EXECUTIVE SUMMARY
OF THE ENVIRONMENTAL IMPACT ASSESSMENT REPORT
ON THE PROJECT FOR THE CONSTRUCTION OF CHITA-KHABAROVSK ROAD "AMUR"
(SECTIONS KM483 - KM596, KM943 - KM1006)

1. INTRODUCTION

1.1. General

This document presents a brief description of the environmental issues related to construction of the motor road Chita-Khabarovsk ("Amur").

1.2. Applicable environmental standards

The project is developed in full compliance with the requirements of the national environmental legislation

The basic legislative acts on the environment protection are:

- The law of the Russian Federation dated January 10, 2002, No. 793 "Environmental protection" (edition of January 10, 2002);

Water Code of the Russian Federation dated November 16, 1995, No. 167- FZ (edition of May 5, 2000);

- Land Code of the Russian Federation dated October 25, 2001, No. 136-FZ (edition of October 30, 2001);

Federal Law dated June 24, 1998, No. 89 - FZ "On industrial and consumption waste" (edition of December 29, 2000, No. 169 - FZ);

Federal Law dated May 24, 1999, No. 96 - FZ "On atmospheric air protection"

- Federal Law dated March 24,1995, No. 52-FZ "On Fauna" (edition of May 4, 1995);

Federal Law dated May 29, 2000, No. 57-FZ "On Mineral resources" (edition of May 29, 2002)

- Forest Code of the Russian Federation dated January 29, 1997, No. 22-FZ
- Federal Law dated April 15, 1998, No. 65-FZ "Ecological expertise".

impact assessment process was based on the in-force regulatory and methodological documents and sectoral instructions, in particular ODM "The manual for environmental impact assessment for design, construction, renovation and operation of the roads and related facilities" issued by the Ministry of Transport of RF, 2002. For the calculations of the pollution the "Recommendations for account of environmental requirements in the design of the motor roads and bridges", Moscow, 1995 was used as well as the software tools approved by the RF Ministry of Natural Resources.

Some specific sections of the EIA report were developed by specialized organizations licensed for this type of activity. The solutions were compared with previous projects.

1.3. The need for investment

The construction of different sections of the Amur road has been underway since 1978 and proceeds very slowly.

To speed up the construction on the basis of the Program of development of the road network "Roads of Russia of XXI century", which was reviewed and approved at the session of the RF Government on June 28, 2001, the Government of Russian Federation issued the orders for accelerated construction of the site.

The construction of the "Amur" road will provide the possibility to use motor transport for freight services and passenger transportation in the direction of the road and will create the basis for development of the road network

2. PROJECT DESCRIPTION

The "Amur" Project Component for the sections km 483-596, km 943-1006 was developed in the scope of the implementation of the program for providing a transit route along Chita-Khabarovsk road.

2.1. General information

The km 483 – 596, km 943 - 1006 sections of the Chita-Khabarovsk road are located on the territory of the Chita and Amur regions and link the Central part of Russia and the Far East.

For the section km 483-596 two main options of the road route were considered: the North and South versions. According to the North version the road route is located close to the railroad and by-passes the settlements of its influence zone at a long distance, then crosses the railroad at the Mogocha station and enters the existing road at a distance of 7 km to the south from Mogocha. The North version of the road is 141 km long.

The South version suggests the by-passing of the ”Sobachkin khrebet (ridge)” with difficult topography to the right from the railroad at considerable distance and by-passing the settlements as well. The South version of the road is 116 km long.

From the ecological point of view the road construction according to the North version is less preferable. Additional allot of woodland (37.5 hectares more than for the South version) will be required. More (approximately by 42%) permanent water courses will be subject to the environmental impact compared to the South version. The road route and access roads located in the uninhabited areas will have a more considerable impact on the flora and fauna, will change the territory more deeply. In the total the emissions of pollutants into the atmosphere will increase during construction of the road following the North version since together with access roads it is 25 km longer.

Considering the priority from the ecological point of view it is recommended to implement the South version as more efficient option with smaller negative environmental impact.

Two alternative options for the road route for the section 943km -1006km were considered as well:

The first version locates the route in parallel to the railway (on the left side) by-passing the settlements Takhdamygda, Solnechny, Bamovsky at a long distance. According to the second version the road route is located to the right of the railroad and crosses it near 956 km then goes eastwards until the crossing with the road B.Never-Yakutsk and enters the existing road.

From the ecological point of view the road construction according to the first version is less preferable. Additional woodland allot (37.5 hectares more) compared to the second version will be required. More (approximately by 12%) existing water bodies will be subject to environmental impact compared to the first version. The road route and access roads located on the uninhabited areas will have more considerable impact on the flora and fauna, will change the territory more deeply. In the total the emissions of pollutants into the atmosphere will increase during construction of the road following the first version since together with access roads it is 6.3 km longer Considering the priority from the ecological point of view it is recommended to implement the second version as more efficient option with smaller environmental impact.

This report presents the environmental impact assessment for construction of the road according to the recommended options.

Giving up the construction of the road of the strategic importance for development of the East region of Russia was not considered as an acceptable solution.

Remote environmental consequences of the project were not considered since the network of settlements within the area of the road route is sparse.

Construction of the road on the considered section was commenced in 1978 according to the feasibility study prepared y the “Soyuzdorproekt” institute. The construction was carried out slowly and in 1994 it was decided to correct the feasibility study pursuant to the modern

regulations. This was done by the design organizations “IrkutskgiprodorNII” and Khabarovsk branch of the “GiprodorNII” institute.

In 2002 following the instruction of the Interregional Directorate for construction of roads in the Far East region of Russia (DSD “Dalny Vostok”) the institute OAO “Irkutskgiprodornii" developed the cost and benefit analysis of investments for construction of the Chita-Khabarovsk road. Within the scope of this work the validity of previously received approvals was extended and new approvals for the road route location (based on the woodland and archeological investigations of the territory) were obtained. There are no objects of historical and archeological value within the road route zone.

At the present time the Interregional Directorate for construction of the roads in the Far East of Russia (DSD “Dalny Vostok”) has the package of approvals. The basic documents are:

Act of selection of the road route location: for Mogochinsky district dated 21.10.01, for Sretensky district dated 06.12.01 (Chita oblast) and for Skovorodinsky district dated 09.12.02 (Amur oblast).

Conclusions of the Mogochinsky, Sretensky<, Skovorodinsky district land management committees on the allocation of the allots for road construction (obtained within the period from 07.12.01 until 11.12.02),

Conclusions of the Mogochinsky (dated 14.12.01) and Amur (dated 10.12.02) Forest administrations on the selection of the road route and the allocation of lands for construction.

Agreement of the Forest service of the Amur oblast Natural resources directorate regarding allocation of lands in the forests of 1st and 3rd groups (# 255, 256 dated 23.12.02)

Agreement with the "Association of the small indigenous peoples of the North" regarding the absence of the areas of indigenous people dwellings within the zone of the road (dated 17.12.01)

Currently, the Environmental Impact Assessment documents for considered sections of the road are being reviewed by the local natural resources committee. Upon approval of the environmental review committee (Expertiza), the materials regarding the transfer of forest lands into non-forest ones (for the forests of the 1st group) will be submitted to the Government of RF in accordance with the established procedure.

Completion of the construction of the “Amur” road on the given section and construction of the road operation and service complex will improve the operation indicators of the region transport system. In its turn this will improve the internal goods turn-over and provide transit of goods through the considered territories of the Chita and Amur regions with optimal speeds, in comfortable conditions and will support stable operation of industrial and social facilities therefore will increase tax payments to the local budget.

Changing of the social and economic conditions as a result of the activity under consideration is essentially an increased demand for labor, creation of additional work places, which will be a stabilizing factor for the given territories characterized by a growing flow-out of population and shrinking of the local production. Improvement of the transport system will have a positive effect on the social and living conditions of the population and will facilitate development of the local productive forces.

No other major development projects are currently planned for the region thus there is no cumulative effect.

The road will produce a powerful impulse for development of the region and improvement of the social and economic conditions of the population of these territories, as well as of all adjacent territories due to development of the richest natural resources.

The road route is located outside the residential settlements. No resettlement of the local population related to the road construction is required.

2.2. Basic technical parameters of the road

According to the expected traffic intensity the Chita-Khabarovsk road “Amur” within the sections km 483-596, km 943 - 1006 pursuant to the SNiP 2.05.02-85 belongs to the technical category III:

- calculated traffic speed is 100 km/h;

– calculated traffic speed on the difficult sections of cross-country (according to the 2.05.02-85, item. 4.1) is 80 km/h.

The beginning of the Chita section is km 483, the end of the section is km 596. The section total length is 113 km. The design route of the section within Chita region is laid in the north-eastern direction up to the administrative boundary with the Amur oblast. After crossing the boundary of the regions the road route runs to the east.

The beginning of the Amur section is km 943, the end of the section is km 1006. The section total length is 63 km. The general direction of the road coincides with the existing direction of the railroad Moscow-Vladivostok. Throughout the whole length of the section the road runs in parallel to the railroad.

Under the conditions of the broken down relief and necessary "blending" of the route with the topography, the plan of the route is in fact alteration of straight lines and curves. The radii of the curves are 1000-3000 m except for difficult narrow places where the curve radii of 600-1000 m are accepted.

The basic standards accepted for project line of the longitudinal profile:

– The maximum longitudinal inclination for the speed of 100 km per hour – 50 ‰;
– The maximum longitudinal inclination for the speed of 80 km per hour – 60 ‰;
– The minimum radius of convex curve in the longitudinal profile – 10,000 m;
– The minimum radius of concave curve in the longitudinal profile – 3,000 m.

The level mark of the road-bed embankment was calculated with the account of snowfall, permafrost conditions and minimal elevation above the ground and surface water levels. The road sections under consideration uses the II principle of designing the road constructions, i.e. with partial allowance for deformation in the road bed base in the form of the construction settlements.

The level mark of the road-bed embankment is established equal to:

– 0.97 – 1.0 m - to prevent covering with snow;
– 1.60 m - as the minimal elevation above the earth surface in places without no surface drainage;
– 2.5 m considering the permafrost.

The project line of the longitudinal profile is characterized by the alteration of embankments and excavations. The maximal height of embankment is 24. 8 meters; the maximal depth of excavation is 19 meters. The excavations are made, as a rule, in the rocky areas; the top soil on the basement surface of the embankment will not be removed. For the surface run-off along the embankments and, if necessary, in the excavations the drainage ditches are constructed. Along the whole length of the designed sections with the exception of rocky areas, the upper layer of the road-bed of 1-meter depth is made of stable (non-heaving) soil. The ground for the construction of the road will be provided from the excavation sites and local reserves of rocky and large rocky debris materials.

The permanent right-of-way includes the land strip for the road facilities including runoff ditches plus 1 m. Temporarily withdrawn land is envisaged for construction of the soil storage areas and access roads to them, for the areas for stockpiles of excess ground, construction sites and temporary facilities. For the travel of construction machinery a temporary withdrawn land strip of 4 m in width is planned on both sides of the embankment. In the places of excavations the width of the temporary withdrawn land strip (from the high side) is assumed to be 10 m to provide safety distance between the edge of the cut slope and the travel way.

The road pavement is designed considering the transport and operation characteristics, category and purpose of the road, composition and prospective intensity of the traffic. During the first stage of construction a transitional coating is constructed. During the second stage upon stabilization of the road-bed the road pavement with the improved coating is constructed: one layer of hot fine-grained thick asphalt concrete. The first stage pavement is used as the lower layer of the basement of the second stage pavement.

The road width is assumed to be 7.0 m; the roadside width is 2.5 m at each side with strengthening strips of 0.5 m in width.

2.3. Basic data on engineering structures, crossings and intersections

The "Amur" road within the sections km 483-596, km 943-1006 crosses many permanent and temporary water bodies, the rivers Itykenda, Boguzia, Davenda, B.Never, B.Kovyli being the largest among them.

Small engineering structures are concrete round culverts of 1.5 m in diameter: with one - or two openings and with three openings (94 pcs); elliptical concrete culverts with an opening of 2.0 m x 2.0 m (8 pcs); rectangular concrete culverts with an opening of 2.0 m x 2.0 m, with two openings (1 pc); metal corrugated culverts of large diameter, with one and two openings (4 pcs).

Totally 33 bridges are planned within the considered sections. The total length of the bridges is 2,016 m, including:

- Middle bridges – 12
- Small bridges – 14
- Large bridges – 7

The dimensions of the roadway in accordance with the in-force regulations are G-10 m. The bearing structures of the bridges are calculated for temporary moving loads A-11 and NK-80.

The Federal road "Amur" within the designed section crosses only the local roads of categories IY -Y therefore all the crossings and intersections are constructed on the same level with transitional speed lanes or without them depending on the importance of the crossed or adjacent road and the traffic intensity there.

The crossing of the railroad Moscow-Vladivostok at km 956 is planned in two levels with construction of an overpass.

Besides the above-mentioned it is planned to build fire exits into the forest, as well as emergency roads on the sections with slopes more than 50%.

Totally 46 crossings and intersections will be constructed including the crossings of type 3-G-1 - 20 pcs, intersections of type 3-V-2 - 1 pc, of type 3-G-2 - 17 pcs, individual intersections - 3 pcs, emergency roads - 4 pcs, 1 junction on different levels of the trefoil type.

Buildings and constructions of the road and transport maintenance, as well as service stations are envisaged simultaneously during the second stage of construction of the road.

3. CURRENT ENVIRONMENTAL CONDITIONS

The current environmental conditions are presented on the basis of engineering and environmental investigations.

The route of the road is laid in the territory with alternating hilly and plain areas, covered with larch and coniferous forest, in the area with permafrost and swampy zones.

3.1. Climatic conditions

The climatic conditions of the region are severe. The winter is cold with little snow. The average temperature in January is -28.4°C - -33°C The summer is hot. The average temperature in July is +17.3°C - +19.2°C The average annual temperature is -4.4°C. The ground is covered with snow in average from the end of October till the end of March-early April.

The annual wind velocity has no regular trends constitutes 1.3-2.3 m/s. The prevailing wind direction is from the north and north-west.

3.2. Geomorphological and geological characteristics

The area is cross-country with complex relief forms. Within the Chita region the road passes through the mountains of the Eastern Zabaikalie, i.e. Daur Raise. The section relief: mountains of average height with smooth contours and flat massive rounded or oval tops and gentle slopes in broad valleys.

Within the Amur region the road runs along the spurs of the Stanovoi Ridge, i.e. Prishilkinskaya mountains and valleys country. The section relief: low mountains, hills and bald mountains. The valley slopes are smooth and, mainly, swampy.

Soils of the road sections are inhomogeneous.

The Chita region is characterized by the Paleozoic intrusions represented by granites, diorites, grandiorites. The Quaternary deposits are represented by diluvial and diluvial-piedmont alluvial, sedentary formations.

In the Amur region intrusions represented by grandiorites, weakly undulose rhyolite-dacitic porphyrites are widely spread. The Quaternary deposits are represented, mainly, by diluvial and sedentary formations.

Alluvial deposits are spread in valleys of brooks. Peat soils occur in certain areas Permafrost is widely spread. The seismicity is number 7 .

Current physical and geological processes and phenomena.

Sharp daily fluctuations of temperature, severe winters with little snow, general humidity deficit cause intensive physical, mainly, frost rotting of rocks. The road is located in the zone of continuous permafrost, therefore icing, moraines and thermokarst phenomena are widely spread in this area.

3.3. Quality of surface and ground water

In the Chita region the road route crosses 20 and in the Amur region 15 permanent water streams. These are water streams of the Amazar-Oldoisky hydrological area with mountains of average height in taiga. The water streams are of the mountainous and semi-mountainous types.

Pursuant to the hydro-geological zoning system the road section within the Chita region is included into the Eastern-Zabaikalskaya and Zaya-Bureya hydro-geological orogen area with intermountain artesian basins and interstitial water masses and belongs to the Upper Amur artesian basin.

The hydro-geological conditions are characterized by the interstitial water in rocky soils and pore-interstitial water in the alluvial, sedentary and diluvial deposits, as well as above-permafrost and ground waters.

3.4. Vegetation. Soils. Fauna

The road passes through the woodland. In the Chita region the forests are, mainly, birch, larch and birch, more rarely larch and pine.

The forests in the Amur region are, mainly, larch and pine with birches and aspens.

They are represented by the forests of III group, more rarely, by the forests of I group.

The soils in the Chita region are permafrost-taiga-gley and grey podzolized transferring into permafrost-meadow-forest, average loamy and permafrost-meadow-black soil.

In the Amur region the soils are brown podzolized, meadow-podzolized and alluvial-meadow and gley-permafrost.

Swampy soils belong to moraines and moraine sections.

The fauna of the territory consists of: ungulates (musk-deer, elk, deer), predators (brown bear, wolf, lynx, sable, otter), rodents (squirrel, chipmunk) and other animals belonging to the taiga species.

In the road route zone there are no rare species of the fauna included in the Red Book.

Due to the proximity of the road to the railway there are already no places where the wild animals stay, hide and breed.

The following species of fish occur in the water bodies crossed by the road within the Chita and Amur regions: taimen, mackerel, lake herring, grayling, minnow, gudgeon, Amur luce, crucian carp and Amur ide.

Generally the rivers crossed by the road are of a low value to the commercial fishing industry apart from a few water bodies that belong to II category of significance for the fishing industry.

3.5. Historical, cultural monuments and specially protected natural territories

An archeological study was carried out during the design stage, which showed that, on the whole the reviewed territory is of potential interest from an archeological point of view. However, there were no archeological monuments discovered in the area of planned or

implemented construction works. There are no specially protected natural objects in the road area.

3.6. Settlements and existing traffic

The road route by passes settlements of the area. The largest settlements in the vicinity of the road in the Chita region are: Sbega, Davenda. They all will have access routes to the road.

The road network is not developed in the area. The nearest settlements Sbega (km 483) is located at a distance of 2 km to the left from the road, Kluchevsky and Davenda (km 576) are located at a distance of 4 km to the left of the road.

The largest settlement in the vicinity of the road in the Amur region is Bolshoi Never. It will have access routes to the road.

The nearest settlements Takhdamygda (km 943) is located at a distance of 2 km to the left of the road, Skovorodino is located 2km to the right of the road, Bolshoi Never is located at km 989 and Kovali, at km 1006.

At the present time there is no permanent traffic on the reviewed sections. Most of the available roads are local field and forest roads for local traffic as well as some winter roads along the Transsibirskaya railway. The available roads serve for internal district communication between the nearest settlements.

4. DESCRIPTION AND ASSESSMENT OF ENVIRONMENTALLY IMPORTANT IMPACTS

4.1. Introduction

The project envisages construction of the road in compliance with the requirements of the environmental legislation.

Operation of the road is accompanied by the atmospheric pollution caused by transport emissions and settling of the fuel combustion products (exhaust gases) on the adjacent territory and surface of the water bodies, as well as by wearing of pavements and tires during movement of transport. The physical impact is the noise generated by the road. The engineering impact includes withdrawal of the territory, disturbance of the landscape integrity, changing of the earth natural topography.

Technological impact is temporary and includes the following: temporary withdrawal of the territory for technological needs, atmospheric, ground and water bodies pollution by exhausts of the construction machinery and mechanisms, specific impact of special operations, noise.

4.2. Atmospheric pollution

The atmospheric pollution is generated by emissions of the exhausts of engines and dusting of the pavement during movement of transport on the road with the expected traffic intensity.

The expected emissions of pollutants into the atmosphere for the operation period of the road are given in the Table 4.2.1:

Table 4.2.1.

Type of pollutant	Maximum permissible concentrations (MPC) for settlements mkg/m^3	Maximum concentration of pollutant along the road centerline, shares of MPC	Maximum concentration of pollutant at the boundary of the right-of-way , shares of MPC
Nitrogen dioxide	0,085	1,64	0,61
Soot	0,15	0,1	<0.1
Sulfur dioxide	0,5	0,02	0.018
Carbon oxide	5,0	<0,01	<0.01
Hydrocarbons	1,2	0,02	0.017

The calculation results allow concluding that the gaseous emissions during operation of the road do not exceed the permissible hygienic norms for the atmospheric air of the settlements and forest plants and do not have a harmful effect on the environment and living conditions of the population.

The calculations of the atmospheric air pollution during construction are presented in the Table 4.2.2:

Table 4.2.2.

Type of emission	Maximum permissible concentrations $(MPC)_{max.one-time}$ mkg/m^3	Maximum concentration of pollutant along the road centerline, shares of MPC
Carbon oxide	5.0	0.44
Hydrocarbons (petrol)	5.0	0.01
Hydrocarbons(diesel fuel)	1.2	0.01
Soot	0.15	<0.01
Sulfur dioxide	0.5	0.04
Nitrogen dioxide	0.085	0.88
Lead	0.001	0.13
Benzapilene	-	<0.01
Formaldehyde	0.035	0.01

Within the zone of the operations the polluting emissions are lower than the MPC of the work zone, therefore their impact on the workers will be within the permissible limits.

The atmospheric air monitoring in the work zone directly on the site is carried out by the labor protection and safety service according to GOST 12.1.005-76.

The construction and road machinery shall meet the requirements of the ecological and sanitary regulations:

- GOST 17.2.2.02-86 for emissions of exhaust gases;
- SN2.2.4/2.1.8.562–96 (sanitary norms) for noise.

The total amount of emissions of pollutants is determined depending on the fuel used by the machinery per unit time:

Table 4.2.3.

Type of polluting source	Emissions of harmful substances, kg/t

	Carbon oxide	Hydrocarbons	Nitrogen oxides	Sulphur dioxide	Soot
Diesel road machinery of power (up to 100, 100-250, more than 250), kW	42-36	18-40	22-90	0.5-2.5	0.3-0.6
Passenger cars and light trucks	210	40	22	0.5	-
Medium-weight trucks with internal combustion engine	180	37	21	0.5	-
Diesel medium-weight trucks	35	12	67	1.3	0.6
Diesel heavy trucks	36	13	69	1.3	0.9

4.3. Noise impact

During operation of the road the motor transport is the source of generated noise. During construction the road the construction machinery and technological construction processes are the sources of noise. The road route passes through the woodland by-passing the inhabited areas, thus excluding the acoustic discomfort for the population.

4.4. Impact on the surface waters

The road impact on the water bodies is characterized by a changed regime of the surface waterways and hydrological regime of the crossed rivers. For construction of the bridges the project envisages a number of measures to minimize the impact on the hydrological regime of the waterways by determining the bridge opening required for free water flow, minimal quantity of the piles in the river-bed, smooth changing of the water flow by regulation facilities.

During operation of the road the main pollutants for the surface waters are the runoff waste water containing materials generated by wearing of the road and bridge pavements, tires, break shoes, dust, dirt, and petroleum-containing substances.

The maximum permissible concentrations of the water pollutants shall not exceed the values given in the Table 4.4.1:

Table 4.4.1.

Type of ingredients	Maximum permissible concentrations (MPC) mg/l
Suspended substances	Background + 0,25(0,75) (depends on the category of the water-user)
Petroleum products	0.05

The actual and maximum permissible values for discharge are given in the following Table 4.4.2.:

Table 4.4.2.

Type of ingredients	MPC mg/l	Actual discharge, mg/l	Maximum permissible discharge, mg/l
Suspended substances	Background + 0.25(0.75) (depends on the category of the water-user)	455.87	1576.24
Petroleum products	0.05	8.42	305.8

Pollution of the surface runoff by lead was not considered because the use of the ethylated gasoline is forbidden everywhere.

The calculation results demonstrated that for large and middle waterways with 95% of the water flow of 0.9-900 m^3/s the actual discharge value does not exceed the maximum permissible ones, therefore the surface runoff does not require additional treatment. If necessary, water treatment reservoirs are constructed of stone on small waterways.

4.5. Impact upon the land resources and soils

The required withdrawal of the land for temporary and permanent use is determined. The total area of the withdrawn land in the Chita oblast is 790 hectares and 360 hectares in the Amur region.

Location of the road route and technological sites is selected considering the minimal withdrawal of valuable woodland, i.e. forests of I group. The area of the withdrawn forests of I group is 158 hectares in the Chita region and 72 hectares in the Amur region. The land is withdrawn in compliance with the requirements of the legislation.

Upon completion of the construction all the temporary withdrawn territories shall be recultivated and returned to the land users.

4.6. Impact on flora and fauna

Due to the proximity of the railroad the valuable species of the animals do not occur in this area. The designed bridges can be used by the animals crossing the rivers. The Amphibia and small animals will use the culverts designed on the temporary waterways.

Construction of the bridges across the fisheries may cause increased concentrations of the suspended matter in the water, which directly or indirectly will influence the river flora and fauna and, consequently, fishing productivity in the rivers. However, there will be no considerable impact caused by the bridges on migration of the fish. Any damage to the river fauna will be compensated.

There are no valuable lands, specifically protected territories, national parks in the area of the road.

The influence on the flora is connected with withdrawal to permanent and temporally use of the lands covered by forest vegetation. The vegetation near the road is exposed to dust and emissions of the exhaust gases.

5. ENIRONMENTAL MITIGATION MEASURES

5.1. General information

Environmental mitigation measures will be carried out on all the stages of the project: design, construction and operation of the road.

5.2. Protection of land

Preservation of the existing natural landscape, woodland, swamps is envisaged by the principles of the road design on this territory.

The construction elements of the road are determined to provide the stability of the structure, preservation of the adjacent landscape, considering the permafrost, complicated climatic, hydrological and ground conditions. All the works shall be carried out within the boundaries of the withdrawn land. The surface runoff system will preserve the soil against the water erosion. To avoid pollution of the soils with petroleum products the machinery and mechanisms shall be in good condition and shall be fuelled in the areas specially designated for this purpose.

Upon completion of the construction all temporarily occupied land shall be recultivated.

5.3. Protection of surface and ground water

The road route crosses 20 permanent waterways in the Chita region and 15 waterways in the Amur region. These waterways have the water protection zones, which depend upon the waterway length. According to the status of the water protection zones it is forbidden to pollute

the ground surface, i.e. to dump the garbage, production waste, to park and wash the machinery and mechanisms. No construction sites, construction material quarries can be arranged in the water protection zone. Construction of the branch roads to the water protection zones of the waterways is not envisaged by the project. Special signs shall be installed on the boundaries of the water protection zones.

On the small waterways, if necessary, a drainage system from the bridge carriageway is constructed using the transverse and longitudinal grades. This system will direct the surface runoff along the sidewalks through the chutes to the stone reservoirs for water collection. The stone chutes are constructed on the embankment slope at the both sides at the beginning of the bridge. Stone water treatment reservoirs shall be installed on the foots of the slopes.

The cost of these measures is 4,410,650.00 RUR in current prices.

5.4. Protection of flora and fauna

During construction of the bridges environmental mitigation measures and measures to minimize the probable damage to the river fauna shall be provided. It is recommended to carry out all the works in the river-bed in winter. No works shall be carried out in the river-bed during the spawning period because the noise and increased turbidity of water during construction will make difficulties for fish migration. It is necessary to carry out construction operations within the time-schedule.

The damage to the river fauna, which is caused by the environmental impact, is compensated in the amount of 300,290.00 RUR in current prices, including:

- Chita region – 76,850.00 RUR;
- Amur region – 223,440.00 RUR.

The damage to the fish resources during the bridge construction has been calculated by the special organizations: the Chita institute of the natural resources and Amur sector of the fishing industry investigations FGUP VostSibrybceter.

The compensation sums will be used for restoration works in the river-beds and reproduction of the fish resources.

Compensation of the damage to the forest resources is envisaged by the project in the amount of 53,214,190.00 RUR, including:

- Chita region – 32,381,080.00 RUR;
- Amur region – 20,833,108.00 RUR.

5.5. Protection of the atmosphere. Noise

The existing forest strips along the road reduce the noise level, concentration of the gas-air emissions and their propagation.

In the working zone where the atmospheric pollution and noise are short lived and local the workers are provided with personal protection equipment. To avoid dusting the soil shall be moistened.

Considerable atmospheric pollution and noise are observed in the working zone during the drilling and blasting operations.

Dust generated during the blasting operations is classified as inorganic dust containing 20-70% of silicon dioxide ($MPC_{max\cdot one\text{-}time}$ for settlements. 0.3mg/m^3, $MPC_{aver.diurnal}$ 0.1 mg/m^3), partially the dust is classified as inorganic containing less than 20% of silicon dioxide (for settlements $MPC_{max\cdot one\text{-}time}$ 0.5 mg/m^3, $MPC_{aver.diurnal}$ 0.15 mg/m^3).

5.6. Safety measures in the zone of blasting operations

The radius of the dangerous zone of scattering of lumps of the soil for the people is 250-350 m and 125-200 m for facilities and mechanisms and depends upon the charge power. The workers shall return to the working zone in 10-15 minutes after the explosion.

The storehouses of explosives are not arranged on the sites. Explosives are delivered to the site as necessary from special storehouses of the contractor.

The expenses included in the forest rehabilitation will compensate damage to the forests caused by blasting within the zone of scattering of lumps of the soil.

5.7. Waste: storage and disposal

Construction waste, garbage, domestic waste shall be stored only in the specially designated places on the sites and removed regularly. Disposal and burial of waste shall be agreed upon in the established order before commencement of the works. Discharge of any non-treated drain waters and waste to the surface water bodies or on the surrounding land is forbidden.

5.8. Protection of the natural and social environment

Prior to commencement of the works visual inspection of the construction site shall be carried out. If any historical, archeological or cultural monuments are observed on the site or in the proximity of the operations (including the bridges), it is necessary to stop the works and inform the special environment protection entities. The same measures are recommended if rare species of plants and animals or communities are discovered.

Development of open casts for road construction materials shall use the technologies providing minimum environmental impact within the boundaries of the open cast areas.

Warning signs shall be installed at the places where wild animals may enter the road route.

5.9. Recultivation measures

All the territories temporary occupied during the construction (sites, temporary/technological access roads, open casts) shall be subject to recultivation according to the conditions of the land users. It is recommended to recultivate these areas immediately upon completion of the construction works.

Expenses on the recultivation works will be 65,395,040.00 RUR including:

- Chita region – 38,458,080.00 RUR;
- Amur region – 26,936,960.00 RUR.

6. ENVIRONMENTAL MONITORING

The environmental monitoring is a complex of observations, assessments, forecasts performed on the basis of scientifically justified programs as well as recommendations and versions of management solutions developed on the basis of these observations, assessments, forecasts, which are necessary and adequate to provide the environmental management and ecological safety.

The monitoring includes three main kinds of activity:

- observation of the impact on the environment and condition;
- assessment of the actual environmental condition;
- prediction of the environmental condition and assessment of the predicted condition.

The environmental monitoring program of the project provides the monitoring of the compliance with the environmental regulations by the operators and minimization of the ecological risk as a result of the assigned activity.

The tasks of environmental monitoring are defined as follows: control the completeness and quality of the engineering solutions, determine the level of the impact on the environment; control the project initial parameters' (accepted on the basis of survey results (and used as basis for predictions)) compliance with the actual situation, work out proposals to provide "ecological safety" where discrepancies occur between the observed results and the predicted impacts.

According to the local environmental monitoring the Client (operating entity) works out the measures to prevent or remove pollution not envisaged by the design, as well as the degradation of the nature components.

The environmental monitoring expenses envisaged by the project are 500,000.00 RUR.

7. PUBLIC CONSULTATION

The issue of construction of the road from Chita to Khabarovsk was discussed in the mass media, TV and radio since this issue had been brought for discussion. Construction of the road "Amur" was included into the President's program of development of the Russian Federation roads.

In August 2001 a joint meeting between the Representation of the President of the Russian Federation in the Far East district and Ministry of transport of Russia was held in Blagoveshensk. The authorized representative of the President of the Russian Federation in the Far East district (Mr. K.B.Pulikovsky), Head of Rosavtodor, the First Deputy Minister of the Ministry of transport (Mr. I.N.Slyunyaev), the Chairman of Amur regional soviet of the people' deputies (Ms. G.S.Guseva) and other representatives of the local authorities were present at the meeting.

Regular information about the priority construction project of the Chita-Khabarovsk road was provided in the local press, i.e. in the magazines: "Roads" No.8 in 2001, No.9 in 1999, "Roads of Angara region" No. 4 in 2001, in the newspapers: "Tribune" No.105 dated 16.06.2001, No.12 dated 10.07.2001, No.171 dated 13.09.2000, "Rossiisky dorozhnik" Nos 6, 7, 17, 14, 20 in 2001, "Transport of Russia" No.27 dated 08.07.2001, No.35 dated 02.09.2001, No.37 dated 16.09.2001, "Road newspaper" No.34 dated 26.09.2001. The information book No.1 in 1997 was entirely focused on the Chita-Khabarovsk road design and construction.

A meeting with the agenda "Improvement of the design and construction technology for the Chita-Khabarovsk road" was held in Irkutsk in December 2001. Representatives from Rosavtodor, Clients, contractors, representatives of research organizations, designers were present.

After the publication of a great amount of materials no response from the public of the settlements in the "Amur" road construction zone was received.

The public consultations for many years (from 1994) were carried out through the environmental protection entities: sanitary and epidemiological inspection, committee of environmental, forestry and agriculture protection, district committees of land reform and land resources, which represent the interests and opinions of the residents of the region.

The public hearings on the road construction were held in Mogocha in September 12, 2002.

The public was informed about the expected construction of the road and bridges, importance of the road for development of the region and the entire road network, dates of the road commissioning, engagement of the local population in the construction. The public was also informed about the ecological problems, preservation of the nature in the territory of the expected construction and about environmental mitigation measures.

The general meeting concluded that construction of the road was necessary, approved the decisions on the monitoring of the road construction operations and adherence to environmental requirements.

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