to the water bottom examination, between the capes there is a boulder riprap at



Pucture1 Situation of Plane

Figure 2 "Coal complex "Vaninsky bulk terminal" of "Daltransugol" Limited

the root of the cliff which is up to 5 m deep and continues with an underwater bank (underwater bench terrace) to marks of minus 20-21 m.

As a result of vertical leveling, territory of the coal complex will consist of a flat site obtained through excavation of a hillside and partially a dumped site on the swamp area housing auxiliary service facilities. Vertical leveling will be cut-and-fill subject to elevation of the existing territory. Elevation of the coal storage area is taken for 17.00 m, elevation of the car unloading system area is taken for 17.00 m, and elevation of the auxiliary service facilities area is taken for 3.25-4.0 m according to the Baltic system of elevations.

Different levels are interfaced with slants of 1:1.5 in fill and 1:1.5-1:0.8 in cut depending on the ground.

Local rocky ground excavated from the cut during vertical leveling is used to form the territory and to fill the approach dam and berthing structures. 50-100 kg and 1.5-2 ton stones necessary to construct the waterworks are quarried and delivered to the laying-in point with barges.

The construction does not require a soil bank to be opened up as soil from the cut dredged to form the coal handling complex area is planned to be used.

At dredging a soil layer is cut, clamped on free spaces and then is used for accomplishment. On temporary lands there is provided for return of a fertile layer, its coarse leveling, and sowing of permanent grasses. Trenching and excavation ground is used for back fill. Laying of permanent way during railway construction, communications provision works and other works do not cause soil contamination.

The projected coal complex comprises production area with railways designed by "Vostsibtransproekt" JSC, a coal storage with chopper and tension stations and conveyor galleries, a two compartment governor settler with a pump filter house, liquefied hydrocarbon gas storage of 400 m^3 capacity and engineer support buildings as well as auxiliary service area with administration building having a control unit, repair and garage station, stock room, fire-station for 2 cars, heating plant area, and other buildings. There is provided for workers' rest place near the administration building.

At the entry to the complex there is a temporary parking for 18 cars with local treatment facilities. There is also a household refuse processing plant with a sewage pumping station including a 50 m sanitary protection zone.

The coal complex is surrounded with a metal gauze fence via 2.5 m high concrete poles with gates and wickets.

The complex area within the fence is 62.5 hectares including:

1. Building area:	
a) Production area	
buildings and structures	0.96 hectares
open coal storage	19.97 hectares
b) Auxiliary service area	
buildings and structures	0.68 hectares
process sites	0.05 hectares
2. Area of pavements, paths and ripraps	0.17 hectares
3. Area of roads (asphalt-concrete)	0.85 hectares
4. Area of roads, sites (gravel)	4.99 hectares
5. Length of intrasite roads	4.88 hectares
6. Length of gauze fence	2.77 km
7. Vegetation area	1.06 hectares

"Daltransugol" LLC leased a 525400 m^2 land plot of settlement lands from public administration of Vanino region of Khabarovsk Territory according to the transfer act which is an appendix to contract of land lease No. 823 of 06.05.04 for design, construction and operation of the coal complex. Cadastral number of the land plot is 27:04:01 01 007:0022. Lease period of the land plot is 25 years.

As per sanitary classification of enterprises the coal complex in Muchke Bay is a number of various works of different hazard classes. Sanitary protection zone off the complex facilities is established in accordance with SanPiN requirements 2.2.1/2.1.1.1200-03 with the state ecological expert conclusion referring the open storage in design to the category "Open storages and unloading points of apatite concentrate, phosphoric flour, cements and other besot goods with freight turnover of 150 000 tons per year" (class I) rather than to the category "Open storages and coal handling points" (class II):

- Open storages and unloading points of dust-forming goods with freight turnover of 150 000 tons per year – class I, 1000 m;
- Boiler house – no less than 50 m (by scattering calculation results – 100 m);
- Truck maintenance enterprises with not more than 10 guard-posts (repair and garage station) – class IV, 100 m;
- Open car parking – 15 m;
- Closed sewage treatment facilities – 50 m;
- Biological treatment facilities – 100 m.

Total area of sanitary protection zone depends on a size of sanitary protection zone from works of higher hazard class, i.e. from open coal storage and coal handling points. Sanitary protection zone of a given size is marked off from the site boundaries in compliance with SanPiN requirements 2.2.1/2.1.1.1200-03 and plotted on the site map (fig.2). Sanitary protection zone occupies an undeveloped area.

According to the analysis performed (see paragraph 4.2) ground level concentrations at the border of normative sanitary protection zone will exceed permissible levels subject to background concentrations.

According to SanPiN applied, works of lower hazard class are allowed within a sanitary protection zone of an enterprise. These are garages, parking places, administration buildings, shops and other non-residential buildings involved into service of this enterprise; non-residential premises for duty personnel, parking places for public and individual transport, power lines, pump houses.

The nearest construction site settlements are Nizhne-Muchke settlement (about 2 km westward – north-westward), Vanino settlement apartment block (about 3 km westward), Oktyabrsky (Sovetskaya Gavan I) and Zavety Iljicha settlements (4-5 km south-westward beyond Vanino Bay). The nearest construction site works are "Transbunker" petroleum storage depot (1375 km south-westward), Toki junction station (1900 m north-westward), Vanino sea commercial port (about 3 km westward – south-westward).

There are no *specially protected nature areas* in the vicinity of the coal complex in design.

The terminal will have a railroad driven from Toki-Vanino area (about 1000 m). Other service lines (a motorway, power lines, water-supply line) are within Vanino settlement. Vanino settlement has no gas pipe lines.

2. ENVIRONMENTAL ASSESSMENT AT THE TERMINAL LOCATION

2.1 CLIMATIC CONDITIONS AND ATMOSPHERIC AIR POLLUTION

The chief factors forming climate of the region in question are monsoon atmospheric circulation, sea water circulation and geographic location of the object.

Muchke Bay is situated in a place of monsoon climate with well-marked seasonal change of prevailing air masses which is conditional on interaction of large baric formations generated over the Asian continent on one side and the Pacific Ocean basin on the other side. So, in winter here predominate dry cold air masses brought by north and northwest flows from Asian anticyclone and in summer comparatively cool air coming from Sea of Japan and Sea of Okhotsk at pacific subtropical maximum. Cold current at west coast of the Tatar Strait brings comparatively low summer air temperatures and frequent fogs.

As there is no national weather network station in Vanino settlement, one can judge annual temperature conditions only from data of Sovetskaya Gavan weather station which is 40 km southward of Vanino settlement (Table 3).

Table 3
Monthly air temperature in Sovetskaya Gavan town (in Celsius degrees)

Months	Monthly mean	Absolute minimum	Absolute maximum
January	-18.0	-42	+6
February	-14.7	-37	+12
March	-8.0	-30	+12
April	+0.2	-20	+24
May	+5.1	-6	+33
June	+9.9	-2	+33
July	+14.3	+2	+36
August	+16.4	+4	+39
September	+12.5	-2	+31
October	+4.8	-14	+24
November	-5.4	-24	+15
December	-13.8	-37	+9

Summer is short and cool here. Mean temperature of the year's warmest month is 16.4ºC.

Winter is quite severe and long. Mean daily temperature usually changes to negative values in the middle of the first decade of November and to positive values in the middle of April.

Basic amount of precipitations falls in the warm half year. 73.1% of yearly value (532 mm) falls during May-October. Number of days without precipitations is 120.

Fogs can happen any time a year but are most frequent in spring and summer.

Climatic conditions of the port location raise atmospheric air pollution potential for low pollutant emission sources in whole. Yearly mean wind speed is 3.8 m/sec. Occurrence of calms facilitating build-up of pollutants in the ground layer changes by months from 11-12% to 28-31% of number of observations. The highest wind speeds with rare occurrence of calms are typical for November-December and adverse weather conditions for pollutant dispersion are most likely in warm months (June-August) when wind speeds fall below yearly mean values and calms are most common. This tightens requirements to atmospheric air protection.

As there is no national weather network station in Vanino settlement, one can judge annual wind pattern from data of the nearest weather station in Sovetskaya Gavan town (Table 4).

Table 4
Monthly mean wind speed and occurrence of calms in Sovetskaya Gavan town

Months	Monthly mean wind speed, m/sec	Occurrence of calms, % of number of observations
January	3.7	18
February	4.2	19
March	4.6	16
April	4.0	20
May	3.4	22
June	2.8	28
July	2.5	31
August	2.7	28
September	3.9	20
October	4.4	17
November	5.0	11
December	5.0	12
Average during the year	3,8	20

Wind pattern of the site under consideration has some peculiarities. North-westers are very often here due to unique orography of the location. This distinguishes it from more seaward regions of the Tatar Strait where predominant winds for a year are northers and north-easters. North-westers are most common within Muchke Bay in winter with their maximum in December (about 49%).

By spring occurrence of north-westers reduces gradually and makes about 23.3% in March and 11.7% in April.

In summer prevailing winds are north-easters, easters and south-easters. Their occurrence makes 45.6% in June.

Predominant winds for a full year are gentle and moderate breezes. Occurrence of winds of more than 10 m/sec is about 5%.

Vanino settlement has no atmospheric air pollution lookout posts but some data suggest that actual pollution level is very low and content of harmful impurities does not exceed tenths of maximum permissible concentrations.

In accordance with a letter of the Far East Hydrometeorological Service administration of 31.05.2001 background concentrations of pollutants within the construction site were:

- All types of dust – 0.42 MPC
- Sulfur dioxide – 0.26 MPC
- Nitrogen dioxide – 0.44 MPC
- Carbonic oxide – 0.46 MPC.

Atmospheric air is natural pure. In this connection Khabarovsk interregional administration for process and ecological inspection has tightened requirements to atmospheric air protection as provided for by federal legislation for projection of the coal complex (see section 1.2).

2.2 SURFACE AND GROUND WATERS. CONDITION OF WATER BODIES.

The project under consideration requires basic information on condition of Muchke Bay which will be used for water engineering and for sewage disposal as well as information on quantitative and qualitative characteristics of ground waters planned to be used for water supply of the coal terminal.

Muchke Bay. Its area is about 50 m^2, depth of coastal strip is up to 10 m. Water level of Muchke Bay is mainly determined by tidal stage and by wind and baric surge intensity.

Tides are irregular and semidiurnal. Average range of spring tides is 0.6 m, neap tides 0.3 m. The biggest tides may be observed at maximum moon deviations and can make 1.1 m at most. Surging winds are south-easters, easters and north-easters. Intensity of wind surge may reach 15-20 cm and surge resulting from combined effect of sea winds and atmospheric agitation on water surface 0.6-0.7 m. Antisurge decrease does not exceed 25-30 cm. Seiche oscillations are slight.

Wave conditions of the site are moderate. Occurrence of storms with wave heights of more than 1 m is about 4%, more than 2 m 0.3%. The highest waves come from north-east and can be seen at 18-19 m depths once in 50 years and can reach 4.4-4.7 m.

Flow pattern of the projection site is mainly determined by tidal effects.

At low tide there appears current in a surface water layer near continental coast of the Tatar Strait which is directed southward along the guide coast line. From Datta Cape to Burny Cape it turns its direction somewhat south-westward due to the coast exposition and acquires up to 50-55 cm/s speed. Within Muchke Bay a narrow jet falls off the main stream. It enters the bay at its south entry cape and flows along its east coast causing anticyclonic water circulation (clockwise). Maximum current velocities are registered in a surface layer of the said jet generally 1.5-2 hours before low tide. Direction of current changes 1-1.5 hours after young tide. Deep layers have later change in direction of current. At this time near-bottom level currents flow from the bay at some angle to surface currents and are compensating.

When sea level raises flood current flows northward along the continental coast of the strait. At this time current in surface water layer at the east coast of Muchke Bay flows from the bay.

Flow pattern is greatly influenced by so called Shrenk current, constant (residual) current flowing southward along the continental coast. It is traced from Chikhachev Gulf to

Grossevich Bay. Its average velocity is approximately 10-15 cm/s. The said current slackens counter tidal flow and accelerates ebbing flow thus causing predominance of southward currents in the strait and south-westward currents in a passage into Muchke Bay.

Ice conditions are quite severe. Ships can touch at the port only with icebreaker assistance during 65 days a year on average. On the way to the bay there is fairly often an up to 5 mile wide area of strong compression of floating ice with a cable belt at the fast ice edge.

The heaviest loads of ice heaping can act on the waterworks from the end of March till the beginning of April. Ice thickness can reach 1.1 m, ice area 50 000 m^2 and drift velocity 0.7 m/s.

Water temperature within coal pier construction site varies from 18.8 to -1.9 ºC. Its yearly mean value is 4.7 ºC.

Sea water salinity is close to oceanic as the site under consideration is far from large streams. Its yearly mean value is 32.1%. The highest water salinity is in winter and the lowest in time of sharp increase of coastal flow. Oscillations in salinity are mainly observed in its surface layer of 3-5 m in width.

Chemical composition of sea water of Muchke Bay is close to oceanic (Table 5).

Table 5

Background concentrations of water pollutants in Muchke Bay, mg/l

Substance	Background concentrations	MPC in fishery water body
Suspended substances	12.5	12.75
Chlorides	19893	11900
BOD_5	1.4	3
Nitrites	0.08	0.08
Oil products	0.1	0.05
Iron	not found	0.05
Sulphates	1650	3500

*As Khabarovsk environmental pollution monitoring center does not control sea water and bottom ground quality, we used data of sea water laboratory test of GosSanEpidNadzor Center in Vanino region (report No.248 of 23.04.01).

These are anthropogenic factors which normally cause pollution of bottom ground. They are discharge of industrial effluents and sewage waters. Within the construction area there are no industrial facilities and settlements therefore there is no sewage discharge. There are no large streams delivering contaminants into waters of the complex in design so bottom ground is not much polluted.

The coast is protected from high impact of storm sea with a wide boulder bench. Bottom ground which can be wave field drifts lies outside the waviest area. Major sources of drifts in Muchke Bay are Tumnin and Dyuanko rivers. However, alluvial material brought by these streams almost fully deposits in waters of Datta and Silantjev Bays and comes in small outside their entry capes. The area under consideration has no large accumulative formations at capes much protruding into the gulf and this shows that there is no beach drift here. Therefore, bottom deformation and water shallowing of the pier in design will be insignificant.

Ground waters of the terminal location

The area under consideration abounds in ground waters of fissure-stratal type.

Basalt fissure waters are predominantly free-flow, rarely with 20-30 m heads. Feeding of basalt aquifer system is mainly atmospheric. Bulk of precipitations (75% of annual quantity) falls in warm season. Subdued land forms and tabular basal deposits promote substantial water accumulation.

According to the regional hydrogeological zone division this territory is located within Primorsk volcanogenic basin which is primarily composed of neogene sheets – 300-600 m quaternary, paleogene and upper cretaceous vulcanites. Water content of these deposits

results from rock fissuring extending up to 50-100 m in depth but the largest water content is common to fissured rocks in fault zones to which surface-stream flows often adjoin.

Porous tabular level of ground waters is typical for Muchke river valley adjacent to the working site. Waters are free-flow with a groundwater table near to the surface with mixed feeding. Water level fluctuations and water salinity are influenced by atmospheric phenomena, regime of stream and tidal and headwater effects of sea basin. Deposited ground mass of the valley is water-saturated almost from the top. This promotes suspending water effect for the main ground layers of the cut.

In 1966 2 km higher up Muchke river mouth there was explored 4.5 km long Vanino field of ground waters in the valley. According to "Gidrospetsgeologiya" company, groundwater resources were 3000 m^3/day by category B. Two 102 and 120.7 m deep wells were drilled during prospecting work. They exposed basalts of sovgavan assise overlapped by a 10 m stratum of alluvial boulder and pebble materials with sandy filler. Discharges of test pumping from those wells varied from 1.67 to 4.55 l/s with water level decreasing by 4.5-18.6 m. Ground water level was 17 and 22 m deep depending on hypsometrical surface marks. At a time "Vodokanal" enterprise of Vanino settlement is linearly extracting ground waters from four 75-95 m deep wells on the explored site. Total water withdrawal from all wells is 1 210 m^3/day.

Annual range of ground water level is 1-2 m, it goes as far as 5-6 m for separate water wells in Muchke river valley.

The most water-bearing part is the upper section of basalt stratum up to 80-100 m depths. The cut is less porous and hollow with the increase of depth (from 17.8 to 13.6%). According to test data basalt permeability is primary 2-25 m/day.

One can see a regularity for Muchke river valley: specific discharges of wells in the river undercurrent are 6.2-13.3 l/s, wells higher up the river 0.11-0.32 l/s with total headward decrease of rock watering.

Basalt waters generally meet utility and drinking water supply requirements. Waters are hydrocarbonate, cation mixed in their chemical composition. Salinity usually does not exceed 100 mg/l and can increase up to 300-700 mg/l and higher to the seacoast.

The plateau-like shoreface of the site has a level of fissure-stratal free-flow waters adjoining rock fissuring zone. These waters lie below the proposed depth of foundations of structures in design. They are normally low-yield and are well drained by coastal cliffs. Surface quaternary deposits of hillsides are waterless; they can include local seasonal waters like perched water.

Bottom deposits of the bay waters have fully water-flooded and water-saturated ground masses as they are overlapped by sea basin waters. Watering of ground masses within the bay allows considering ground of technogenic, sea and alluvial masses as water-saturated. This promotes suspending water effect for the main ground layers of the cut.

2.3 BIOLOGICAL RESOURCE CONDITION

There are rare and valuable terrestrial and vegetative fauna species at coal terminal site. Vegetable world is poor. According to natural technical survey dated 01.08.05, there is no tree vegetation in the planned construction area, only meadow and shrub vegetation.

Animal life (wild animals) mostly consists of little gnawers and birds of no game value.

At the same time ichthyofauna of Muchke bay lists such valuable species as humpback salmon, salmon trout, taimen, loach, herring, navaga, smelt, flounder, rasp, and pilengas.

Humpback salmon passes the bay on its migration route from the middle of May to the middle of July. During March and May smelt migrates for spawning with a peak in first decade of May. This is to be considered upon waterworks construction. January – March is a time of spawn migration for navaga. Loach migrates down to the bay in May. Pilengas and flounder winter in the bay. Pacific redfin and malma also migrate down by Muchke river to the bay for winter. By commercial fishing importance river Muchke is of highest category.

3. SOCIO-ECONOMIC CONDITIONS

Coal complex "Vaninsky Bulk Terminal" will be constructed in underdeveloped and poorly populated part of Khabarovsk Territory, in 900 km of its center and 450 km away from relatively big city Komsomolsk-on-Amur, on the border of Vaninsky and Sovetsko-gavansky administrative regions. As mentioned earlier (in paragraph 1.1), Vanino settlement is one of the compact settlement group situated along the railroad Komsomolsk-on-Amur (Pivan) – Sovetskaya Gavan. This 70 km long section is adjoined to Tatar Strait and is almost completely isolated from the other population and production sources. The total land of all settlement in the area is about 320 km^2, size of population in 2004 is 71.2 thousand people that is 80.5% of the Vaninsky and Sovetsko-Gavansky regions population and 5% of Khabarovsk Territory population (table 6).

Table 6
Dynamics of population growth in Vaninsky and Sovetsko-Gavansky regions

	1996, thousand people	2001, thousand people	2004	
			Thousand people	% of 1996
Total population of Vaninsky region	50.0	46.9	41.8	83.6
Including urban population	33.3	31.4	29.5	88.6
Living in Vanino settlement	21.2	19.6	19.0	89.6
Living in Oktyabrskiy settlement (Sovetskaya Gavan – I)	7.9	7.7	6.5	82.2
Total population of town Sovetskaya Gavan and Sovetsko-Gavansky region	57.0	51.7	46.6	81.8
Including urban population	55.6	50.9	45.7	80.2
Living in town Sovetskaya Gavan	33.1	30.1	30.1	90.2
Living in Zavety Ilicha settlement	12.3	11.9	9.5	77.2
Living in Mayskiy settlement	4.0	3.8	3.0	75.0
Living in Lososina settlement	5.5	5.1	3.1	56.4
Total population of Vaninskiy and Sovetsko-Gavanskiy regions	107.0	98.6	88.4	82.9
Including urban population	88.9	82.3	75.2	84.5
Rural population	18.1	16.3	13.2	72.9

Data presented in the table 6 show that population of the area under consideration constantly decreases. Rate of decrease is higher than average in Khabarovsk Territory (17.7% against 8.5% from 1996 to 2004). Population decreases in all settlements of Vaninskiy and Sovetsko-Gavanskiy regions, but highest rates of decrease are observed in rural areas and settlements of urban type. At the same time, decrease rates in Vanino settlement and town Sovetskaya Gavan are similar to average rates of Khabarovsk Territory. The main reason of the current demographic situation is different social-economic conditions.

Most favorable conditions are in settlements involved in maritime and railway transport servicing that shows most stable development in Khabarovsk Territory comparing to other industries. In 2000-2004, total volume of carriage by railway increased 1.4 times (from 13.3 to 18.1 mln. tons) and 2.2 times (from 2.2 to 4.7 mln. tons) by maritime transports from Khabarovsk Territory harbors. Industries of Vaninskiy region are gold mining, nonmetal building materials, lumbering and woodworking; of Sovetsko-Gavansky region – food, woodworking, shiprepairing and extraction of nonmetal raw materials. These industries are economically less stable than transport (growth of industrial production in Khabarovsk Territory from 2000 to 2004 is 129%). Even more complicated economical situation is in agricultural industry that has no favorable environmental conditions and is presented only by animal (poultry and pig) breeding.

It is obvious that improvement of demographic situation and development of social sphere is closely connected with stable employment of population in highly profitable economy branches. It is necessary to consider that total unemployment level in Khabarovsk Territory (6.6% in 2004) is lower that average in Russia (8.3%), whereas nominal wages and income per head is higher: 8950 and 7480 rubles/month in 2004 against average values of 6740 and 6380 rubles/month in Russia.

Coal terminal construction in Vanino settlement will not only provide increase of employment in maritime transportation with satisfactory income level, but will support development of related industries.

Construction of coal handling complex will cause significant increase of Toki railway station cargo turnover. As developing complex will be connected, it is necessary to:

- additionally extend Toki connecting station
- construct new regional park in the coal complex territory
- construct the approach line connecting Toki station and region park
- construct railroad underbridge in eastern rail bottleneck of Toki station in intersection with highway instead of existing crossing
- perform related work to provide communications, power, manage wagons, etc.

Railroad construction involves reconstruction of old and construction of new waterworks, e.g. pipe culvert (3 items), bridge over Muchke river and highway crossover.

Construction of the coal terminal is of great economical importance to the whole Khabarovsk Territory. Having estimated capacity of the terminal equal to 12 mln tons, total volume of carriage though Khabarovsk Territory seaports comparing to current level will increase 2.6 times. That leads to significant increase of tax revenue for local and regional budgets. Thus, implementation of planned aids is to improve social-economic conditions both in area of coal terminal location and in the whole Khabarovsk Territory.

4. ENVIRONMENTAL IMPACT UPON IMPLEMENTATION OF COAL COMPLEX PROJECT "VANINSKY BULK TERMINAL"

4.1. GENERAL INFORMATION

Main intention of "Daltransugol" company during implementation of coal complex project "Vaninsky Bulk Terminal" is to decrease environmental impact according to requirements of Russian legislation and considering regional ecological priorities.

Ecology will be stressed during construction of the terminal and during its operation.

Main sources of environmental impact at the construction stage are:

Sources	Possible impacts
Dredging work	Darkening of water, sedimentation, temporary modification and destruction of aquatic life habitat
Utilization of offshore zone for waterworks construction	Loss of aquatic biological resources, disturbance of sea animals
Earthwork	Loss of vegetative and soil covering, violation into natural system, dust production

Construction transport and mechanisms	Discharge of vehicle exhaust gas in the air, noise, dust
Formation, removal and deactivation of solid waste	Debris-strewn territory, pollution of land drainage, discharge in the air in case of none-controlled burning
Transportation and storage of petroleum, oil and lubricants	Pollution of soil and land drainage, fire threat, emission of contaminators into air

Environmental impact during construction stage is temporary and lasts 45 months. Loss of growth and top-soil, and also noise have no vital importance because of ecological low value of area and its remoteness from especially protected natural and residential area.

Most significant residual environmental stresses produce such sources as dredging and utilization of Muchke bay water area for construction. Project provides corresponding entitlement payments for these sources.

Main sources of environmental impact at the operation stage are:

Sources	Possible impacts
Coal dust and discharge of exit gas from shore equipment and ships into air	Deterioration of air quality
Water consumption, sewage discharge, rain and ice water disposal of the terminal site	Depletion of underground water reserves, deterioration of seawater quality in Muchke bay
Formation, removal and deactivation of solid waste	Debris-strewn territory, pollution of seawater in Muchke bay, discharge in the air during burning
Sea craft traffic	Disturbance of sea animals
Oil slicks from sea crafts	Pollution of Muchke bay water area

These environmental impacts are of permanent nature and are considered in project plan.

4.2 OPEN AIR IMPACT EVALUATION

Open air will be influenced during construction of the coal terminal and during its operation.

Dust will be discharged into atmosphere during construction on excavation digging, stacking, unloading and loading of rock construction materials. This will also accompany shotfiring. Air will be also polluted by working equipment exhaust gases including nitrogen oxide, carbonic oxide, sulfur dioxide, soot and hydrocarbon of burned fuel.

Contaminator scattering calculation, considering most machine-dense construction area, was performed in order to estimate influence on open air in the construction period. Calculation shows that construction work impact area (according to 0.05 MPC isometric line) will be 1.05 km. Additional pollution in the nearest settlement will be 0.15 – 0.17 MPC for nitrogen dioxide and sum of nitrogen dioxide and sulfur dioxide.

Main atmosphere polluting sources during operation of the coal handling complex are ground storages and chopper nodes.

Coal handling complex

Coal handling complex contains the following dust intensive objects:

- car dumper
- chopper stations
- open belt conveyors
- coal storage
- ship loading machine

Car Dumper

Two rotor type car dumpers hold two four-axle, 71 ton cars or one eight-axle car each. Coal from cars is unloaded into undercar bins. Car dumper work cycle is 2-3 minutes. Coal from bins gets to conveyors through feeders. Technical performance of car dumper is 3500 tons/hour that is 25 cycles per hour in summer. Necessity to defrost coal in winter decreases number of cycles and performance of coal unload.

Dust produced by coal unload into undercar bins is removed from air of the operating area by aspiration system through cleaning system (sources 1 and 2). Ventilation system performance is 100000 m^3/h.

Coal gets to closed conveyors from bins through feeders. Dusty air from the unload zone is removed by aspiration system with 11200 m^3/h performance (sources 3 and 4).

Chopper Stations

Most dusty places of coal transmission from conveyor to conveyor are chopper stations. Chopper stations No. 1-9 are closed unheated spaces equipped with aspiration system with 15000 m^3/h performance (sources 5-20). In summer aspiration system doesn't work because of high humidity.

Belt Conveyors

Coal gets from car dumper to chopper station No. 1, then from one chopper station to the other and from storage to a ship loading machine in closed galleries preventing coal dust exhalation.

Coal dusts from belt conveyors along the coal storage and from two conveyors in the berth. Coal is delivered to conveyors from chopper stations and by stackers from the storage. Conveyor length is 810-830 m, width – 1.6 m (sources 21-26).

Coal Storage

Storage work includes coal reception from car dumpers, its piling by quality, mixing and shipping to sea craft. Coal is laid-up using stackers. Depiling and shipping to a ship is performed by reclaimers.

According to handling variant approved in the project, coal storage dimensions are 260.0 x 765.0 m. Width of the area is enough for four lines of piles 50.0 m wide each, three subfloor roads for stacker and two for reclaimers (see paragraph 1.1).

Ground storages of bulky goods are the most intensive dust sources caused by wind erosion. This source is the most complicated to rate the discharge, evaluate environment impact and fight the dust.

The size of dust particle that discharges into the atmosphere is usually less than 10 μm. Large particles get on the ground right away or sedimentate from air for the short time. Minute particles of mineral dust in free condition as aerosol pollute air generally near discharge sources and for the short time, but do damage.

Sum of dust and coal discharge during its storing and storage formation is taken into consideration in source 27.

Bulldozers, automatic loaders and other transshipping equipment participating in the technological process are the sources of exhaust gases. Basic components of exhaust gases produced by diesel engines are nitrogen oxides, sulfur dioxide, hydrocarbon, carbon monoxide and soot (source 30).

Ship Loading Machine

Ships will be loaded by two mobile rotary loading machines equipped by telescopic unloading chutes that ensure precise transfer of coal into cargo holds lowering dust level (sources 28 and 29). Loading machine performance is 3500 tons/hour.

Project considers discharge sources in service and support area.

For independent operation of handling complex, project includes construction of several supporting objects providing the operation of primary objects.

Heat supply will be 2 kW "Termax" boiler installation consisting of two container-type units. Installation runs on summer and winter diesel fuel.

Thermocontainer specifications are the most advanced both technically and ecologically. Implementation of modern burning system decreases specific fuel consumption that leads to decrease of furnace gas volume and contaminant concentration.

Furnace gas is carried off the boils by gas flue and 30 m high funnel with 600 mm diameter (source 31). Furnace gas produced by burning of diesel fuel contains nitrogen oxides (nitrogen oxide and dioxide), sulfur dioxide, carbon monoxide, soot.

Automated diesel power station with one 600 kW generator will provide electric power to handling complex objects in case of centralized electric system failure and for emergency control and automation system lightning. Diesel generator discharges are treated as emergency (source 32).

Ready storage of fuel for boiler installation and diesel generator consists of two elevated tanks with 23 m^3 capacity each and stores fuel for 10 days of operation. Fuel is shipped by auto transport and flows into the tank by gravity. Maximum amount of fuel vapor that contains benzol, sulphuretted hydrogen and hydrocarbon discharges into air during tankage. (source 33)

Treatment facilities of the surface run-off from the 'Mechanic' boiler-house territory are a source of hydrocarbons emission into air (source 34).

To support the coal cars' unfreezing plants in winter, a liquefied gas (propane – butane) warehouse is provided for. Liquefied hydrocarbons are delivered to the complex in special cylinder containers of 21 m^3 in capacity and numbering 16 units. The largest hazard comes from presence in gas of an odorant (ethyl mercaptan). Leaks from stop valves and regulating fittings, flanges are the source of gas emission to the atmosphere (source 35). The treatment facilities of surface run-off from the tank battery are a source of release of hydrocarbons (source 36).

The *garage* is provided for vehicles, cleaning and mobile fuel-handling machines ensuring operation of the main and auxiliary complex facilities. Vehicle engines running using diesel fuel discharge nitrogen oxides, sulfurous anhydride, carbon oxide, hydrocarbons, soot into air (source 37). Same contaminants come at the entrance and exit of vehicles to and from the *maintenance station* and repair shop, also to and from the *parking lot* for 18 vehicles (sources 38, 39).

The *treatment facilities for the rainfall run-off* from the parking lot (typical design 503-6-9.86) comprise a rainfall run-off sump tank, gasoline and oil accumulation well (source 40). The surface of tanks is completely covered. There are similar treatment facilities in the liquefied hydrocarbons tanks' ground. Leaks from the treatment facilities via which hydrocarbons enter the atmosphere are a source of contamination of atmosphere.

Household sewage from the buildings and facilities of the service and attendant zone enter via a closed network into the sewage pumping stations and further to the *full biological purification facilities* E-50.

The source of atmospheric air contamination is the gas generated in the course of anaerobic stage of waste waters treatment in the anaerobic reactor. Gas containing nitrogen oxides, ammonia, hydrogen sulphide, carbon oxide, methane comes from the reactors into atmosphere via leaks in the reactors' floors (source 41).

Transport ships

In all berths under construction or reconstruction, pursuant to the sea ports technological design regulations (RD 31.3.05-97), it is provided to install electric stations to connect ships to the shore network. During handling operation, the carriers in the berth are connected to electric stations. There are no emissions of contaminants from engine operation.

The demand in services of harbor fleet ships will be satisfied through the existent division in the Vanino port.

To prevent dust accumulation in the coal handover stations, the following explosion-proof dust filtration units are used:

Car Dumper:

- dust filtration units for cleaning the zones of circular car dumper into under-car hoppers, which have the flow rate of 100,000 m^3/hr (sources 1, 2), cleaning efficiency being 95-99%;

- dust filtration units for cleaning the zones of re-loading from hoppers onto covered conveyers, the flow rate being 11,200 m^3/hr and cleaning efficiency being at least 95% (sources 3, 4);

Re-loading Stations:

- dust filtration units for cleaning the zones of re-loading from one conveyer into another, the flow rate being 15,000 m^3/hr and cleaning efficiency being at least 95%.

The qualitative and quantitative composition of contaminating emissions are determined according to the input of the technological part of the project, also in accordance with the effective nature conservation regulatory documents.

In connection with different technological solutions taken in the project to abate dust emissions during winter and summer time, different emission values have been produced. The calculation of scattering during winter takes into account operation of aspiration systems – organized, point sources of emissions Nos. 1-20. Scattering during warm season was calculated based on the assumed absence of a functioning aspiration system with regard to intensive coal wetting at the warehouse and all re-loading nodes – non-organized dust-emission sources.

The quantitative value of dust emissions for the warm and cold seasons is given in table 7.

Table 7. Characteristics of Coal Dust Emissions from Main Re-loading Nodes

Re-Loading Node Name	Basic Characteristics	Source No.	Maximum Emission Per Second		Gross Emission ton/year
			Winter, g/sec	Summer, g/sec	
Car Dumper	Throughput 3500x2 ton/hr 12,000,000 ton/year	1, 2*	0.0408333	0.0233334	0.162
Car Dumper Re-Loading	Throughput 3500x2 ton/hr 12,000,000 ton/year	3, 4	0.0408333	0.0233334	0.162
Re-Loading Stations PS1	Throughput 7000 ton/hr 12,000,000 ton/year	5, 6	0.0408333	0.0233334	0.162
PS2	Throughput 7000 ton/hr 4,000,000 ton/year	7, 8	0.0408333	0.0233334	0.054
PS3	Throughput 7000 ton/hr 4,000,000 ton/year	9	0.0816667	0.0233334	0.0108
PS4	Throughput 7000 ton/hr 2,000,000 ton/year	10, 11	0.0408333	0.0233334	0.027
PS5	Throughput 7000 ton/hr 6,000,000 ton/year	12, 13	0.0408333	0.0233334	0.081

PS6	Throughput 7000 ton/hr 2,000,000 ton/year	14, 15	0.0408333	0.0233334	0.027
Central PS	Throughput 7000 ton/hr 12,000,000 ton/year	16, 17	0.0408333	0.0233334	0.162
PS8	Throughput 7000 ton/hr 2,000,000 ton/year	18	0.0816667	0.0233334	0.054
PS-9	Throughput 7000 ton/hr 12,000,000 ton/year	19, 20	0.0408333	0.0233334	0.162
Band Conveyor KL5	Dimensions 825x1.6	21	0.66528	0.9504	11.988726
KL6	Dimensions 810x1.6	22	0.326592	0.046656	5.885375
KL7	Dimensions 830x1.6	23	0.334656	0.047808	6.030692
KL8	Dimensions 810x1.6	24	0.326592	0.046656	5.885375
KL9	Dimensions 830x1.6	25	0.669312	0.95616	12.061385
KL15	Dimensions 825x1.6	26	1.008	0.156	18.353952
Coal Pile, Re-Loading Nodes (Stacker, Re-claimer)	Storage Dimensions 765x200, 14000 ton/hr	27	4.42112	2.21056	168.43161
Ship Hold, Ship Loading machine	Throughput 12000 ton/hr	28, 29	0.816667	0.0116667	0.576

* Emission values from one source

Based on the design data and emission calculation outcome, presence of 15 contaminants was determined in emissions from the main facilities of the complex being designed. Five substances (subject to emergency diesel power station functioning) form 6 groups of summations:

- ammonia and hydrogen sulphide;
- ammonia, hydrogen sulphide, and formaldehyde;
- nitrogen dioxide and sulfurous anhydride;
- sulfurous anhydride and hydrogen sulphide;
- hydrogen sulphide and formaldehyde.

The list of contaminants present in the emissions from sources is given in table 8.

Table 8.
List of Contaminants Emitted into Atmosphere

Code	*Contaminant*	*Criteria Used*	*Criteria Value, mg/m3*	*Hazard Class*	*Contaminant Emission, g/sec*	*Contaminant Emission, ton/year*
1	2	3	4	5	6	7
0301	Nitrogen (IV) Oxide (Nitrogen Dioxide)	MPC m/r	0.085000	2	1.9422671	11.311494
0303	Ammonia	MPC m/r	0.200000	4	0.0002917	0.009198
0304	Nitrogen (II) Oxide (Nitrogen Oxide)	MPC m/r	0.400000	3	0.3156080	1.837790
0328	Black Carbon (Soot)	MPC m/r	0.150000	3	0.4513723	7.257109
0330	Sulfur Dioxide	MPC m/r	0.500000	3	0.8469170	15.362784
0333	Hydrogen Sulphide		1.000000	1	0.0000725	0.000767
0337	Carbon Oxide	MPC m/r	5.000000	4	2.9889682	7.949073
0410	Methane	OBUV	50.00000	0	0.0044440	0.140029
0703	Benz(a)pilene (3,4-Benzpilene)	MPC s/s	0.000001	1	0.0000020	0.000001
1325	Formaldehyde	MPC m/r	0.035000	2	0.0200000	0.005000
1728	Ethanethiol (Ethyl Mercaptane)	MPC m/r	0.000050	3	0.0000074	0.000002
2704	Petroleum Benzine	MPC m/r	5.000000	4	0.0560647	0.040760
2732	Kerosene	OBUV	1.200000	0	0.1962716	0.094045
2754	Saturated Hydrocarbons C12-C19	MPC m/r	1.000000	4	0.5027851	0.139817
2909	Inorganic Dust: up to 20% SiO2	MPC m/r	0.500000	3	8.8132182	231.949115
Total Substances: 15					16.1382898	276.096984
Including Solids: 2					9.2645905	239.206224
Liquid/Gaseous: 13					6.8736993	36.890760

Calculation of contaminants' scattering in the atmospheric air was done within the project using the uniform air pollution calculation software "Ecolog" developed by NPO "Integral" (Saint Petersburg). The program implements the method of calculating concentration in atmospheric air (OND-86) developed by the Central Geophysical Observatory named after Voejkov and agreed with the USSR Ministry of Health. The method of calculation allows sanitary and hygienic assessment of the level of surface air pollution with harmful contaminants.

The calculation of contaminants scattering in the atmosphere is done based on the input including:

- the list of contaminants (table 8);
- the parameters of emissions obtained based on the calculations performed;
- meteorological characteristics and coefficients determining the conditions for contaminants scattering in the atmosphere;

- the general layout scheme of the designed project with emission sources marked thereon;
- the location map including the marked regulatory sanitary protective zone (fig. 2);

- the maximum permissible single concentrations (MPC) of contaminants taken in accordance with the hygienic regulations GN 2.1.6.1338-03, and approximate safe levels of impact (OBUV) of contaminants in the atmospheric air of populated areas GN 2.1.6.1339-03;
- permitted contribution into atmosphere pollution in the location area of the coal terminal in Muchke bay issued by Rostekhnadzor for the Khabarovsk Krai (see section 1.2);
- computation rectangle of 2900 x 2800 in size covering the affected zone (0.05 MPC) of emission sources, the coordinate grid step being 200 m (not exceeding the size of the sanitary protective zone);
- enumeration of wind directions by 1 degree at worst meteo conditions.

The calculation produced the values of surface concentrations in the nodes of the computation rectangle based on which values it is possible to assess the level of pollution with this contaminant or other. In case the obtained concentrations in the computation grid nodes do not exceed the established share of concentrations, emissions of these contaminants are proposed as the maximum permissible emissions.

Location of the computation points is marked on the location map (fig. 2).

Scattering was calculated for the summer and winter periods. This is due, firstly, to different conditions under which coal dust enters the atmosphere in summer and winter (sources Nos. 1-29).

The calculation produced the values of surface concentrations in the nodes of the computation rectangle based on which values it is possible to assess the level of pollution with this contaminant or other.

For convenience of surface concentrations analysis, the calculation of scattering included additional computation points at the border pf regulatory sanitary protective zone and industrial zone of settlement Vanino beyond the sanitary protection zone of the port.

As a result of calculations of the air environment pollution, concentrations of harmful contaminants in the surface air created by emissions from the enterprise in case of dangerous wind velocities were obtained, together with coordinates of these concentrations, also the isolines of air pollution with harmful substances as shares of MPC.

The scattering calculation results show that the highest level of concentrations is observed for coal dust and the ground of substances combining nitrogen dioxide and sulfurous anhydride.

Coal Dust

In winter, due to the absence of wetting at the re-loading nodes, coal dusting is the most intensive.

In total, 29 sources of coal dust emission are identified. The calculation of surface concentrations took into consideration the maximum throughput of all re-loading nodes and the largest coal pile area. Under these conditions, the concentration formed at the border of the sanitary protection zone varies in winder between 0.25 to 0.1 MPCmr*. The in the operation area, concentration makes 1.15 mg/m^3, which makes 0.28 MPCrz** (MPCrz=4mg/m^3). Outside the sanitary protective zone, the level of concentration mostly does not exceed 0.2 MPC. The level of contamination with coal dust is determined by

* MPCmr is the maximum single permissible concentration limit

** MPCrz is the maximum permissible concentration in the working area

blowing from the pile (source No. 27). The table below gives the sources contributing most of all.

Table 9.
Sources Making the Largest Contribution to Air Contamination (in Winter)

Code	Substance	Maximum Design Concentration (Share of MPC)	Source	Workshop	Contribution %	Point No.
1	2	3	4	5	6	7
2909	Inorganic Dust	0.2400	0027	Coal Storage	62.5	1
2909	Inorganic Dust		0025	KL-9	8.33	1
2909	Inorganic Dust		0021	KL-5	8.33	1
2909	Inorganic Dust	0.220	0027	Coal Storage	68.18	2
2909	Inorganic Dust		0025	KL-9	9.09	2
2909	Inorganic Dust	0.20	0027	Coal Storage	65.0	3
2909	Inorganic Dust	0.1500	0027	Coal Storage	66.67	4
2909	Inorganic Dust	0.180	0027	Coal Storage	66.67	5
2909	Inorganic Dust	0.1300	0027	Coal Storage	53.85	5

In summer, during the period of maximum coal wetting at all re-loading nodes and at the pile itself, the dusting level falls down more than twice. The maximum concentration in the operation area does not exceed 0.575 mg/m3 (0.14 MPCrz). At the border of the established sanitary protective zone, dust concentration is within the range of 0.1 MPC. The level of contamination is still determined by dust blowing from the pile (source No. 27, see table 10).

Table 10.
Sources Making the Largest Contribution to Air Contamination (in Summer)

Code	Substance	Maximum Design Concentration (Share of MPC)	Source	Workshop	Contribution %	Point No.	Point Coordinates	
							X	Y
1	2	3	4	5	6	7	8	9
2909	Inorganic Dust	0.100	0027	Coal Storage	80	1	-1170	-620
2909	Inorganic Dust	0.080	0027	Coal Storage	87.50	2	-1170	-150
2909	Inorganic Dust	0.070	0027	Coal Storage	85.71	3	-1060	280
2909	Inorganic Dust	0.060	0027	Coal Storage	83.33	4	-820	950
2909	Inorganic Dust	0.070	0027	Coal Storage	71.43	5	-600	950

The concentrations summation group combining nitrogen dioxide and sulfurous anhydride reaches the highest concentration value. At the border of the sanitary protective zone, the concentration exceeds 0.1 MPC. The level of contamination in winter is determined by the emissions from the boiler house.

Existence of emissions from the emergency diesel power station aggravates the situation of scattering of the group of substances under discussion. In the part of the sanitary protective zone close to the diesel power station, the concentrations reach 0.5 MPC.

Concentrations of other substances and produced summations groups do not exceed 0.1 MPC at the border of sanitary protection zone in case of worst meteo conditions (see table 11).

Table 11
Design Concentrations of Contaminants in Check Points

Code	Substance	Contribution	Concentrations (Share of MPC)		
			At Border of Sanitary Protective Zone	Outside Sanitary Protective Zone	Maximum Concentration at Check Points
1	2	3	4	5	6
301	Nitrogen Dioxide	0.2	0.09	0.04	0.22
304	Nitrogen Oxide	0.2	0	0	0.01
328	Soot	0.2	0.02	0.01	0.08
330	Sulfur Dioxide	0.2	0.02	0.02	0.05
333	Hydrogen Sulphide	0.2	Calculation is not expedient		
337	Carbon Oxide	0.2	0.01	0	0.04
410	Methane	0.2	Calculation is not expedient		
703	Benz(a)pilene	0.1	0		
1325	Formaldehyde	0.2	0		
1728	Ethanethiol	0.2	0		0.03
2704	Petroleum Benzine	0.2	Calculation is not expedient		
2732	Kerosene	0.2	0		0.01
2754	Hydrocarbons	0.1	0		
2909	Inorganic Dust	0.25	0.24	0.13	2.3
6009	The sum of Nitrogen Dioxide and Sulfur Dioxide		0.12	0.05	0.27

It should be noted that the predominant wind direction in summer is northwest (16.76%). So, contamination will be crabbed to the Muchke bay water area. Unfavorable wind direction, which is southeast, amounts to 10.79%.

During the cold season (from December till April), contaminating admixtures, north (14.5%) and northwest (32.24%) winds being predominant, will move towards the water area. In case of these directions of winds, contamination in the settlement will be reduced to minimum for all admixtures.

4.3 ASSESSMENT OF WATER CONSUMPTION, WATER DRAINAGE, AND IMPACT ON MUCHKE BAY WATER AREA

It is planned to provide the coal complex “Vanino Bulk Terminal” with drinking-quality water from the underground water-supply source in the Muchke River valley including connection to two water pipelines in the area of the second lift station. From the connection point to the complex territory, the water pipeline will provisionally go as two lines, within the complex territory the water pipeline is closed loop. Due to extensive length of the network from the connection point to the complex territory, it is provided for arranging two step-up pumping stations in the water pipeline network outside the site and within the complex territory. A combined water supply system is provided for to cover the domestic and drinking, production, and fire protection purposes. Direct and re-circulating water supply schemes are used. Water re-circulation is projected at the vehicle wash and in the car dumper building.

The total volume of water consumption is 400.752 thousand m^3/year, of them for *production needs thousand m^3/year*:

- Process needs (coal wetting at the storage, re-loading stations, galleries, snow production)- 352.0;
- Make-up of re-circulation system in the car dumper building- 14.24;
- Boiler house operation— 15.6;
- Vehicle wash (make-up of re-circulation system) — 1.16;
- Treatment facilities — 0.046;
- Other needs — 38.305

personnel's household needs, thousand m^3/year:- 17.706

At the entrance of water pipelines into the buildings, it is provided for arranging water-metering nodes with pressure regulators and flow meters.

Water consumption for the process needs is based on the data from the German supplier of the heap sprinkler equipment. The sprinkler system is designed to prevent dust accumulation over heaps. To this end, rotating sprinkler units are installed around the heap to provide foe heap surface wetting. The equipment parameters are set so that at the start of the system only one unit is triggered. After a certain water volume has been passed, the next unit is triggered following the program. With the help of the position identification system, sprinkler units in each working area can be switched off automatically. Using the control device, one can program different operation modes of the whole sprinkler equipment. Wetting is performed during the warm season. According to specialist calculations, the volume of water required for wetting will make 239.2 thousand m^3/year, 1060 m^3/day (maximum in summer).

In order to reduce coal piles dusting during winter in the absence of natural sediments, their whole surface is covered with artificial snow and rolled with bulldozer. To produce artificial snow, SUFAG equipment is taken. Water is fed to the snow gun under pressure. Depending on the pump motor power, water may be delivered to a different height. Plant productivity is up to 90 m^3 of snow per hour. Gum productivity may vary depending on air temperature. The gun may be wheel or sledge mounted. Snowing starts after frosts become stable in the absence of sediments. Thereafter, snow will be added from time to time in the areas where the cover is damaged. The required volume of water will make 112.8 thousand m^3/year, 1440 m^3/day.

Water consumption in the boiler house is made of single filling and makeup of the system. The total consumption of making-up water in similar boiler houses of the same power amounts to 2.4 m^3/hr. The boiler house runs 24 hrs/day; operation period is 365 days/year. Water consumption in the boiler house is 24*2.4=57.6 m^3/day, 15.6 thousand m^3/year.

At the vehicle wash, a water re-circulation system is provided for using purified water. Fresh water consumption is taken equal to 10% of the wash water volume and amounts (according to the typical design data) to 4.45 m^3/day, 1.157 thousand m^3/year.

In the car dumper building, water is used for cooling the bearings of ventilation plants, in the hydro de-dusting aspiration installations, for hydro cleaning. Water consumption is taken in accordance with the typical design data. For the purposes of saving water, the design provides for a water re-circulation system. After clearing at precipitation tank, water is fed to the hydro cleaning water pipeline. Making-up water consumption amounts to 39 m^3/day, 14.24 thousand m^3/year. The hydro cleaning system consists of a network of

pipelines with electrified gates, drainage chutes and collection reservoir pits fitted with pumps.

Water consumption for the needs of the biological treatment plant "Vodolei", pursuant to the design data, makes 0.125 m^3/day, 0.046 thousand m^3/year.

Territory wetting is performed during warm season on rainless days. The area of improved coatings is 6750 m^2, designed water consumption is 0.4 l/m^3. Lawns area is 500 m^2, designed water consumption is 3 l/m^3. Water consumption will amount to: 0.0004*6750 + 0.003*500 = 3.57 m^3/day.

Household needs are consumptions in showers and sanitary-hygienic needs according to regulations as per each employee. Shower grids are installed in the administrative building, repair and mechanic workshops, garage. Calculation of water consumption for sanitary needs was done with regards to shift-based schedule of work and number of working days. In aggregate, the household needs, including 10% of unaccounted consumption, make: 17.706 thousand m^3/year, 51.161 m^3/day.

For fire extinguishing purposes, it is provided for using water from the common water-supply system. The largest water consumption for the said needs is 78.8 l/sec. The internal fire extinguishing of conveyors' galleries is provided with automatic water-air system equipped with drencher jets. The feeding and distribution pipelines are laid in dry pipes; an electric gate is installed at the entrance that is triggered from the mounted fire alarm sensors.

Water Drainage

At the projected enterprise, the following categories of wastewaters are produced:

-household waste waters;
-surface run-off fro the territories.

Industrial wastewaters are not produced. The design of the vehicle wash place and the car dumper's unloading device include local treatment facilities with re-circulation water supply systems.

Household wastewaters from the buildings and facilities of the administration and auxiliary services go via a closed network into the sewage pump station designed following the typical design 902-1-132.88 and further to the treatment facilities of complete biological purification having the throughput of 50 m^3/day.

The flow rate of household wastewater coming for purification makes 17.706 thousand m^3/year, 51.161 m^3/day. After purification, wastewaters are discharged into the sea (Muchke bay) as one combined discharge – outlet No. 1.

For the building of the pumping and filtration station, re-loading station, maintenance post, car unloading complex control unit, which are located at a considerable distance from the treatment facilities of completed biological purification, a household sewage system is designed with wastewater export to "Vodolei"-type treatment facilities. The volume of wastewaters does not exceed 1 m^3/day, 365 m^3/year. After treatment, wastewaters are discharged into the sea via the designed outlet No. 2.

Contaminated surface run-off from the coal complex production territories undergoes treatment at local treatment facilities and is exported via storm manifolds into the sea through outlets Nos. 1 and 2.

The aggregate volume of wastewaters discharged into the sea makes: outlet No. 1 – 62.549 m^3/hr, 19.364 thousand m^3/year; outlet No. 2 – 138.042 m^3/hr, 57.421 m^3/year.

In accordance with the output parameters of treatment facilities, the following concentrations of contaminants at wastewaters outlets Nos. 1 and 2 are taken:

1.Outlet No. 1

-BOD, total – 4.46 mg/l
-suspended substances – 4.8 mg/l;
-ammonia nitrogen – 0.5 mg/l;
-nitrites – 0.02 mg/l;
-nitrates – 9.1 mg/l;
-phosphates – 0.2 mg/l;

-petroleum products – 0.035 mg/l.

2.Outlet No. 2

-BOD, total – 3.0 mg/l
-suspended substances – 7.2 mg/l;
-ammonia nitrogen – 0.35 mg/l;
-nitrites – 0.015 mg/l;
-nitrates – 7.5 mg/l;
-surface-active agents – 0.025 mg/l;
-petroleum products – 0.05 mg/l;

Calculations of maximum permissible concentration of contaminants in wastewaters have been made.

With regard to the performed calculations, suggestions have been made concerning establishing the permissible limits of contaminants discharge with wastewaters into Muchke bay. (table 12).

Table 12

Design Indices of Permissible Limits of Contaminants Discharge into Muchke Bay

Wastewater Composition Indices	Wastewater Flow Rate, m^3/hr	Concentration of Contaminants, g/m^3	Permissible Limit of Contaminants Discharge, g/hr
Outlet No. 1			
BOD, total	62.549	4.46	278.969
Suspended Substances	62.549	4.80	300.235
Ammonia Nitrogen	62.549	0.50	31.275
Nitrites	62.549	0.02	1.251
Nitrates	62.549	9.10	569.196
Phosphates	62.549	0.20	12.510
Petroleum Products	62.549	0.035	2.189
Outlet No. 2			
BOD, total	57.321	3.0	414.126
Suspended Substances	57.321	7.2	993.902
Ammonia Nitrogen	57.321	0.35	48.315
Nitrites	57.321	0.015	2.071
Nitrates	57.321	7.5	1035.315
Surface-Active Agents	57.321	0.025	3.451
Petroleum Products	57.321	0.05	6.902

The project makes suggestions as to prevention of discharge of contaminated wastewaters.

Wastewaters from Ships

Petroleum-contaminated and household wastewaters from carriers at the terminal are not accepted. As carriers enter the bay, the drainage system's valves are plugged, and during riding no discharge of mold wastewaters is done.

According to MARPOL-73/78 requirements, all modern ships are equipped with special tanks (vessels) for separate accumulation of petroleum-contaminated and household sewage waters as well as with separation units providing regulatory treatment of wastewaters to the residual concentration of petroleum products not exceeding 15 mg/l. The accepted equipment allows (according to RD 31.04.23-94 "Instructions on Preventing Pollution from Ships") discharging wastewaters outside the 12-mile range.

The volume of petroleum-contaminated wastewaters is 1174 m^3/year; that of household waters – 406 m^3/year.

The mold and household wastewaters from the port fleet ships are received by mold waters collector followed by utilization and discharge of treated waters outside the 12-mile range. The volume of mold waters is 21.8 m^3/year; that of household waters – 119.7 m^3/year.

Impact on Muchke Bay Water Area During Hydro-Engineering Operations

- Hydro-engineering operations comprise:
- erection of a shore-line protection dike;
- bottom-deepening operations for bases of facilities;
- erection of hydro-engineering structures.

The root structure of trestle is inaccessible for swimming devices due to shallow waters. Hence, dike filling from the shore by a pioneer method is envisaged.

Delivery of rock by dump trucks shall be done from shore excavations. Filling will be done using high-quality soil containing not more than 5% of fine argillaceous particles in terms of volume. It is not allowed to use soils containing water-soluble sulfuric salts and organic particles in excess of 5% of the weight of dry mineral part of soil. Rock is protected directly after filling with reverse detritus filter and covered with stone weighting 1-1.5 ton in order to avoid washing out by stream and rough sea. Dike length is 95 m, its width is 10 m. The dike head reaches the level of minus 4.5 m. The water area allocated for the dike is 0.78 hectare. The dike is designed for installation of supports for the conveyor gallery in shallow waters and their protection from the action of waves and ice.

Soil removal and bottom smoothing for the supports of hydro-engineering structures shall be done with a specialist grab gear. The area of bottom-deepening operations for hydro-engineering facilities (berth and access pier) will make 0.8955 hectare. The volume of excavated soil will be 6710 m^3. During dike filling and bottom deepening, a turoid cloud will be temporarily generated.

The *berth facility* represents a stationary berth connected with the shore with a pier of 250 m in length. The optimal design of such extended facility is a bridge-type design, the basic elements of which are supports and span structures. Supports for the span erections of the motor road arranged at the depth of over 4.5 m represent an underwater fundamental block in the form of a reinforced concrete massive giant with rigidly embedded steel tubes of 1420 m in diameters filled with reinforced concrete. On the tube heads, cast reinforced concrete cross beams are installed on which the span structures are mounted.

The *berth part* of the pier is made as a common for both berths dray of 240 m in length and 20 m wide, along which ship-loading machines move along rails of 16.0 m gauge, and two detached mooring pawls. The dray rests on six detached supports mounted with a step of 48.0 m, which are also used as baffle and mooring pawls. The supports used for the dray

represent a reinforced concrete massive giant, into two sections of which two tubes of 2.0m in diameters are cast. The distance between tubes is taken equal to the ship-loading machine rail gauge – 16.0 m. On top of the tubes, a reinforced concrete crossbeam is arranged, onto which the dray rests. No other materials different from steel and concrete are applied in the structures contacting water. Impact on the water environment at this stage of works is minimal.

As a result of berth and pile operation, the sea area is taken away during installation of supporting elements: the pier – 0.817 hectare; the berth part – 0.3896 hectare.

So, the temporary impact on the water environment as a turoid cloud occurs during dike filling and excavation of pits for the berth and pier enclosures. The area of bottom-deepening operations is: S=0.8955 hectare. The total taken away sea area is 1.2513 hectare.

4.4 GENERATION, REMOVAL, AND NEUTRALIZATION OF PRODUCTION AND CONSUMPTION WASTE

The waste generation sources are the production facilities of the coal complex, treatment facilities, maintenance and garage unit, power unit (boiler-house), the administrative and domestic building.

Waster from carriers at the coal complex are not taken.

The mode of re-loading complex operation is round-o-clock, all the year round. The schedule of work of the administrative and management personnel and employees of the maintenance and garage unit is one shift, five days a working week.

The total number of re-loading complex employees is 334 persons, the mean daily number of working is 266 people.

The *coal complex production facilities* include: the berth front, car-dumping complex, coal storage warehouse, re-loading stations. During re-loading operations, waste is generated as dust caught in the aspiration system bins. The re-loading coal complex personnel are provided with special clothes. Based on this, the following waste has been taken into account: *coal dust, soiled textile (special clothes and footwear), working leather footwear that lost its consumer properties*.

The most versatile waste is generated at the treatment facilities designed for treating wastewater from hydro washing in the car dumper building, surface waters from the coal storage, petroleum-contaminated wastewaters, household wastewater.

Treatment of runoff from the cola storage is done in the regulatory sump and at the pumping filtration station where the filtration material is regularly flushed to restore the properties. Filling has a long service life therefore it is not taken into consideration in calculation of the waster generation norms. The treatment process is accompanied *by generation of waste (precipitation) during treatment wastewater not included in other items (precipitation from the sump*). Precipitation consists mostly of coal particles.

In the car dumper building, a re-circulation water supply system is provided for. Contaminated waters from hydro washing are purified by settling in three pits (sumps) located in the building, as a result, *waste (sediment) is produced during treatment of wastewaters not included in other items (sediment from the sump*).

To purify the surface run-off from the territory of the reservoir of liquefied hydrocarbon gases, treatment facilities are provided for, which have been developed by NPP “Polychim”. The treatment facilities include three wells. In the first well, there is the settlement area and mechanic filter (mechanic treatment cartridge with mineral wool). The second well has a sorption filter filled with MAT-brand coal. The third well is control with a regulatory pipe. Coal service life is 5 years. Mineral wool operation period until replacement is not less than 2 months of continuous operation. Petroleum products coming with wastewaters are absorbed by mineral wool. As a result of treatment facilities’ operation, the waste is produced: *worked out filtration and absorption masses contaminated with dangerous substances (mineral wool contaminated with petroleum products), used coal filters contaminated with dangerous substances (the content of petroleum products is not less than 15%), waste (sediments) during treatment of wastewaters not included in other items (sediments from rainfall waters treatment facilities*).

To purify the surface run-off, the treatment facilities for petroleum-containing wastewaters PKF “Mechanic” are also used, which have the productive rate of 5 l/sec, and local treatment facilities made according to TP 503-6-9.86.

The fully prepared at factory treatment facilities PKF “Mechanic”, Saint Petersburg, comprise: a coalescence separator and sorption filter. Based on the functional features, they can be divided into three parts: the sump, the coalescent separator, and the sorption filter.

As sorbent, fibroil is used. This material can be regenerated by simple soaking and does not go into waste.

During operation of PKF “Mechanic” treatment facilities, *a floating film from oil-recovery units (caught petroleum products) and waste (sediment) during treatment of wastewater not included in other items* (*sediments from rainfall waters treatment facilities)* are produced.

Local treatment facilities designed according to the typical design 503-6-9-86 consist of a sump, a well with a filter, and a black oil recovery well. Floating petroleum products in the sump are exported via a pipeline into the black oil recovery well. Solid particles settle in the sump and produce sediment. Water afterpurification is done in the well with filter. As the filtering filling, hydrophobic claydite is used. Used claydite is subjected to regeneration and subsequent use, hence, the filtering filling does not go into waste.

During operation of local treatment facilities (TP 503-6-9.86), the following waste is also produced: *a floating film from oil-recovery units (caught petroleum products) and waste (sediment) during treatment of wastewater not included in other items* (*sediments from rainfall waters treatment facilities).*

Vehicle washing ground is equipped with a re-circulation water supply system with treatment facilities similar to the typical design 503-1-21c.83. Wastewater treatment process of accompanied by production of *a floating film from oil-recovery units (caught petroleum products) and waste (sediment) during treatment of wastewater not included in other items* (*sediments from rainfall waters treatment facilities).*

To purify *household wastewaters*, the project provides for biological treatment facilities: household wastewater treatment station E-50 having the throughput of 50 m^3/day, and “Vodolei” plant having the throughput of 1 m^3/day. In the course of wastewater purification, *waste (sediment)* is produced *during mechanic and biological purification of wastewaters*.

In the maintenance and garage unit designed for repair of machines and vehicles (24 units), the following waste is generated: *worked vehicle oils, worked non-disassembled lead accumulators with electrolyte poured out, waste salts (slurry after electrolyte neutralization), waste solid production materials contaminated with petroleum and oil mineral fat products (used oil filters), cleaning tissues contaminated with oils (oils content is 15% and over), unsorted scrap ferrous metals, used tires*.

In the power unit comprising two thermal containers from “Termax”, a diesel generator from “Caterpillar”, and two surface reservoirs of 25 m^3 capacity each, the following is generated in the course of operation: *slurry from cleaning the pipelines and vessels from petroleum and petroleum products; cleaning tissues contaminated with oils (oils content is 15% and over).*

In the building of the administrative and household complex accommodating sanitary household premises, first-aid post, production canteen, offices of the administration and management personnel, state services and controlling bodies, as well as auxiliary premises, and in the coal complex territory, utility waste is generated*: unsorted garbage from household premises of organizations (except for bulky), unsorted waste food from kitchen and catering organizations, mercury lamps, used fluorescent mercury-containing tubes, medicinal waste, waste of consumption at production facilities similar to utility (swept from the enterprise territory), waste (sediment) from cesspools, and household wastewater (sewage slurry)*.

The list and characteristics of waste generated at the enterprise are given in table 13. Waste codes are determined in accordance with the Federal Classification Catalogue of Waste (FKKO) approved by order No. 786 RF Ministry of Natural Resources dated 02.12.2002 and addendum to FKKO issued by the RF Ministry of Natural Resources No. 662 dated 20.07.2003.

Table 13
List, Physical & Chemical Characteristics, and Composition of Generated Waste

No.	Waste Type		Technological Process		Hazard Class	Physical & Chemical Characteristics		
	Description	FKKO Code	Description	Code		Aggregate State	Solubility	Waste Composition
	2	3	4			7	8	9
1	Mercury lamps, used fluorescent mercury- containing tubes	353 301 00 13 01 1	Indoor and outdoor lighting		1	Finished product the has lots its consumer properties	Non-soluble	Mercury, glass
2	Floating film from oil-recovery units (caught petroleum products)	546 002 00 06 03 3	Treatment of petroleum-containing wastewaters at local treatment facilities		3	Emulsion	Non-soluble	Petroleum products, water
3	Used filtration and absorption masses contaminated with hazardous substances (mineral wool contaminated with petroleum products)	314 800 00 00 00 0	Treatment of wastewater at NPP “Polychim” treatment facilities		3	Solid	Non-soluble	Petroleum products, mineral wool, water
4	Used vehicle oils	541 002 02 02 03 3	Maintenance of vehicles, diesel generator		3	Liquid	Non-soluble	Oil
5	Used lead accumulators, not disassembled, with electrolyte poured out	921 101 02 13 01*3	Maintenance of vehicles		3	Finished product the has lots its consumer properties	Non-soluble	Lead, plastic, ebonite
6	Waste solid production materials contaminated with petroleum and mineral fat products (used oil filters)	549 030 00 00 00 0	Maintenance of vehicles		3	Finished product the has lots its consumer properties	Non-soluble	Petroleum products, textile
7	Cleaning tissues contaminated with oils (oils content is 15% and over)	549 027 01 01 03 3	Repair and maintenance of machinery and equipment		3	Fiber	Non-soluble	Petroleum products, mechanic admixtures, textile
8	Slurry from cleaning pipelines and tanks from oil and petroleum products	546 015 00 04 03 0	Cleaning of fuel tanks		3	Slurry	Non-soluble	Petroleum products, mechanic admixtures
9	Used coal filters contaminated with hazardous petroleum products (the content of petroleum products is less than 15%)	314 802 00 00 00 0	Replacement of coal filter at treatment facilities		4	Loose	Non-soluble	Petroleum products, activated carbon, mechanic admixtures

10	Waste (sediments) during mechanic and biological purification of wastewaters	943 000 00 00 00 0	Operation of household wastewater treatment facilities		4	Paste-like	Non-soluble	Stabilized silt, mechanic admixtures
11	Waste (sediment) during treatment of wastewaters not included in other items (sediment from the sump)	948 000 00 00 00 0	Treatment of wastewaters from the coal storage		4	Paste-like	Non-soluble	Coal particles, water
12	Used tires	575 002 02 13 00 4	Maintenance of vehicles		4	Finished product the has lots its consumer properties	Non-soluble	Rubber
13	Coal dust	314 021 01 11 00 4	Coal re-loading		4	Paste-like	Non-soluble	Coal dust
14	Waste (sediment) during treatment of wastewaters not included in other items (sediment from rainfall waters treatment facilities)	948 000 00 00 00 0	Treatment of rainfall run-off at treatment facilities		4	Solid	Non-soluble	Mechanic admixtures, water
15	Waste (sediment) from cesspools and household wastewaters (sewage)	951 000 00 00 00 0	Cleaning of bio-toilets		4	Paste-like	Non-soluble	Ammonia nitrogen, phosphates, organic compounds
16	Waste salts (slurry after electrolyte neutralization)	515 000 00 00 00 0	Electrolyte neutralization		4	Slurry	Non-soluble	Gypsum
17	Medicinal waste	971 000 00 00 00 0	Operation of the first-aid post		4	Solid	Non-soluble	Textile, glass, plastic
18	Soiled textile (used special clothes and footwear)	582 000 00 00 00 0	Replacement of special clothes		4	Finished product the has lots its consumer properties	Non-soluble	Textile, footwear
19	Working leather footwear that lost its consumer properties	147 006 01 13 00 4	Replacement of leather footwear		4	Finished product the has lots its consumer properties		Leather footwear
20	Unsorted garbage from domestic areas of organizations (except for bulky)	912 004 00 01 00 4	Personnel's vital activity		4	Solid	Non-soluble	Organic substances, paper, polyethylene
21	Unsorted waste food from kitchens and catering organizations	912 010 01 00 00 5	Functioning of the production area canteen		5	Paste-like	Non-soluble	Remnants of foodstuffs and meals
22	Waste of consumption at	912 000 00 00 00 0	Territory cleaning		5	Solid	Non-soluble	Paper, polyethylene

	production facilities similar to utilities (swept from the enterprise territory)							, sand, leaves
23	Unsorted ferrous metal scrap	351 301 00 01 99 5	Repair and maintenance of machinery and equipment		5	Solid	Non-soluble	Metal

Waste generated at the enterprise has solid, liquid, and paste-like form. They will be accumulated and temporarily stored in designated places. Influence on soil and emission of toxic substances into the air and rainfall run-off are eliminated.

The temporary storage and accumulation places include metal and plastic containers, tanks, grounds.

The maximum volume of temporarily stored waste within the enterprise territory will be determined by the availability of free tanks and facilities for their temporary accumulation and by their handling procedure according to the requirements of regulatory documents and instructions.

The trapped *coal dust* will be regularly collected from aspiration plant bins with a mobile aspirator and directed back to the warehouse. *Waste (sediment) during treatment of wastewaters not included in other items (sediment from the sump)* consisting mostly of coal particles will be also sent to the coal storage.

Used mercury lamps, fluorescent mercury-containing tubes will be accumulated in a separate auxiliary room. Waste generation norm is 116 pcs/year (0.037 ton/year). Used lamps will be handed over for utilization to a specialist plant in Komsomolks-on-Amur. It is recommended to perform handover every year.

The *floating film from oil-recovery units (caught petroleum products)* will be recovered at the treatment facilities made based on the analogue of TP 503-6-9.86, TP-503-1-21c.83 PKF “Mechanic”. The total accumulated waste volume with regard to water-content (60%) is 0.226 m^3.

As a rule, the capacity of treatment facilities allows collecting the regulatory quantity of settled petroleum products for more than a year. It is recommended to clean the treatment facilities once a year. Waste disposal (burning at the boiler-house) is performed after cleaning without the storage stage.

Used vehicle oils. In the routine maintenance and repair area, a well for used oil is provided for having the capacity of 1m^3. The norm of used oils generation being 0.397 m^3/year, the well’s capacity allows accumulating waste for over a year. It is recommended to burn waste at the boiler-house every year.

Used filters and oily tissues will be generated in the volume of 4.288 m^3/year. It is recommended to put two capped tanks in the garage unit, each having capacity of V=0.2m^3. Sufficient number of tanks vacation operations is: 4.288 : 0.4 = 11 times a year. Waste will be burnt at the settlement’s boiler-house that runs on coal.

Slurry from cleaning the pipelines and tanks from oil and petroleum products. Cleaning of fuel tanks will be done once every two years. The waste generation norm is 0.052 m^3 for two years. Slurry will be burnt at the settlement’s boiler-house that runs on coal.

Ferrous metal scrap will be accumulated in a special ground. The recommended regularity of waste removal to the specialist enterprise for the purpose of recycling is once a year.

Used tires will be also stores at a special ground and consumed at the enterprise as necessary without prolonged storage: for land development and as baffle means at the berth facilities.

Waste from the treatment facilities of household wastewaters will be removed by a special vehicle to the silt grounds of nearest existent treatment facilities 1 – 4 times a year in accordance with the typical design of facilities.

Sewage from bio-toilets will be handed over for treatment to the in-house treatment facilities (E-50). The estimated regularity of removal will be once every 2-3 weeks: 32:1.6=20 times. The capacity of one bio-toilet is 400 l.

Used accumulators will be accumulated in the repair and garage unit building, stacked on racks, and will be removed for treatment as they are accumulated. Waste generation norm is 7 pcs. a year.

Waste in the form of *sediment from oil-recovery unit* at local treatment facilities. Suspended substances that will come after treatment of wastewaters will be retained in a sump. The sediment accumulation zone in the treatment facilities usually allows operating treatment facilities without cleaning for over a year. It is recommended to clean oil-recovery units once a year. The general norm for generation of this type of waste is 22.431 m^3/year.

Replacement of *used coal filters contaminated with hazardous substances (the content of petroleum products is less than 15%)* will be done once every 5 years. It is recommended to burn the waste at the settlement's boiler-house running on coal.

Used filtration and absorption masses contaminated with hazardous substances (mineral wool contaminated with petroleum products). Filter will be replaces 2-3 times a year. It is recommended to burn the waste at the settlement's boiler-house running on coal.

Solid household waste, together with special clothes, footwear, swept waste, slurry from electrolyte neutralization, waste from the first-aid post, canteen, having the total volume of 280.275 m^3/year, are accumulated in 2 safety metal containers, the capacity being V=0.65 m^3 (the aggregate volume is 1.3 m^3) at a dedicated ground. The recommended regularity of waste removal for burial: 280.275 / 1.3 = 216 times, or once every other day.

Subject to observance of the production and consumption waste handling norms and rules, the time limits for their handing over for disposal and burial to the organizations having respective licenses, the waste of the planned project will not render a negative effect on the environment.

The list, characteristics, and quantities of production and consumption waste subject to disposal with regard to the waste code and toxicity class pursuant to the regional list of waste are given in table 14. The table lists all types of waste for this enterprise in the reverse order of their toxicity level.

Table 14

List and Quantities of Production & Consumption Waste Subject to Disposal

Seq. No.	Information about Waste					Waste Disposal Facilities		
	Waste Description Code acc. to Federal Waste Classification Catalogue	Hazard Class	Total Waste Per Year			Final Disposal at Municipal Disposal Dump of Solid Household Waste, Quantity	Temporary Storage at the Production Site	
			Unit of Measurement	Generation Norm As Per Design	Utilized or Neutralized Quantity		Quantity	Facility Description
1	2	3	4	5	6	7	8	9
1	Used mercury lamps, fluorescent mercury-containing tubes **353 301 00 13 01 1**	1	ton pcs	0.037 116	0.037 116 to de-mercurization	-	0.037 116	Auxiliary room
2	Floating film from oil-recovery units (caught petroleum products) **546 002 00 06 03 3**	3	ton	0.121	0.121, burning	-	Without storage	-
3	Used filtration and absorption masses contaminated with hazardous substances (mineral wool contaminated with petroleum products) **314 800 00 00 00 0**	3	ton	2.391	2.391 burning	-	Without storage	-
4	Used vehicle oils **541 002 02 02 03 3**	3	ton	0.357	0.357, burning	-	0.357	Well for used oils, 1m^3 capacity, 1 unit
5	Used lead accumulators, not disassembled, with electrolyte poured out 921 101 02 13 01 3	3	ton pcs	0.688 7	0.688 7 to recycling	-	7 pcs	Part of premises in the repair and garage unit

Table 14 (continued)

1	2	3	4	5	6	7	8	9
6	Waste of solid production materials contaminated with petroleum and mineral oil products (used oil filters) **549 030 00 00 00 0**	3	ton	0.011	0.011 burning	-	0.4 m^3	Capped tank, 0.2 m^3 capacity, 2 pcs.
7	Cleaning tissue contaminated with oils (oil content is 15% and over) **549 027 01 01 03 3**	3	ton	0.770	0.770, burning	-		
8	Slurry from cleaning pipelines and tanks from petroleum and petroleum products **546 015 00 04 03 0**	3	ton	0.098	0.098 burning	-	Without storage	-
9	Used coal filters contaminated with hazardous substances (the content of petroleum products is less than 15%) **314 802 00 00 00 0**	4	ton	0.159 once every 5 years	0.159, burning	-	Without storage	-
10	Waste (sediments) during mechanic and biological purification of wastewaters **943 000 00 00 00 0**	4	ton	3.217	3.217, removal to silt ground of treatment facilities of settlements	-	Without storage	-

Table 14 (continued)

1	2	3	4	5	6	7	8	9
11	Waste (sediment) during treatment of wastewaters not included in other items (sediment from the sump) **948 000 00 00 00 0**	4	ton	83.917	83.917, returned to the warehouse	-	Without storage	-
12	Used tires **575 002 02 13 00 4**	4	ton pcs.	2.174 65	2.174 65 re-use	-	65	Part of the ground
13	Coal dust **314 021 01 11 00 4**	4	ton 168	21.546	21.546, returned to the warehouse	-	Without storage	-
14	Waste (sediment) during treatment of wastewaters not included in other items (sediment from the rainfall treatment facilities) **948 000 00 00 00 0**	4	ton 168	24.675		24.675	Without storage	-
15	Waste (sediments) from cesspools and household wastewaters (sewage) 951 000 00 00 00 0	4	ton 168	32.000	32.000, removal to E-50 treatment facilities	-	1.6	The bio-toilet tank, 0.4 m^3 capacity, 4 pcs.

Table 14 (end)

1	2	3	4	5	6	7	8	9
16	Waste of salts (slurry after electrolyte neutralization) **515 000 00 00 00 0**	4	ton m^3	0.036 0.033	-	0.036 0.033		
17	Medicinal waste **971 000 00 00 00 0**	4	ton m^3	0.048 0.192	-	0.048 0.192	0.753 1.3	Metal container for solid household waste, 0.65 m^3 capacity, 2 pcs.
18	Soiled textile (used special clothes and footwear) **582 000 00 00 00 0**	4	ton m^3	1.837 8.442	-	1.837 8.442		
19	Leather working footwear that has lost its consumer properties **147 006 01 13 00 4**	4	ton m^3	0.012 0.079	-	0.012 0.079		
20	Unsorted garbage from domestic areas of organizations (except for bulky) **912 004 00 01 00 4**	4	ton m^3	5.825 11.651	-	5.825 11.651		
21	Unsorted waste food from kitchen and catering organizations **912 010 01 00 00 5**	5	ton m^3	58.364 77.818	-	58.364 77.818		
22	Waste of consumption at production facilities similar to utilities (swept from the enterprise's territory) **912 000 00 00 00 0**	5	ton m^3	96.194 182.060	-	96.194 182.060		
23	Unsorted scrap ferrous metal **351 301 00 01 99 5**	5	ton	14.311	14.311, for recycling		14.311	Part of ground

4.5 ASSESSMENT OF IMPACT ON SEA BIOCENOSIS

Construction of hydro-engineering facilities, bottom-deepening operations, and dam filling will lead to ousting benthos and littoral organisms living in the area of operations which may cause temporary interruption in industrial fishing in the construction area. Negative consequences for the sea water-area animals will consist in:

- temporary increase of water turbidity in the area of bottom-deepening operations and fillings;
- death of associations of bottom organisms unable to move in the work production area;
- ousting of invertebrates and vertebrates from the construction area;
- loss of fish fattening places due to part of the water area being torn away;

increased level of air and hydro-acoustic noise.

During erection of the berth facility and dam filling, all kind of fish without exception can actively avoid the work production area. Damage to fish reserves will be expresses as: death of larvae, young fish, also the forage reserve of benthophague fish in the areas torn away for supports of hydro-engineering facilities and in the bottom-deepening area, also littoral spawning ground, if any, being temporary put out of operation.

Increased turbidity caused during bottom deepening may lead to temporary decrease of the process of photosynthesis of water plants. Nevertheless, this effect will be local and sort-time and won't cause significant degradation of bottom plant associations.

Functioning of the cooling systems of ships occupied in the construction operations will be causing death of plankton due to thermal impact. Still, this action bear a purely local nature, plankton losses restore fast because it will be brought into the area of operations with currents from adjacent water area. Impact of ship mechanisms during the construction period is comparable in terms of the order of magnitude with natural conditions and won't render a significant influence on the plankton of the sea terminal location area.

After construction in the sea water-area is completed, bottom organisms usually return back to the firm soil, and new associations will not be different in their specific composition and quantities from the old ones thanks to easy adaptation of animals to movements. It usually takes 3 years for benthos associations to restore to the original condition; at that, the distorted areas are inhabited with aquatic life from the adjacent parts. The biocenosis structure (correlation of species) restores in 5-6 years.

Tearing away of sea water-area is insignificant in size and comprises shoreline dam (S=0.78 hectare) and the area occupied by the supports of the berth and pier (S=0.4713 hectare). Sloping-type design of the dam reinforced with stone fill creates favorable conditions for habitat of shoreline biocenosis. Application of sloping walls made of stone fill has been well tested and is widely used in constructing ports abroad (USA, Japan and other countries), because it improves to a certain degree the biological equilibrium of water environment (thanks to "reefing" phenomenon). The area of the underwater dam part compensates by 11% the removed for filling bottom area. After some time the surface of the underwater part of the dam and pile supports is prompt to active biofouling.

In case of intensive operation of the complex, fish will be periodically frightened during the ship servicing period.

Damage to sea aquatic life is assessed in the project cost estimates summary to amount thousand rubles and is subject to compensation in the form of compensation payments.

5. PLAN OF ENVIRONMENTAL PROTECTION ACTIONS

For the purposes of minimizing adverse impacts on the environment down to requirements of effective regulatory documents and to ensure meeting the legislative requirements, the main environmental protection actions include:

1. Implementation of atmospheric air protection actions provided for in the coal complex project under consideration.

The project suggestion protective measures allowing significant abatement of the impact of dusting sources on the environment.

To eliminate dust entrance into environment from the car dumper building during unloading of cars, it has been provided for:

-an automatic sprinkler dust-suppressing system functioning during the seasons with positive temperatures;
-an automatic aspiration system functioning during the seasons with negative temperatures;
-use of high-performance (not less than 95% efficiency) dust collecting equipment;
-dust removal in winter and washing out in summer after each shift.

At the storage areas, it is provided for:

-wetting pile with water in summer, covering with snow in winter;
-rolling coal storage with a bulldozer;
-placing part of containers in covered galleries.

At the re-loading stations, the following has been designed:

-an automatic sprinkler dust-suppressing system functioning during the seasons with positive temperatures;
-an automatic aspiration system functioning during the seasons with negative temperatures;
-use of treatment facilities with the purification effect of at least 95%.

For the operations of coal loading on board the ships, a ship loading machine has been provided for equipped with a telescopic down pipe with a dust-suppressing attachment.

2. Implementation of water reserves protection actions provided for in the project under consideration.

The following may be referred to as the main projects actions aimed at rational use and preservation of water reserves:

-application of a circulation water supply system for process needs;
-treatment of wastewaters discharged into the Muchke bay to fishery norm of the content of contaminants;
-use of rock not susceptible to washing out in construction of sea hydro-engineering facilities.

The project provides for necessary investments in the facilities of water protection purpose (table 15).

Table 15
Cost Estimates of Water Protection Facilities at Coal Complex "Vanino Bulk Terminal"

Facilities	Cost Estimates, RUR, thousand			Total Cost Estimate	
	Construction Operations	Assembly Operations	Equipment, Inventory	RUR, thousand	USD (exchange rate $1 = 2? RUR)
Household sewage networks	592.19	-	-	592.19	21.9
Rainfall sewage networks	3711.88	-	-	3711.88	137.5
Sewage pump station (well)	26.98	15.68	282.48	325.05	12.0
Pumping & filtering station	879.31	76.50	259.35	1215.16	45.0
Household wastewaters treatment station E-50, 50 m^3 throughput	1157.80	36.49	3264.99	4459.28	165,2
Biological wastewater purification plant "Vodolei", 1 m3/day throughput	-	2.24	122.06	123.30	4.6
Treatment facilities for rainfall drainage from parking	87.07	-	-	87.07	3.2
Two-section regulating sump	53638.52	2841.53	10766.63	67246.68	2490,6
Treatment facilities for contaminated with petroleum wastewaters, 5 m^3/sec throughput	-	8.50	84.98	93.48	3.5
Treatment facilities for contaminated with petroleum wastewaters, 5 m^3/sec throughput	-	8.50	84.98	93.48	3.5
Reservoir of waste water	743,27	121,00	9,25	873,52	32,4

The technical parameters of treatment facilities provided for in the project are given in Appendix A.

3. Performance of the calculation of Muchke River water balance for water intake for production needs taking into consideration minimum allowable river flow rate at the level of minimum monthly average water consumption in case of 95-percent supply of the summer and autumn, and winter periods, in order to prevent water body depletion. The calculation should be made using the observation data of the Far East Inter-regional Department for Hydrometeorology and Monitoring of Environment.

Ground: Letter from the Amur Basin Water Department of the Federal Water Reserves Agency dated 30.08.2005 No. 02-11/1644.

4. Development of actions on shared participation in reconstruction of Muchke water intake in order to increase its yield in the form of well flushing, acquisition of pumps, and improving the productive rate of the second rise station.

Ground: Letter from the Municipal Unitary Enterprise of Public Water Supply and Sewage, Vanino District Administration, dated 3.08.2000 No. 5/804.

5. Development and approval of the plan of environmental protection actions aimed at preservation of water biological resources and their habitat during construction of the terminal's hydro-engineering facilities

Ground: Letter from the Khabarovsk Krai Department of the Federal Service for Veterinary and Phytosanitary Supervision dated 30.06.06 No. 5018.

6. Development of actions to improve waste handling measures during complex operations, provided for in the project

Under the project, waste quantity reduction is achieved through rational use and saving of material resources supporting the technological process and maintenance of equipment.

It is provided for using some of the waste at the enterprise:

- coal dust is returned back to the storage;
- wet sediment from the regulating sump and from the sumps in the car dumper building is distributed throughout the coal pile surface for dust suppression purposes;
- vehicles are used for land development and fender protection

It is provided for handing over other waste to external organizations for disposal, neutralization, or recycling having concluded respective contracts:

-mercury lamps – for de-mercurization to Komsomolsk-on-Amur;

-silt from household wastewater treatment facilities – to silt grounds of existent treatment facilities of the settlement;

-used oils, recovered petroleum products – for burning in the port boiler house running on black oil;

-used filters, tissues, petroleum slurry from cleaning fuel tanks, used filters from treatment facilities - for burning to the coal-running boiler-house of the settlement;

-scrap steel, accumulators – to special enterprises collecting and recycling ferrous and non-ferrous metals.

Part of waste will be sent to burial:

-sediment from the rainfall wastewaters treatment facilities;

-special clothes, solid household refuse, swept waste, first-aid post refuse, slurry from electrolyte neutralization shall be removed to the dump of solid household waste.

To prevent atmospheric air pollution from burning waste in boilers, it is necessary to provide for measures of using special plants for burning the waste (for example, like Forcyte or Smart-Ash). Special clothes can be also burnt at such plants. It is expedient

to send used oils for regeneration or re-use in operations not requiring guaranteed quality.

Ground: Federal Law “On preservation of atmospheric air” dated 4.05.99 No. 96-FZ, article 18.

7. Development (upon completion of construction) of the terminal’s sanitary protection zone arrangements

Ground: Sanitary rules and regulations SanPiN 2.2.1/2.1.1.1200-03 “Sanitary protection zones and sanitary classification of enterprises, facilities, and other objects”, clause 2.10.

8. Implementation of fire safety measures provided for in the coal complex project

In order to ensure explosion and fire safety, the design of the administrative and domestic building with entrance checkpoint provides for fire-risk premises of category B (storage rooms, technical areas, archives, laboratory) to be isolated one from the other and from the areas of other category with fire-proof partitions, floors, filling of openings with fire-proof doors. For safe evacuation of people from the building, two evacuation stairwells are provided for, with natural lighting, that have exit directly outside and via the hall. The width of the stairwell flights, the width of corridors, passages, doors, also the length of evacuation routes from the furthest working place is taken in accordance with SNiP 2.09.04-87; also an exit to the roof from the stairwell is provided for.

For the purpose of ensuring explosion and fire safety in the material storage areas, the design provides for the following measures: warehousing areas, storage rooms are isolated from adjacent premises and one from the other with fire-proof partitions. For the category A areas, the cover provides for an easily removable roof, filling of door openings is done with fire-proof, spark-extinguishing doors, floor structure has a spark-extinguishing filling. The structure of ramps and canopies adjacent to the building is made of inflammable materials. For safe evacuation of people from the building, swing doors, wickets in the gates are provided for. For evacuation from the mezzanine areas where ventilation chambers are located metal staircases are provided for.

For safe evacuation of people from the building, three evacuation exits directly outside are provided for. The width of the stairwell flights, the width of corridors, passages, doors, also the length of evacuation routes from the furthest working place is taken in accordance with SNiP 21-09-97 and NBP 101-95 “Norms of designing fire safety facilities”.

At the liquefied gas warehouse, the project provides for liquefied gas storage in cylinder containers located in a concrete ground of 9.0 x 40.0 m in size with a 1m high fencing wall along the perimeter; the width of the fire road around the liquefied hydrocarbons tank stock is 6.0m. Warehouse fire extinguishing is water, with the help of mobile fire machinery.

To protect the liquefied hydrocarbons warehouse from direct strokes of lightning, it is provided for installing a 35.0 m high metal lightning rod. All the buildings and facilities are also equipped with lightning protection. As the external grounding contour, first of all, reinforcement of reinforced concrete foundations of the buildings and facilities is used; if necessary, an artificial grounding contour is provided for.

The provided for source of fire water supply to the complex is water intake in Muchke River with connection of two water lines in the vicinity of the water intake second rise station. From the connection point to the complex territory, it is provided for arranging two lines of water pipeline, within the territory it is closed-loop.

The requirements to the supplied process equipment in terms of fire safety of both individual elements and the whole complex will be taken into account by the supplier at the time of manufacture. At that, before commencement of equipment delivery and assembly, the supplier shall provide certificates of compliance with the national standards of the Russian Federation for the manufactured equipment.

The aspiration and dust-suppression systems, along the whole technological process – from car unloading in car dumpers to coal delivery on board the ship with a ship-loading machine, as well as use of fire-proof equipment, including re-loading stations and covered feeding conveyor lines significantly reduce the risk of occurrence of fires in the complex.

One should note the measures to prevent self-ignition of coal (by way of systematic checks of temperature in piles and mixing it when necessary), in order to eliminate feeding such coal for loading, which additionally guarantees reduction of the fire risk in conveyor galleries.

In case of fire occurrence, it is provided for to liquidate it using the automatic fire-extinguishing system at the coal warehouse and technological facilities, with the help of fire machines – in support and auxiliary facilities. For safe evacuation of people from the building, three evacuation exits directly outside are provided for. The width of stairwell flights, the width of corridors, passages, doors, as well as the length of evacuation routes from the furthest working place is taken in accordance with SNiP 21-01-97 and NBP 101-95 “Norms of designing fire protection facilities”.

At the liquefied gas storage place, the project design provides for liquefied gas storage in **cylinder containers** located in a concrete ground of 9.0 x 40.0 m in size, with a fencing wall along the perimeter, 1 m high, the width of fire passage around the liquefied hydrocarbons reservoir stock is 6.0 m. Fire extinguishing of the warehouse is waste, with the help of mobile fire machines.

For protection of the liquefied hydrocarbons warehouse from direct lightning strokes, a metal lightning-rod installation, 35.0 m high, is provided for. The whole building and facilities are also equipped with lightning protection. As the external grounding contour, first of all, the reinforcement of the reinforced concrete foundations of buildings and facilities are used; if necessary, an artificial grounding contour is provided for.

The planned source of fire water supply for the complex is water intake at the Muchke River with connection of two water lines in the vicinity of the water intake second rise station. From the connection point to the complex territory, it is provided to the water pipeline as two lines, within the territory it is close-looped.

Requirements to the supplied process equipment in respect of fire safety both for separate elements and for the whole complex will be clarified by the supplier in the course of its manufacture. At that, before commencing delivery and installation of equipment, the supplier shall provide certificates of compliance of the equipments made with the national standard of the Russian Federation.

The aspiration and dust-suppression systems along the whole technological process – from cars unloading in car dumpers to coal feeding on board of ship using a ship-loading machine, also use of explosion-proof equipment including the re-loading stations and covered feeding conveyer lines significantly reduce the risk of occurrence of fires in the complex.

One should mention the measures preventing coal self-ignition (by way of systematic checks of temperature in piles and its mixing if necessary), in order to eliminate feeding of such coal for loading, which additionally guarantees reduction of the fire occurrence danger in conveyor galleries.

In case fire occurs, it is provided for its extinguishing using the automatic fire extinguishing system at the coal storage and technological facilities, with the help of fire machines – at the attendant and auxiliary facilities.

6. ECOLOGICAL MONITORING PROGRAMS

Natural environment monitoring comprises the following types of works:

- measurement and registration of the volumes and composition of quantitative indices (emissions and discharges) connected with contamination sources (the number and concentration of emissions, effluents, and discharges versus the permissible values);
- measurement and registration of the environment quality parameters (ecological, physical, chemical);
- assessment of the impact of performed nature preservation actions or changes in the technological processes on abatement of negative impact on the environment;
- comparison of actual and forecasted (at the stage of assessment) impacts;
- measurement and assessment of efficiency of operations aimed at restoration of natural environment, as well as abatement of negative effects;
- keeping documentation – reports, logs etc.

Ecological monitoring programs are developed in cooperation with supervising bodies, which approve the time schedules.

6.1 IMPLEMENTATION OF THE PRODUCTION EMISSIONS CONTROL PROGRAM PROVIDED FOR BY THE COAL COMPLEX PROJECT

According to the project, to arrange control over observance of the norms of maximum permissible emissions, the categories of emission sources are determined with regard to each harmful substance discharged by each source. Based on the category of “source – contaminant” combination, control regularity is established.

Based on the results of classifying sources by categories, the Time-Schedule of Control at the Enterprise Over Observance of MPC Norms at the Sources of Emissions is established. The list of mandatory controlled sources include, first of all, the ventilation emissions from the cal dumper building and re-loading stations, as well as stack of the boiler-house and diesel power station (table 16).

Table 16
Time-Schedule of Controlling MPC at Emission Sources

Source	Source Description	Emitted Substances		Control Regularity	Control Regularity in case of Emergency (NMU)	Maximum Permissible Limit, g/sec	Maximum Permissible Limit, mg/m3	Cont-rolled By	Method of Control
		Code	Description						
0001	Vent. tube	2909	Inorganic dust: up to 20% SiO2	Once a year	Once 24 hrs in case of NMU occur-rence warning	0.0408333	1.63801	Acc-redited Control Lab	Deter-mining weight of dust trapped by fiber tissue filter etc.*
0002	Vent. tube	2909	Inorganic dust: up to 20% SiO2	Once a year		0.0408333	1.46882		
0003	Vent. tube	2909	Inorganic dust: up to 20% SiO2	Once a year		0.0408333	13.38797		
0004	Vent. tube	2909	Inorganic dust: up to 20% SiO2	Once a year		0.0408333	13.38797		
0005	Vent. tube	2909	Inorganic dust: up to 20% SiO2	Once a year		0.0408333	9.81570		
0006	Vent. tube	2909	Inorganic dust: up to 20% SiO2	Once a year		0.0408333	9.81570		

0007	Vent. tube	2909	Inorganic dust: up to 20% SiO2	Once a year		0.0408333	9.81570		
0008	Vent. tube	2909	Inorganic dust: up to 20% SiO2	Once a year		0.0408333	9.81570		
0009	Vent. tube	2909	Inorganic dust: up to 20% SiO2	Once a year		0.0408333	19.63142		
0010	Vent. tube	2909	Inorganic dust: up to 20% SiO2	Once a year		0.0408333	9.81570		
0011	Vent. tube	2909	Inorganic dust: up to 20% SiO2	Once a year		0.0408333	9.81570		
0012	Vent. tube	2909	Inorganic dust: up to 20% SiO2	Once a year		0.0408333	9.81570		
0013	Vent. tube	2909	Inorganic dust: up to 20% SiO2	Once a year		0.0408333	9.81570		
0014	Vent. tube	2909	Inorganic dust: up to 20% SiO2	Once a year		0.0408333	9.81570		
0015	Vent. tube	2909	Inorganic dust: up to 20% SiO2	Once a year		0.0408333	9.81570		
0016	Vent. tube	2909	Inorganic dust: up to 20% SiO2	Once a year		0.0408333	13.38797		
0017	Vent. tube	2909	Inorganic dust: up to 20% SiO2	Once a year		0.0408333	13.38797		
0018	Vent. tube	2909	Inorganic dust: up to 20% SiO2	Once a year		0.0816667	19.63142		
0019	Vent. tube	2909	Inorganic dust: up to 20% SiO2	Once a year		0.0408333	13.38797		
0020	Vent. tube	2909	Inorganic dust: up to 20% SiO2	Once a year		0.0408333	13.38797		
0027	Vent. tube	2909	Inorganic dust: up to 20% SiO2	Once a year		4.4211200	159.03309		
0028	Vent. tube	2909	Inorganic dust: up to 20% SiO2	Once a year		0.0816667	2.93765		
0029	Vent. tube	2909	Inorganic dust: up to 20% SiO2	Once a year		0.0816667	2.93765		
0031	Tube	0	Nitrogen (IV) Oxide (Nitrogen Dioxide)	Once a year		0.4400282	314.30586		Method with alfa-naphta-lamine*
0031	Tube	0337	Carbon Oxide	Once a year		0.2887515	206.25107		Using TG-5 Gas Analyzers
0031	Tube	0330	Sulfur Dioxide	Once a year		0.6140720	438.62286		Tetra-chloro-mercurate
0031	Tube	0328	Black Coal (Soot)	Once a year		0.2724133	194.58093		
0031	Tube	0304	Nitrogen (II) Oxide (Nitrogen Oxide)	Once a year		0.0715040	51.07471		Method with Chromium Acid
0032	Tube	0703	Benz(a)pilene (3, 4 Benzpilene)	Once a year		0.0000020	0.00143		Method of quasi-linear spectra
0032	Tube	0337	Carbon Oxide	Once a year		1.0333333	738.09521		Using TG-5 Gas Analyzers
0032	Tube	0330	Sulfur Dioxide	Once a year		0.2000000	142.85714		Tetra-chloro-mercurate
0032	Tube	0328	Black Coal (Soot)	Once a year		0.0833333	59.52379		

0032	Tube	0304	Nitrogen (II) Oxide (Nitrogen Oxide)	Once a year		0.2080000	148.57143		Method with Chromium Acid
0032	Tube	0301	Nitrogen (IV) Oxide (Nitrogen Dioxide)	Once a year		1.2800000	914.28571		Method with alfa-naphta-lamine
0032	Tube	1325	Formaldehyde	Once a year		0.0200000	14.28571		Method with phenyl hydrazine hydro chloride
0032	Tube	2754	Saturated Hydrocarbons C12-C19	Once a year		0.4833333	345.23807		

* The method of control is determined by the specialist laboratory that carries out control.

During summer, the majority of sources in the complex is represented non-organized. Control by means of measurements with instruments of actual emissions from non-organized sources is hardly possible. The most expedient method of control in this case is determining outside the production site of actual conditions of air basin contamination at specially selected control posts. The decision of the necessity of such control of enterprise emissions' norms is made by the Khabarovsk Department for Technological and Ecological Supervision same as selection of substances in which respect it will be performed.

6.2 DEVELOPMENT OF THE ATMOSPHERIC AIR QUALITY OBSERVATION PROGRAM ACCORDING TO THE SANITARY LEGISLATION REQUIREMENTS

The decision of carrying out such observations is taken by the sanitary and epidemiological supervision bodies (table 17). Laboratory investigations of air samples should be done by a laboratory accredited pursuant to statutory procedures.

Table 17
Basic Parameters of Atmospheric Air Quality Observation Program

Air Sampling Areas	Requirements for Undertaking Monitoring	Priority Control Substances	Check Points and Regularity	Results Assessment Criteria
At the border of the sanitary protective zone	SanPiN 2.2.1/2.1.1. 1200-03, SanPiN 2.1.5.1032-01	Dust, carbon oxide, nitrogen oxides, sulfur dioxide, benz(a)pilene, hydrocarbons	As agreed with the sanitary and epidemiological supervision bodies	Individual requirements, see section 1.2, table 2
In the area affected by the enterprise	SP 1.1.1058-01, SanPiN 2.1.5.1032-01	Dust, carbon oxide, nitrogen oxides, sulfur dioxide		GN 2.1.6.133-03

Above the temporary waste storage places	SanPiN 2.1.7.1322-03	Specific substances which emission is possible from the waste storage places		30% of MPC in the working zone GN 2.2.2/2.4.1. 1340-03

6.3 DEVELOPMENT OF THE PROGRAM OF LABORATORY CONTROL OVER THE QUALITY OF DISCHARGED WASTEWATERS AND MONITORING OF THE WATER BODIES' CONDITION IN ACCORDANCE WITH THE WATER AND SANITARY LEGISLATION

An individual requirement is established in the Opinion of the Amur Basin Department, Federal Agency for Water Reserves, No. 61 (2005) in respect of the working design of the Coal Complex "Vanino Bulk Terminal" (Muchke Bay).

In accordance with hygienic requirements to protection of surface waters (SanPiN 2.1.5.980-00), production control over the composition of wastewaters and water quality of water bodies is carried out in the laboratories accredited (attested) following the statutory procedures.

The location of checkpoints, the list of contaminants to be checked, as well as regularity of studies and data submission are to be agreed with the state sanitary and epidemiological bodies and the water reserves department bodies.

The nearest to the wastewaters outlet checkpoint of production control over lumped discharge is set within the radius of 500 m from the place of discharge in the water area.

The results of production control over the water bodies' water quality are submitted to the state sanitary and epidemiological service and water reserves department bodies. Yearly summarized results of water quality studies of water bodies are submitted accompanied with analysis of the reasons for dynamics of changes over the last two years and actions towards abatement of contamination with specific time limits for their completion.

Water users are obliged to provide information to the bodies and institutions of state sanitary and epidemiological service and population about contamination of water bodies and forecasted deterioration of water quality, also about the decision made as regards prohibition or restriction in using water, the actions under way.

6.4 ORGANIZATION DURING CONSTRUCTION PERIOD OF REGULAR HYDRO-BIOLOGICAL MONITORING PROVIDED FOR BY THE COAL TERMINAL PROJECT

(investigation of plankton and benthos) in accordance with the individual requirements of the Khabarovsk Krai Department of the Federal Service for Veterinary and Phytosanitary Supervision (letter dated 30.06.06 No. 5018) established during getting approvals for the works of constructing hydro-engineering facilities of Coal Complex "Vanivo Bulk Terminal".

6.5 IMPLEMENTATION OF RADIATION MONITORING PROGRAM PROVIDED FOR BY THE COAL TERMINAL PROJECT

The radiation control system is designed to detect unauthorized carrying away by hand and vehicle of fissible and radioactive materials and is implemented on the basis of stationary detection system for fissible and radioactive materials "Yantar-1P" and "Yantar-1A".

"Yantar-1P" and "Yantar-1A" instruments are installed in specially equipped zones at the entrance checkpoint and at the entrance into the territory of the regime zone and serve for determining presence of fissible radiation materials on vehicles at the time of crossing the regime zone border.

When radioactive materials are detected, the alarm signal from the Yantar system and video image from TV camera the system is equipped with is fed to the post control station.

For producing the audio signal about excess of the threshold level of radiation background level, an audio alarm system is installed. Background measurement is done automatically.

Clarification of the list and brand-names of the equipment, special machines and special control devices both for the frontier and customs services is done at the stage of working documentation development.

7. BRIEF CONCLUSIONS

In accordance with the posted tasks, the assessment performed of the impact on the Vanino settlement environment and adjacent thereto territory and sea water area by the Daltransugol's contemplated activity towards construction and operation of Coal Complex "Vavino Bulk Terminal" has shown:

1.The geographic situation, nature and climate, ecological, and social and economic conditions of the terminal placement area are favorable practically by all parameters for the contemplated activity. The area is characterized by low man-made loads on all environment elements, relatively low occupancy, and weak industrial development. Creation of the Vanino Bulk Terminal corresponds to the Vanino settlement's specialization in reloading of cargos from railways onto sea ships and is aimed at development of the existent transport node Vanino-Sovetskaya Harbor.

2.Selection of the terminal construction site in free lands of Vanino settlements in the area where infrastructure facilities are located that are designed for industrial use, at a sufficient distance from the residential development and significant distance from specially protected natural territories, featuring extremely poor composition of vegetation ensures minimum impact of the contemplated activity on the environment and population.

3.The Coal Complex "Vanino Bulk Terminal" Construction Project has been developed in accordance with the requirements of the Russian legislation and international sea law, also subordinate legislation and regulatory technical documents. For the project materials, positive opinions were received from the state ecological expertise of the Federal Service for Ecological, Technological, and Nuclear Supervision and Natural Resources Department for the Far-East Region, Russian Federation Ministry of Natural Resources, an exhaustive scope of approvals with all interested federal and local authorities has been provided. The list of expertise opinions and approvals is given in Appendix B.

4.The planned in the project implementation of technical and technological solution as well as taken for implementation nature preservation actions in principle ensure the ecological safety of project implementation. Assessment of possible man-made impact of the project has been made with regard to current condition of natural environment and mostly reflects the real consequences of contemplated production activity. The set of planned nature preservation actions is aimed at preventing or abatement of man-made impact rendered by the coal terminal on the natural environment, and investments in creating productive capacities of nature-preservation purposes are sufficiently reflected in the terminal construction cost estimates. The special volume of the project sufficiently covers scenarios of possible emergency situations during operation of a bulk terminal, actions are suggested for their prevention or liquidation of their consequences.

5.The analysis of types and the degree of influence of the contemplated activity on the majority of environment elements shows weak negative effect. Assessment of permissibility of additional man-made load on the atmospheric air and land shows favorable characteristics of their condition, which allows drawing a conclusion about permissibility of an additional load in the form of Vanino Bulk Terminal construction and operation.

6.The main ecological limitations of the contemplated activity are caused by high value of fish resources in the Muchke bay area, a damage to which under the project is to be compensated, they are also connected with the danger of depletion of underground water reserves, which, due to regional specificity, are used not only for drinking but for production needs as well.

7.An additional man-made load on the Muchke bay water area and underground waters will not lead to irrecoverable changes in the environment condition subject to implementation of all nature preservation measures provided for in the project and observance of the requirements of supervision bodies which were set during project approving process.

8.The conditions for ecological permissibility of the contemplated activity are development of a plan of actions on preserving water biological resources and their habitat, preparation of Muchke River water balance, development of actions for participation in reconstruction of the Muchke water intake, also development of a program for monitoring wastewaters and water condition in Muchke bay, and arrangement of a hydro-biological monitoring during the construction period.

9.Implementation of the terminal construction project and putting it into operation will render a strong positive effect on the social and economic conditions in Vanino settlement and adjacent territories thanks to provision of stable occupation and increase of tax income into all levels of budgets with extension of the possibilities of social sphere development which will facilitate preventing flow-out of population into more developed regions of the country and improving the demography situation. The terminal construction is supported by the local population which have certain hopes connected with creation of a new terminal. The public hearings to discuss the Vanino Bulk Terminal construction project (Public Hearings Minutes dated 4.07.05 approved by the head of the Vanino municipal establishment, Vanino area, Khabarovsk Krai) notes the benefits both for the Vanino area and for the whole Far-East Region.

Appendix A
Treatment Facilities of Coal Complex “Vanino Bulk Terminal”

A 1. Production and Surface Wastewaters Treatment Facilities

The treatment facilities complex consists of tank-type facilities (regulation sump, purified water tank, and pumping and filtration station).

The technological process of treatment. Surface run-off collected by the drainage system from the coal storage territory is fed to a two-section regulation sump, where full regulation of run-off takes place based on 70% of annual run-off and simultaneous settlement during 12 hours. In regulation sumps, partial settlement of suspended particles takes place. The efficiency of tank operation as a sump may reach 40%, it largely depends on the mode of operation and subject to clarification in the course of operation.

After settlement, water is treated with finely ground coal, which, as a 5% coal suspension, is fed together with polyacrylamide into the mixer – air separator. Then water goes onto two-three step filters, layer-by-layer filled with crushed burnt rock and active coal filling.

After filters wastewaters are partially used for the in-house needs of the treatment facilities and fire extinguishing (for these purposes, a special tank of purified water is designed). The remaining wastewater is discharged into the sea. Before being discharged, purified water is disinfected.

The duration of filter cycle is 24 hrs, minimum. Thereafter, water-air washing is performed to restore the filtering ability of the filling.

The head pumps lines feeding wastewaters for filtration is equipped with a flow meter allowing accounting of the volumes of wastewaters that underwent treatment. The design throughput of the facilities amounts to: 427 l/sec, 130 m^3/hr; 55,015 thousand m^3/year. The facilities performance efficiency is given in table A.1.

Table A.1. Production and Surface Wastewaters Treatment Facilities

Contaminating Component	Concentration, mg/l			Treatment Effect, %
	Original Wastewater	After Settlement	After After-Purification Using Filters	
BOD_{total}	30	15	3	90
Suspended Substances	500	40	7	99
Petroleum Products	20	3-4	0.05	99.7

A.2. Treatment Facilities of Complete Biological Purification

Station of biological purification of household wastewaters E-50

A compact block-type plant E-50 is designed for receiving and deep purification of household and close to them as regards composition wastewaters of small settlements, hotel and tourist centers. Treatment facilities' throughput makes 50 m^3/day. The station can be used for treatment of wastewaters of settlements with conventional population number of up to 200 people.

Such type of stations is suitable for operation conditions both in southern areas and in northern conditions.

Basic Technical Characteristics:

Parameter	*Unit of Measurement*	*Value*
Weight without water	ton	14
Station overall dimensions (length x width x height)	m	6.0x6.0x5.6
Size based on concrete foundation (length x width)	m x m	9.0x9.0
Installed electric power	kW	23.65
Power consumption for process needs	kW	3.2

Technological Parameters:

Parameter	*Unit of Measurement*	*Value*
Throughput	m^3/day	50
Mean nominal wastewater flow rate	m^3/hr	2.1
Maximum coefficient of hour unevenness		2.5

The effect of treatment is given in table A.2.

Table A.2. Efficiency of E-50 Treatment Facilities Operation

Contaminating Component	Concentration, mg/l		Purification Effect, %
	Original Wastewater	After Purification	
BOD_{total}	255	3-5	98-98.8
Suspended Particles	221	3-5	97.7-98.6

Ammonia Nitrogen	34.8	0.5	98.4
Nitrites	-	0.02	-
Nitrates	-	9.1	-
Phosphates	11.1	0.2	98
Temperature	15-30°C	-	-

The station consists of four factory-made block-containers installed on the concrete foundation in two storeys.

Joint together, the block-containers form a heated building inside which all necessary facilities and equipment are mounted. This design ensures the conditions of sufficient thermal insulation and convenient operation of treatment facilities of low productivity.

The conditions of purified wastewater outlet meet the requirements of discharge into a fishery water body of the 1st category.

The technological scheme of treatment. The station uses the scheme of complete biological purification of wastewaters with the processes of nitri-denitrification, after-purification in a bioreactor with immobilized on an inert carrier micro flora, and ultra-violet disinfection. The station also includes Self-Cleaning Filtering Device (UFS), flow rate equalizer, aerobic stabilizer – silt denser, and fine after-purification strainer with purolat filling.

The technological and tank equipment installed inside the station include:

- self-cleaning filtering device (UFS);
- equalizer;
- aero tank;
- secondary sump;
- bioreactor of the first after-purification stage;
- bioreactor of the second after-purification state;
- fine after-purification strainer with purolat;
- stabilizer;
- ultra-violet disinfection unit

The process scheme uses the method of biological purification of wastewaters with a trophic chain of immobilized and freely floating microorganisms using fiver polymer attachments of different modifications shaped as brushes invented in-house and manufactured by a group of scientists from Ecos headed by the scientific adviser Dr. Eng. Sc. Professor N.I. Kulikov.

Analysis of interaction between microorganisms and attachment from fiber polymer brushes revealed expedience of placing brushes at all stages of biological purification of wastewaters. The purification and after-purification processes are intensified thanks to optimal settling of microorganisms in accordance with their habitat, which is particularly important in case of facilities of small volume.

Higher efficiency of station performance is achieved by way of applying modern control and metering instruments, latest measurement converters, intellectual actuators.

The advantages of compact plants using “Yorsh” (brush) synthetic filling are:

- 1.5-fold decrease of facilities’ volumes;
- high technological stability of efficient purification;
- reduction in the level of capital, power, operation costs;
- useful optimal use of the volume of each facility by purification stages;
- fast putting into operation;
- functional simplicity;
- absence of smell;
- esthetic appearance;
- seismic stability;
- longevity.

Plant “Vodolei”

For treatment household wastewaters in the pump and filtration station area, Vodolei plant is offered having a throughput of 1 m^3/day. The developer is OJSC “CNIIEP of Engineering Equipment”, the manufacture is EKSIKA – MOEZ No. 1, Moscow.

The plant consists of two parts – the biological purification unit and the deep purification unit, and it is designed for complete biological and deep purification of household wastewaters.

The treatment facilities function based on the principle of aero tanks with flooded filling made of synthetic materials on which microorganisms grow that provide efficient purification of wastewaters.

Water saturation with oxygen is done with a jet aerator when water is fed into it that is taken from the plant with a submersible pump.

The sediment generated in the treatment facilities does not require additional treatment and after composting can be used as a fertilizer. Sediment removal, due to its small quantity, is done not more than once a year.

The plants are made of metal with corrosion-proof coating.

The design throughput is 1 m^3/day;

The overall dimensions are, m:

	Biological Purification Unit	Deep Purification Unit
length	2.7	1.8
width	1.3	1.3
height	1.6	1.6

The effect of treatment is given in table A.3.

Table A.3. Treatment Facilities Performance Indices

Contaminating Component	Concentration, mg/l			Treatment Effect, %
	Original Wastewater	After Biological Purification Unit	After Deep Purification Unit	
BOD_{total}	300	15	3	99
Suspended Substances	260	15	3-4	98-99
Ammonia Nitrogen	30	2-4	0.3-0.4	99
Nitrites	-	0.1-0.25	0.01-0.02	-
Nitrates	-	3-5	6-9	-
Surface Active Agents	10	0.5-0.8	0.02-0.03	99.8

A.3. Petroleum-Contaminated Wastewaters Treatment Facilities

Treatment Facilities for Rainfall Run-Off from the Parking Ground

The treatment facilities are designed according to the typical design 503-6-9.86 and comprise: a sump, black oil collection well, filter well. As filtration filling, it is suggested to use hydrophobic claydite. The facilities throughput is 2 l/sec.

In accordance with VSN 01-89 “Vehicle Maintenance Enterprises”, concentration of contaminants in surface run-off makes:

Suspended substances — 300 mg/l;
Petroleum products — 40 mg/l;
BOD_{total} —30 mg/l

Concentration of contaminants after settlement:

Suspended substances — 40 mg/l;
Petroleum products— 2.4 mg/l;
BOD_{total} — 9 mg/l

After after-treatment on the filter, concentration of contaminants will make:
Suspended substances — 6 mg/l;(98% purification)
Petroleum products — 0.05 mg/l;(99% purification)
BOD_{total} — 3 mg/l(90% purification)
and will not exceed the permissible concentrations to discharge wastewaters into a water body of fishery water utilization purpose.

- *Filtering Device*

The main developer of the technology of treatment using claydite filters is the Institute of Chemistry, Far-East Division of the Russian Academy of Sciences.

As the filling material of filters – sorbent, slate claydite is used (obtained by way of roasting crushed clay slate). This is a cheap and widely spread material.

Slate claydite represents particles of 10 to 25 mm in size. Particles' porosity is produced thanks to cracks on the surface. The total porosity of particles in terms of volume reaches 40%. Such structure of claydite particles increases the contact surface with the purified water. Water-repellent properties – claydite hydrophobization, is performed is special modifier furnaces.

Black oil capacity of hydrophobic claydite makes 30% of its weight, loose density is 0.75 ton/m^3.

The volume of claydite filling into the cartridge is 0.703 m^3, which corresponds to the loose weight of 0.53 ton. The maximum possible quantity of collected petroleum product corresponds to 0.16 ton.

The annual weight of recovered petroleum product is determined by formula:

$M_{oil} = W_{rainfall} * K * (C_{in} – C_{out})$ kg/year, where

$W_{rainfall}$ is the annual quantity of produced surface waters, thousand m^3;

K is the coefficient taking account of the share of rainfall runoff sent to purification (is assumed equal to 1);

C_{in} is the concentration of petroleum products in wastewaters before purification with filters (2.4 mg/l);

C_{out} is the concentration of petroleum products after purification with filters (0.05 mg/l).

$M_{oil} = 0.383 * 1 * (2.4-0.05) = 0.9$ kg/year

Thus, the maximum possible number of petroleum products absorbed by filters ten times exceeds their design annual number, which evidences a potentially long period of filtration filling service. The warranty operation period for filters is 3 years (according to the Institute of Chemistry, Far-East Division of the Russian Academy of Sciences).

Used hydrophobic claydite is subjected to regeneration (roasting in the modifier), thereafter its properties are restored.

Treatment Facilities "Mechanic"

To purify contaminated surface and production run-off from the boiler-house territory (boiler, tank trucks pouring out ground, boiler fuel tanks stock), fully factory-made treatment facilities "Mechanic" (Saint Petersburg) are provided for that have throughput of 10 l/sec, 36 m^3/hr, 288 m^3/day and consist of: a coalescence separator SOR.II-10-JK and a sorption filter.

The set of treatment facilities allows purifying the surface and production run-off with the output parameters of contaminating substances of:

Suspended substances —- up to 0.05 mg/l;
Petroleum products- up to 5 mg/l;
BOD_{total} — up to 5 mg/l

The strongest contamination with petroleum products at the inlet into separator SOR.II-10-Jkis 5000 mg/l. The guaranteed concentration of petroleum products at the outlet is 0.05 mg/l when used together with the sorption filter. The efficiency of purification is given in table A.4.

Based on the functional features, the treatment facilities can be divided into three parts: a sump, a coalescence separator, and a sorption filter.

Sump. Wastewater comes by gravity into the front part of a tank where with the help of simple sedimentation, non-soluble particles settle, lighter particles are separated only at the coalescence separator. The sump is designed for the interval of cleaning of once every half a year, at that the maximum contamination of the sedimentation space may reach half of the height between the coalescent insert and tank bottom.

Coalescent separator. It works similarly to the sump, based on the principle of gravitation, i.e. on the difference of density between water and its contaminants but with the help of coalescence insert plates it is possible to increase the space utilization efficiency which allows reducing the size of the separator. To raise purification efficacy, at the outlet from the coalescence separator a coalescence filter is placed with filtration foam ASISP having PPI 30 density, which, in addition to separating oil particles, provides further removal of suspended substances. Floated separated oil particles are retained by the submerged partition and further poured manually into the oil tank. From there it is regularly pumped into a tank with the help of a mobile submersible mono-block pump AP 30.50.07.IV equipped with a built-in explosive-proof motor made by GRUNDFOS.

Sorption filter. The sorption filter uses dynamic adsorption, i.e. a process when the adsorbent solution flows through the immobile layer of sorbent. The border between the used and fresh sorbent is not clear. During the filtration process, this zone moves towards the exit from the adsorption unit. This determines the sorbent service life dependent on the desired level of purification at the outlet. The service life of sorbent is considerably affected by the level of contamination with suspended substances at the inlet, as well as concentration of petroleum products at the outlet. The surface of fibers is practically not wetted with water (water absorption is up to 3%). Fibroil material is lighter than water. When it is saturated with petroleum products, it is possible to regenerate it by extraction with respective solvents (up to initial sorption function), or by simple soaking. For washing the filters, a special ground is provided for that is fenced by skirting and an underground tank of $5m^3$ capacity with a mobile submersible mono-block pump AP 30.50.07.IV equipped with a built-in explosive-proof motor made by GRUNDFOS.

Treatment facilities for production and rainfall run-off doe not require permanent servicing. In case of intermittent operation, it is recommended to do a visual check once a week, in case of continuous operation – a daily check.

Table A.4. 'Mechanic' Treatment Facilities Performance

Contaminating Component	Concentration in Run-Off, mg/l*)		Purification Effect, %
	Incoming for Purification	After Purification	
Suspended Particles	343.93	5.0	98.5
BOD_{total}	20.24	5.0	74.3
Petroleum Products	43.82	0.05	99.5

*) rainfall run-off and runoff from the boiler-house

NPP "Polychim" Treatment Facilities

The facilities are designed for treating surface run-off collected from the liquefied hydrocarbons tank stock territory and technological roads.

The plant is manufactured as an underground facility. The first well has the settlement zone and mechanic filter. In the second well there is a sorption filter filled with coals of MAY brand name manufactured by NPP "Polychim". The third well is control with a regulation tube to maintain water level so as to avoid sorption filter emptying. The efficiency of purification is given in table A.5.

Table A.5. NPP "Polychim" Treatment Facilities Performance

Contaminating Component	Concentration in Run-Off, mg/l		Purification Effect, %
	Incoming for Purification	After Purification	
Suspended Particles	200	10.0	95
Petroleum Products	50	0.05	99.9
BOD_{total}	30	3	90

Plant servicing does not require special training and high qualification of personnel. The filtration units do not require personnel's interference into their operation. The service life of sorption filter before reactivation of MAY sorbent makes not less than 6 months in case of its continuous operation. The service life of coal is 5 years in case of correct operation. The service life of mineral wool before replacement is not less than 2 months of continuous operation. MAY coals are widely introduced at the enterprises of the Northern-West Region of RF for after-purification of waters to the MPC norms in terms of petroleum products (up to 0.05 mg/l), also for purification of drinking water.

In this project, the purification plant of the maximum throughput of 8 m^3/hr is taken. To make it, standard rings of 1 m in diameter are used.

A.4 Treatment Facilities at the Vehicle Washing Place

The closed water-supply system at the vehicle-washing place (in the repair and garage unit) provides for purification of wastewaters at mechanic treatment facilities. The treatment facilities are designed based on typical design 503-1-21c.83 and consist of: a sump with gasoline and oil recovery unit, a black oil collection well. The facilities throughput is 3 l/sec.

The gasoline and oil recovery sump consists of sections. In the first section, preliminary settlement of wastewaters and sedimentation takes place. Floated petroleum products go to the black oil collection well. Water after-treatment takes place in gasoline and oil recovery unit (the second section). There, a cartridge with filtration filling is installed for deep purification of the incoming fluid. As filtration filling, hydrophobic claydite is used. The effect of treatment is given in table A.6.

Table A.6. Performance of Treatment Facilities in Closed Water-Supply System of Vehicle Washing-Place

Contaminating Component	Concentration, mg/l			Treatment Effect, %
	Original Wastewater	After Purification	Process Requirements to Water Quality	
BOD_{total}	70-140	40	80	45.7
Suspended Substances	700-3000	15	40	97.9
Petroleum Products	40-60	4.4	15	90
Tetraethyl Lead	0.016-0.018	0.001	0.001	93.8

The quality of purified wastewaters meets the process requirements to the quality of water used for washing vehicles.

Appendix B

List of Expertise Opinions and Approvals Under the Coal Complex "Vanino Bulk Terminal" Project

1.Opinion of the expert commission of the State Ecological Expertise. Approved by the Khabarovsk Inter-Regional Department of the Federal Service for Ecological, Technological, and Nuclear Supervision 19.10.2005 No. 768/P.

2.Opinion of the expert commission of the State Ecological Expertise of the Natural Resources Department for the Far-East Region of the Russian Federation Ministry of Natural Resources. October 2005.

3.Opinion of the federal state institution "Amurrybvod", Amur Basin Department for Preservation, Reproduction of Fish Reserves and Regulation of Fishing, Russian Federation State Committee for Fishery, dated 21.06.2005 No. 03-14 2004.

4.Opinion of the Water Reserves Division for Khabarovsk Krai, the Amur Basin Water Department of the Federal Agency for Water Reserves, dated 12.08.2005 No. 837.

5.Sanitary and epidemiological opinion of the territorial department of the Federal Service for Supervision in the Field of Consumer Rights Protection and Human Well-Being for the Khabarovsk Krai dated 04.10.05 No. 27 99 21 650 T000112.10.05;

6.Sanitary and epidemiological opinion of the territorial division of the Federal Service for Supervision in the Field of Consumer Rights Protection and Human Well-Being for the Khabarovsk Krai in Vanino and Sovetsk-Gavan Districts dated 18.06.05 No. 085, with an expert opinion dated 10.06.05;

7.Opinion of the Central Department of the Russian Federation Ministry for Civil Defense Affairs, Emergency Situations, and Liquidation of Consequences of Natural Calamities (GU MChS of Russia) dated 7.06.2005 No.1204.

8.Opinion of the Department of the State Fire Supervision, GU MChS of Russia, for Khabarovsk Krai dated 02.06.05 No. 1125-13;

9.Opinion of the GIBDD of Vanino District, Khabarovsk Krai, dated 15.06.05 No. 681/-10;

10.Opinion of the Department for Khabarovsk Krai and Jewish Autonomous Region of the Federal Service for Veterinary and Phytosanitary Supervision dated 30.06.06 No. 5018 on all-year-round construction of hydro-engineering facilities.

11.Letter of the Khabarovsk Specialist Sea Inspection of the Federal Service in the Field of Nature Utilization dated 19.10.2005 № 5-09/984.

12.Letter of the Amur Basin Water Department of the Federal Agency for Water Reserves dated 30.08.2005 No. 02-11/1644 "On water utilization conditions".

13.Letter of the Department for Khabarovsk Krai and Jewish Autonomous Region of the Federal Service for Veterinary and Phytosanitary Supervision dated 11.11.2005 No. 2458 "On no-objection to conditions of using water of the water body of Muchke bay".

14.Opinion on the working design of the Department for Roads and Outdoor Development in the Vanino District dated 21.06.06 No. 603/1;

15. Opinion on the working design of the Department for Architecture and Town-planning of the Vanino District Administration dated 28.07.05 No. 253;

16. Opinion on the working design of the Soventsko_Gavan Road Repair & Construction Department dated 05.08.05 No. 377;

17.Decree of the Khabarovsk Krai Governor "On permission to Baltic Construction Company – Vostok LLC the construction of a real estate object "Coal Reloading Complex in Vanino Port (Muchke Bay)" dated 27.01.03 No. 66-r;

18.Enactment of the municipal establishment of Vanino District, Khabarovsk Krai, “On provision to Daltransugol LLC of a land plot into lease” dated 06.05.04 No. 158;

19.Decree of the Khabarovsk Krai Governor “On design and construction of real estate object “Vanino Bulk Terminal in Muchke Bay, Vanino settlement, Khararovsk Krai” dated 26.10.04 No. 800-r;

20.Enactment of the Head of Vanino Municipal District on establishing a land plot selection commission dated 12.09.02 No. 326;

21.The act of selecting the land plot for construction, agreeing the contemplated design solutions, technical conditions for connection to supply sources, engineering networks and utilities of the object dated 02.05.04;

22.The architectural planning brief No. 11 for development of working design “Vanino Bulk Terminal” dated 06.07.05;

23.Permit for construction of the State Labor Inspection in Khabarovsk Krai dated 27.06.05 No. 1/19;

24.A copy of the deed of conveyance for the land plot out of the lands of settlements to Daltransugol LLC dated 11.05.04;

25.A copy of contract for disposal of solid petroleum-containing waste and tissue between Rifei-ANS LLC (contractor) and Daltransugol LLC (customer) dated 20.04.05;

26. A copy of contract for disposal of mercury-containing waste between Regional Ecological Center of Demercurization LLC (contractor) and Daltransugol LLC (customer) dated 21.04.05;

27.A copy of contract for removal of garbage tissue between Rifei-ANS LLC (contractor) and Daltransugol LLC (customer) dated 20.04.05;

28.A copy of contract for removal of garbage and use of solid household waste disposal ground of MUP “RzhEP” (contractor) and Daltransugol LLC (customer) dated 10.04.05;

29.A copy of contract for receipt of draining and contaminated with black oil waters between FGUP “ROSMORPORT” (contractor) and Daltransugol LLC (customer) dated 11.04.05;

30.Technical conditions of Khabarovskenergo OJSC for external power supply of the coal terminal in Muchke bay dated 10.03.05;

31.Technical conditions of MUP “Vodocanal” of the Vanino District Administration for water supply of the coal terminal dated 03.08.2000 No. 5/804;

32.Technical conditions of the Khabarovsk Krai State Fire Service for designing fire safety measures dated 14.06.02 No. 27/2-10202;

33.Technical conditions of Khabarovsk Krai Central Department for Civil Defense and Emergency Situations for development of section “Engineering and technical civil defense measures. Measures preventing emergency situations” dated 23.11.01 No. 5/2403;

34.A letter of guarantee from the Sovetsk-Gavan Branch of “Khabarovskkraigas” on supply of liquefied gas to the coal terminal dated 18.03.05 No. 179;

35.A statement from the FGU “Khabarovsk Territory Fund of Geological Information” on the absence in the construction site of explored reserves of mineral resources (letter dated 25.06.02 No. 349-06);

36.A copy of the protocol of monitoring measurements of the accredited test laboratory center of the branch of FGUZ “Epidemiological Center in Khabarovsk Krai in Vanino and Sovetsk-Gavan Districts” No. 31 dated 21.06.05;

37.Letter of the Khabarovsk Inter-Regional Department for Technological and Ecological Supervision “On issue of tying to the city system of coordinates and quota for contribution into atmosphere pollution” dated 19.08.05 No. 3731;

38.Minutes of Public Hearings on discussion of the Vanino Bulk Terminal Construction Project dated 04.07.05 approved by the Head of the Vanino municipal establishment, Khabarovsk Krai. .