Order of Lenin, the Siberian branch of the Russian Academy of Sciences the Baikal Institute of nature management

Assessment of the environmental condition of the territory of Zakamensk to determine the zone of ecological trouble

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The performers

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Introduction

19.08.98 the Government of the Republic of Buryatia # 284 a Government Commission was set up to develop a programme for the socio-environmental rehabilitation, the Zakamensk, which was entrusted with the preparation of materials to assess the State of the environment and public health, as well as the development of the special federal programme on urgent measures on socio-environmental rehabilitation, the Zakamensk to assign the territory to the area an environmental emergency or disaster.

Materials preparation was entrusted to the BEAT of SB RAS, on the basis of which was formed by temporary workers, who carried out the assessment of the State of the environment and health of the population of the town of Zakamensk.

Assessment was based on the "criteria for the assessment of the environmental situation of the territories in order to identify areas of environmental emergency and environmental disasters" (1992) and in accordance with the requirements of the materials submitted for State environmental examination for the separate parts of the territory of the Russian Federation to the environmental emergency or zones of ecological disaster "(1995).

Contained in their submissions, information on the health status of the population as Zakamensk are based on data for statistical reporting agencies of health data, the neighbourhood SES Zakamensk and the Ministry of health of Belarus.

Sanitary-and-hygienic assessment of groundwater and surface water, drinking water and the risk of contamination of drinking water supplies is based on the State of BELARUS, the special studies PGO "Burâtgeologiâ", Geological Institute of the RUSSIAN ACADEMY of SCIENCES and the Buryat Republic Center for Hydrometeorology and environmental monitoring. The basis for assessment of chemical and radiation pollution of soils based on the materials of detailed studies carried out in 1990-1992 he was a Gudžirskoj of EMG specialists and Zakamensk party no. 1 Central geological and geophysical expedition PGO "Burâtgeologiâ" (Kuzmin et al., 1991; 1992; the Ravens and others 1990). When evaluating the process dynamics of contamination of soils and surface waters used regular multi-year research conducted with 1990, in the territory of the Džidinskogo ore site by members of the Geological Institute of the RUSSIAN ACADEMY of SCIENCES (Khadanovich et al., 1993; Hadanovich et al., 1997; Yatsenko, 1994; Yatsenko, 1999; etc.)

The main objects of study in the administration of these observations were man-made sands tailings Džidinskogo Gok, mine and quarry water mines Holtoson, pervomayskiy, soil, groundwater, surface water and sediments pp . Modonkul′, Inkur, Barun-Zun and Naryn, snow cover, soil contamination assessment was based on the approximately quantitative spectral analysis of soil samples to the central laboratory "PGO" Burâtgeologiâ. quantitative content of toxic elements in soils by atomic absorption chemical analysis performed in the laboratory of physicochemical methods of analysis of the Geological Institute of the RUSSIAN ACADEMY of SCIENCES. water samples were analysed by chemical method in the central laboratory "PGO", Burâtgeologii in Buryat Republic Center for Hydrometeorology and environmental monitoringin the laboratories of State of the Republic of Buryatia, Bronnickoj expeditions IMGRE, Geological Institute of the RUSSIAN ACADEMY of SCIENCES.

1. delimitation of the territory

The research area covers natural environments, including industrial mining of Pervomaysky, Inkurskogo, Holtosonskogo, processing plants and waste dumps Džidinskogo Gok, residential area of the city with residential and holiday Zakamensk sectors. along with the areas of preserved natural landscapes of this area forms a natural-technological system as a result of the more than 60-year-old industrial Džidinskogo Gok (fig. 1 appendix). natural border pass on the watersheds of major rivers (p. (p) . Myrgenšeno and Modonkul′) and Jeddah (in the North).

More detailed studies to assess the environmental, public health and the dynamics of the changes made to the territory of Zakamensk. It includes the residential area of the city and the surrounding area from the East, the Džidinskogo Mining and processing plants processing waste storage vol′fra-Mo-molybdenum ores-the main sources of pollution. In the North of the border of the territory runs along the mouth of the Modonkul′ River, where it flows into the Džidu River Delta sedimentation formed a barrier significantly restricts the distribution of pollû consultants.

2. physical-geographic characteristics of the territory, as Zakamensk. 2.1. climate description area

Climate is sharply continental with winds prevailing during the year, the North West and the North. In the warm season of increasing winds northerly direction that is largely submeridional′noj orientation of the Valley in the lower reaches of the Modonkul′ River, where the town of Zakamensk. Wind speed: 0.3 m/sec. in the winter, up to 2 m/s. in the spring. Maximum speed in the spring-summer season reaches 20 m/s.

According to the weather conditions, favourable for dispersion of contaminants in the atmosphere, the territory of Zakamensk refers to the dangerous zone ' capacity of pollution. Inversion are frequent, especially in winter at night. Periodic air stagnation in the surface layer contribute to air pollution.

2.2. Geomorphological and geological structure • the territory of Zakamensk

Regional geomorphological terms the territory of Zakamensk is located in the southern part of the Mongolian and Siberian mountain belt and is dedicated to the Selengino-Vitimskoj area of linear distortion-morfost-2-rukture of the first order, the Mesozoic lay with moderate neotektoničeskoj increase in the subsoil (Ufimtsev, 1991).

The relief of the city to the Valley (ABS OTM. 1040-1100 m) and low (up to 1400) and in nearby Midland (1700-1800 m) system Spurs Džidinskogo Ridge. The main amount of residential and industrial buildings in the dolinnom type of the relief of lower reaches of Modonkul′, directly above its confluence with the Džidu River (Figure 2 of the annex).

The bottom of the Valley Modonkul′ in the city is mostly clear rear contour with mountain slopes of varying steepness. Only in estuarine parts of side tributaries (streams, Zun-Inkur and Barun-Naryn) closed contour accumulative oval (cones of) up to a height of 20-30 m above the urezom River. Bottom width 1.0 km. Within the floodplain and terraces of kartiruûtsâ height of 2-5, 3-6, 8-10 m.

-0.2 0.1 km wide Floodplain waterlogged and anthropogenically transformed (pitted, eroded soil and vegetation cover). the rear part of the floodplains of the lower mouth of the warranty date Entry Reqd.. Inkur to the mouth of Handl baruun-Naryn strengthened dambovymi facilities for flood

protection below the mouth of Handl baruun-Naryn River floodplain ***about*** an adjoining floodplain terrace height of 2-3 m offset by man-made deposits received here by pit emergency discharges from the concentrator part of sediment in unosilas′ water floods further downstream, and her mouth formed the alluvial fan of man-made sand. another part of the sediment was pushed into the river by bulldozers, which formed the hilly ridges up to 4-6 m.

Decking floor width 0.2 -0.3 km fully mastered, including the agricultural needs of the population (vegetable gardens, pastures, hayfields). Elements of the terraces (brovki, ledges, contour) are currently struggling on slope surfaces and fronts streets. Location of terraces in the city are two sections: 1) below the mouth of the manual. Inkur-with terrasovym complex on the right bank of the river Modonkul′ and a steep slope on the opposite radical; 2) below the mouth of the manual. Barun-Naryn with such a terrasovym complex, mostly on the left side of the river. The restructuring plan of dolinny relief is due, apparently for two reasons: 1-formation at the mouth of the Modonkul′ podprudnogo by the filling of the reservoir Valley Džidy Pliocene-Quaternary "Valley" basalts; 2-the crossing of the river bursting zone NW trending with the right compression counterpart moving its wings: EAST wing moved to the South-East, on the WEST wing. Breaking zone intersects the Valley just above the place of change reaches Modonkul′ with North-East to submeridional′noe (opposite the mouth of Handl baruun-Naryn).

Power loose deposits in the Valley of Modonkul′ reaches 60-80 m. Sediments are Pebble-valunnymi with sand and loam formations up to 54 meters in the southern part of Zakamensk and three of the premises, located downstream. Cut thickness here has such structure: pliocenovye valunniki the bottom with sand up to 75 m, in the middle of the area-laminated silts-podprudnogo Lake deposits, up to 20 m and the top-of-the-art sand with pebbles, before 10 pm Buried tal′veg and its terraces are located at a depth of about 50-60 m or less. The modern complex of the reserve is applied to the Pliocene-Quaternary unconsolidated formations.

Clear rear contour, the more power the Valley sediments overlying the reserve is complex and other signs show that the Valley of the river Modonkul′ in the lower reaches of the Valley-grabenom. Graben is timed to the units left behind raising amid raised and raised blocks. Platoes slopes, especially in the lower part of them, are a mežblokovye surface. Tectonic slopes in the area of the city with modern climatic conditions fall under the influence of insolâcionnyh processes. Although the Western and eastern slopes of the exposition covers roughly the same, but first get more heat, so they are more dry and is dominated by processes of accelerated delûvial′nogo demolition of unconsolidated formations. At the same time, the less warm slopes of the northern and Eastern exposure is widespread deluvial-soliflûkcionnye education and better expressed in soil and vegetation.

Platoes surface often represented bedrock outcroppings on ridges, separated by poor saddles.

For the geological structure of the territory is characterized by the harmony between Zakamensk to two regional geological structures, represented by carbonate-terrigenous formations of the lower Paleozoic Džidinskogo sinklinoriâ and intruzivami Modonkul′skogo granitoids of the array. The border between them is in the area of the city to the bottom of Handl. Barun-Naryn. Along the developed zone rocks characteristic of faults-ul′traosnovnogo rocks the whole plate, the small body of granitoids of intensely misfolded and rasslancovannyh osadočno-volcanic rocks. Calcareous sediments (limestone) and the output of small magmatic body Granites are recorded in the starboard side near the mouth of the manual. Barun-Naryn at the gidrootvala dam and emerges on the right slope of the River below the mouth of the Modonkul′ manual. Barun-Naryn. The rest of the greater

part of the hillsides surrounding the city, developed granitoidnye breed. The last are more resistant to weathering than the breed terrigenous-carbonate strata.

The city territory is confined to the projected 6-7-point earthquake zone, but the location of its node in the intersection of long-lived NE rift with neotektoničeskimi breaks of submeridional stretches near regional sublatitudinal Mesozoic-Cenozoic Rift Valley Džidy, enhances its seismic danger.

A real threat to the city creates now that its eastern margin of arrays of man-made sand: stale tails and gidrootval. Loose loose sands arrays, with a complete lack of land layer, actively disperse exogenous destructive processes-the wind, snow and rain water, gravity, lol, etc. Given that rainfall in the area is mainly (80%) and-70 in the summer months, and there are extensive multi-day downpours, the danger of eroding the catastrophic erosion of sand and debris flows is very great. On the arrays of the vigorous growth of Dalley, erosion gullies, pull-quotes, and all this against the backdrop of the Aeolian relief microforms (blowing and nurturing soil movement).

Increases the risk of the geomorphologic situation gidrootvala to link to faults zone NW trending. In the case of the release of internal energy fracture, it will move on to the wet punktirno-layered composition, loose sediments, creating preconditions for the emergence of landslides. Even earlier, before the mid-1990 's, there was an array of water filtration sand and suffozionnye dispersal of nurturing soil in its lower part. Currently, hydraulic structures-Zhenya gidrootvala destroyed and the protective layer of gravel on the surface gravel eroded network Dalley and small erosive pull-quotes. Active is the stem loose deposits of an array to the former waterworks. A concentrated stream of sand to transit, North zakraine array and goes on a low terrace and catch r. Modonkul′ in the form of a Roundhouse cone stem. Incoming sands carried floodwater downstream r. Modonkul′ and the Valley of Džidy.

2.3. hydrogeological conditions

Source of water supply as Zakamensk are underground water. Surface water for drinking purposes are unsuitable because of the high degree of contamination with heavy metals.

The groundwater zones of fracture of crystalline rocks are also not used due to low yields and heavy metal contamination.

Water requirement of city and Džidinskogo Gok in its period of production activities was estimated at 18-20 thousand cubic meters. m a day. With a view to the supply of water in sufficient quantity and of adequate quality water was organized in the Valley of the river Modonkul′, at 50 m above the mouth Handl. Inkur. For the construction of a water intake drilled 6 wells from 49 to 72 m. Productive aquifer presented modern alluvial sediments r. Modonkul′-pebbles, gravel, raznozernistym sand; average capacity of 50 m. aquifer water table lies at a depth of 2-3 meters, while at the same time the 5-minute wells (one well-reserve) performance intake was 135-140 l/s. exploitable reserves of Modon Kul deposits of underground waters were not approved by the Territorial Commission for reserves (TKZ). Natural resources soil stream alluvium r. Modonkul′ are F.i. Shulga in 125 DM/s, i.e. water intake worked on the depletion of stocks, an indication of this is the reduction of water levels in the groundwater wells and surface water in the Modonkul′ river water intake in periods. Due to technical errors, irregularities in the construction of wells, the latter were zapeskovany-a modern well depth-31 -32 m.

Water intake water quality meets the requirements of GOST-82 "drinking water" in chemical composition and the bacterial profile. However, there is a potential risk of contamination of the

aquifer environmentally hazardous toxic elements contained in groundwater, because of the power of aeration zone (2-3 m) and its litologiče-black composition (pebbles, gravel, sand) aquiferis not protected from contamination. The most probable emergency is gradually deepening and widening of a depression funnel for water abstraction and water capture Handl. Inkur, which contain the most concentrated environmentally highly dangerous toxic substances. Another threat is the notch construction land in the Valley of the river Modonkul′, above the water. In the succession of a "window" in the zone of aeration can penetrate surface water contaminated drainage water West Gallery, which also contain environmentally dangerous components: Cd to 472, Si-505, Zn up to 165, Cr 525 to MACS.

As priority measures for the protection of the groundwater in the area of water intake may be recommended:

(a)) setting aside the manual. Inkur down from the water intake;

b) close the "window" in the Valley of the river Modonkul′ clay material.

For normal operation the water intake should be repaired wells, i.e. clean up their trunks from the sand.

In the case of the depletion and deterioration of groundwater quality Modon Kul deposit may serve as an alternative to the Zakamenskoe underground water deposit, located on the right bank of Džidy, above the mouth of the Modonkul′. A significant portion of its territory now occupied by Horticultural Society "gornyak". The field was opoiskovano and proposed to raise exploration F.i. Shulga water as the source of the Džidinskogo GOK. Based on the results of the assessment carried out preliminary exploration, which fully confirmed the feasibility of domestic deposits.

Hydrological conditions Džidinskogo deposits of underground waters favorable. At the top lies the modern alluvium r. Džidy with capacity of 6-11 m, in which the groundwater is protected from surface contamination; the second aquifer is in pliocenovom allûvii with capacity of 35-75 m, the Pebble-gravel material with sand. It is separated from the upper layer of Pleistocene age loams horizon capacity 7-10 pm Vodoobil′nost′ wells high-30-80 DM/s with decreasing water level at 6-7 pm-aquifer piezometric level, water pressure is set at 0.5-0, 5 m above the surface of the Earth. Wells samoizlivaût Xia, sometimes with the flow up to 40-50 l/s.

TKZ approved exploitable reserves of Zakamenskogo deposit in the amount of 17 thousand. cube. m a day on industrial categories. They have safely secured constantly vospolnâemymi natural resources. Water deposits are protected from surface contamination layer of impermeable loams. The quality of the water conforms to the requirements of GOST-82 "potable water".

Thus, the Zakamenskomu deposit of groundwater is not threatened by depletion (provided the crane mode wells, uncontrollably izlivaûŝih coalesces) and pollution.

3. **description of the business activities of Mr. Zakamensk** 3.1. economic development and use of the site

Town-forming enterprise, the Zakamensk is Jida tungsten-molybdenum plant, which is organized in 1934, in the first years of its production activity is based on winning gold-tungsten deposits along the Gudžirke, Handl. Ivanovsky and others. In 1939 he began to operate underground tungsten mine of Holto and processing plant. In 1941 he started Pervomaysky molybdenum mine and processing plant. During the second world war, the most important task of the country's defence industry supply of tungsten and molybdenum, assigned mostly to Jida GOK, had them performed with honour. Every second tank was wearing armor, džidinskim alloyed tungsten. In 1973 he started working Inkurskij tungsten mine and processing plant.

Due to the remoteness of the railroad (260 km) and from other industrial plant producing most of all necessary for its activities on the ground, and was diversified economies with a complex industrial structure. This is reflected in the structure of the urban area. It includes industrial and residential zone.

The industrial zone is situated in the South-Eastern, Eastern and North-western part of the city. There are enrichment plants, repair-mechanical and cement plants, base materials, Creamery, bakery, brewery, meat-processing plant, a sewing shop factory "Tuyana", a transportation company, urban sewage, farm, bovine, poultry farm, a pig farm. From the South-East and North-East of the residential area of the city closely adjacent dry (old) and namyvnoe (new gidrootval) tailings storage concentrators Džidinskogo GOK. Total area of about 100 hectares. The presence of powdered, washed away by the breaching relief dumps tailings have violated hygiene conditions surrounding residential areas of the city. According to sanitary norms and namyvnoe dry tailings are "chemical producers and production class, 1 p. 9 hazard (hazard)". Normative sanitary zone of 1000 m.

Apart from tailing dams And treatment plants, sources of environmental pollution are heating plants, domestic waste water. According to a statistical report 2 TP-air emissions from four boiler Central boiler is not significant and accounted for 4594.47 tonnes/year, including dust-1332 t/year gas-3262 t/year. Household waste water of the city to a centralized sewage system through pumping station pumping on biological treatment plants located in the northern part of the city. After the mechanical and biological treatment of waste water produced in r. Modonkul′ with $BGPS_5$ = 1 0 mg/DM^3 (Lygdenova et al., 1991). Waste processing plants since 1952, is being dumped on. when working through the gidrootval, a water recycling system.

3.2. the use of mineral resources

In 1997, the GOK had stopped issuing Jida tungsten concentrate. Now Inkurskij and Holtosonskij tungsten mines, processing plants are mothballed. Even previously terminated molybdenum factory in connection with redemption mainly stocks stockwork ores. The remaining molybdenum ore in orogovikovannyh slûdistyh Shales of industrially useless due to bad analysis due to the presence of a large number of nuisance biotite.

The remaining in-place reserves of Inkurskogo and Holtosonskogo deposits in the balance reserves of tungsten in Russia make up 14.4%, and stocks in the tails of the enrichment-a 25% stock availability for Jida GOK inferior only in Russia Tyrny-Auzskomu plant, but surpasses it in content WO_3 in ores and their quality.

Inkurskoe gas field is the largest oil field of Russia štokverkovym. stocks and contents WO_3 it's comparable with the largest deposits in the world the same industrial type (UK, Hemerdon Mystery Creek in the United States, Panaskejra in Portugal) with annual production of 1.2 million tonnes of ore remaining industrial stocks provide the company at 140 years old.

Holtosonskoe tungsten mine was the largest deposit of conductor types in Russia. in the light of the practice of the repaid it took 2-nd place in the world of stocks WO_3 after the Sihuašan′ deposits in China, where stocks greatly depleted and the average grade dropped from 0.8 to 0.5% (Ananin, 1999). in the performance of 250 000 tons of ore per year remaining at Holtoson Vienna the deposit reserve includes diluting materials enough for 14 years. in addition, there are significant prospects for stock build-up on depth, on the flanks and in the meždužil′nyh spaces of deposits (Khadanovich, Smirnova, 1991).

t Ore deposits of the Džidinskih complex (ore deposits of Transbaikalia, 1995). industrial ores Of stockwork, in addition to the main component of mo (0.1 -0.15%) contain on average (in%): 0.018 Veo; 0.031 $W0_3$; C; 0.024 0.038 Zn; 0.04 Pb. Inkurskogo and Holtosonskogo Ore deposits are mineral composition, the DIF </b20 >examines the content of useful components. in addition to the main component $W0_3$ (0.14-0.7%) and they contain (in%): 0.02-0.56 PB; 0.04-0.38 Zn; 0.03-0.17 C; 0.003-0.01 Bi; 0.02-0.05 Be; 4.2-7.6 F; up to 175 g/t Ag, up to 4 g/t Ai. Furthermore, in ores of all fields marked by elevated concentrations of Cd, Hg, co, Ni, CR elements 1 and 2 classes of danger, named components in smaller concentrations present in the mine overburden dumps and off-balance ores. they are actively involved in the processes of migration and the concentration on geochemical barriers in environments.

Stockwork ore deposits after primary crushing at the mine site laboratories mines were transported to processing plants by rail narrow gauge road, later on built in range with the cableway. Ore deposits transported from Holtosonskogo conductor otkatočnyh adits Mill Road (see Figure 1). Ways of transportation are contrasting threads for mechanical dispersion of ores.

Enrichment of molybdenum ore was floatation method of obtaining molybdenum concentrate most of the rest of the useful components concentrated in the sul′fidnom promprodukte removing Mo varied in different years from 79.8 to 88.55% Tungsten ore processed on. flotogravitacionnoj diagram removing WO 3 the concentrate was in the early years -76.7 52.3%. related useful components other than fluorite, concentrated in the sul′fidinom promprodukte that skladirovalsâ together with sul′fopro-what product molybdenum factory in 1980, the spechraniliše. poor sulfide-tungsten stockwork Inkurskogo ore could be processed in conjunction with richer thread ores Holtosona. Standard Checkout 49% actual extraction sometimes declined to 39% (Ananin, 1999), that characterizes the imperfection of the flotogravitacionnoj product of Sulfide enrichment technology.otdelâvšijsâ, while trimming the tungsten concentrate that contains additional useful features, it mixed up with the tails.

The Gok established two tailings (see Figure 1). the first is dry, formed through natural method is immediately adjacent to the industrial processing plants and the urban development of the city of Zakamensk. in the South-Eastern part is specotval sulfide promprodukta. filling it was produced from 1939 to 1958 Gg. tailings dam, also known as Džidinskim deposits were substantial technological sands is a linzovidnuû occurrence of 660 x 300 m, the average power of 10.6 m (Hadanovich, 1999).

The second is gidrootval-tailings dam at the mouth of the river BA-runes-Naryn. Filling it started in 1958 and discontinued in 1997 in connection with the termination of the Džidinskogo GOK. Transportation of tailings in the gidrootval was produced in association with sulfide product by a slurry pipeline, a water recycling system. Tailing has in the plan the form of an equilateral triangle, whose base is bulk dam, with a height of approximately 22 m, length is 950 m Length gidrootvala up the Valley of the river Naryn-baruun-1700 m in the Southeast part of pond-remnant.

Both tailings stacked nescementirovannym plohootsorti-licensed quartz sand mixed with fragments of grains of feldspar, amphibole, èpidota, more rare fluorite, sulphides, gûbnerita, scheelite, Beryl. Sulfide specotval is sypučkoj with some grains of pyritic sphalerite, galenite, chalcopyrite ore, dull, gûbnerita, scheelite, complex sul′fosolej Bi and Ag as well as the rare telluridov and u and Ag .

On the surface of the tailings there is no soil and vegetation cover. It divided the tiny grooves strujčatogo Washout, narrow ravines and steep tal′vegami, vodoroinami, indicating active slope processes associated with linear flûvial′noj erosion. Bulk dam gidrootvala also breaks down under the influence of temporary streams that form the river Modonkul′ the cone stem, small landslides. On the surface of the tailings are specific deflationary form: enclosed depressions, blowing down and cross the prevailing North-Western winds a small projection ridges, bumps. This is especially the case for

substantial storage tailings in a subsurface depth inches-the first of dozens of centimeters there has been a sharp decrease in the number of particulate concentration of coarse silt and ŝebnistoj components of dicofol and blowing small particles.

Plane wash material with substantial storage surface tailings under the influence of neruslovogo склонового rainwater and meltwater runoff is directed to the bed of the Modonkul′ River in 3 and SW direction and runs through a large part of the territory of Zakamensk. Linear demolition of temporary surface watercourses is sand Earth dams and ditch on the eastern outskirts of the city to the North, in the direction of r. Modonkul′ (see Figure 1 in the annex). For dams were used from the tailings. Dams and ditches were also to collect emergency discharges tailings transportirovavšihsâ on gidrootval on gipsometrical above a slurry pipeline.

The most significant was the substantial erosion of the tailings in the long term of its existence (58 years), taking into account the time of operation before and after conservation by now. As a result of a plume pereotložennyh sands, has complicated the configuration protâgivaûŝijsâ to r. Džidy in General, at 7.5 km. within the prolûvial′no-allûvial′nuû, width from 50 to 500 m, and del′tovuû parts (see Figure 1 of annex). Last, called Modonkul′skim field of technogenic sand, formed at the mouth of the river Modonkul′, is in the form of elongated, area 1 x 2.5 km, maximum power 2 m Surface is rough, it has low shafts and fall, often filled with water.

Cable material nescementirovan in his pereslaivanie is sandy and Sandy-clayey, clayey layers. In General, in the direction of demolition material is reducing grain sands, improve their sort. Clay and sand-clay seams are enriched in sulfides, gûbneritom, šeelitom. Del′tovaâ part of the plume, built mostly with fine sands, has cut a thin strip similar to the rhythmic layering reflecting periodic major flooding of the water in the Delta. Puff up to 2 mm, enriched with clay, densely saturated with sulphides, contain higher concentrations of gûbnerita and scheelite.

For the material of both tailings with high content of toxic components that inherit their concentration in raw ores (table 1 in the annex). The dust fraction (-0.07 mm) concentrations of toxic elements in 2-5 times. Pereotložennyh ribbon cable sands also have high concentrations of these elements. Note the decline of their contents as you increase the distance of migration. In the sands of gidrootvala visible differentiation on the surface and in the concentrations of these elements-they are reduced in SW direction and depth from dumping the pulp along the dam.

Cytological and physico-mechanical properties of man-made sand promote intensive dispersion of their material, particularly thin and fine fractions, pollution of the natural environment. the main processes are: wind rampage covering more extensive territory; plane wash and linear erosion, especially intense in the spring and summer floods; alluvial demolition RECth Modonkul′ pereotložennogo material; anthropogenic dispersal of episodic use sand spreaders for roads, playgrounds, construction, etc. Transfer of sulphide waters at considerable distance (7.5 km and more) is preserved on the surface of the grains tape flotation reagents. In and around by substantial volumes of sand shifting itself clearly marked U. high concentrations (up to 29 g/t) are typical for the priplotikovoj part, deposits of tailings ponds and the bulk of the buried soil as a result of the concentration of U in the recovery gleevom the barrier, as well as the estuary of the plume demolished sands, as the result of a concentration of U in the sedimentacionnom and recovery barriers.

4. assessment of the Habitat alterations, the Zakamensk

To determine the size and intensity of technogenic pollution in 1990-92 he was a Gudžirskoj FRACTURE by Zakamensk Executive Committee held a detailed 1: 5000 scale, ecological-

geochemical survey, which consisted of a study of soils, groundwater and surface water, snow cover, the radiation situation (Kuzmin et al. 1991; 1992). These materials have been supplemented by research of the Buryat scientific center of the SB RAS, the Federation of the Republic of Buryatia, Buryat Republic Center for Hydrometeorology and environmental monitoring.

4.1. atmospheric air

Assessment of the State of the atmosphere is based on an integrated assessment of air pollution study area to determine which uses a system of direct, indirect and indicator criteria.

Direct evaluation criteria Main criteria. State air pollution values are the maximum allowable concentrations (MACs) of the USSR Ministry of health has approved for hazardous substances, adverse human health effects. it should be borne in mind that the atmosphere is in a special position in the ecosystem, as the migration of man-made pollutants and the most variable and dynamic of all components of the abiotic components.

The atmosphere is the primary link in the chain of pollution environments and objects. In some cases, soil and surface water can be sources of secondary pollution of the atmosphere or indicator of pollution. This situation determines whether in addition to the assessments of the pollution of the air, and directly impacts impacts on neighbouring environment. Cumulative assessment of the AB shall include an assessment of:

1) pollution levels with hygiene items;
2) the resource potential of the atmosphere;
3) a certain degree of influence on environment: land cover and surface water;
4) trends and intensities of human influences;
5) defining the spatial and temporal extent of negative effects.

The most general and informative indicator of air pollution is KIZA-composite index annual average pollution of the atmosphere, which is used to compare pollution of various territories and to assess long-term trends in state changes.

Table 1

Criteria for the assessment of the State of pollution of the atmosphere

comprehensive index

Indicators	Environmental condition classes			
	rules (h)	risk (p)	The Crisis (To)	disaster (b)
Levels of atmospheric pollution	< 5	5 - 8	8 - 1 5	> 15

Resource potential of the atmosphere (RPA) territory is determined by its dispersible material and eliminate impurities and is characterized by the factors favouring and hindering air purification.

$$RPA = \frac{\mathbf{X}\ (Ni + N_2)}{\mathbf{(I)}\ (N_3 +_4 N +_5 N)},$$

where Ni , $(N)_2$ -for purification of factors:
Nj -normalized for the number of days with wind > 15 m/s;

$(N)_2$ -number of days with precipitation > 5 mm.
$(N)_3$, $(N)_4$, $(N)_5$ -to cleanse the factors:
$(N)_3$ -number of days with fog;
$(N)_4$ -number of days with štilâmi;
$(N)_5$ -number of days with relative humidity > 80%.

Based on materials provided by Goskomgidrometcen-centers of the Republic of Belarus, us REPUBLICAN calculations were made for the city of Zakamensk. In General, the urban area is characterized as a territory with low ambient air purification capacity.

Indirect measures of pollution atmosphere is the intensity of atmospheric contaminants as a result of dry deposition to soil and water run-off and its precipitation.

The evaluation criteria are valid and critical load value, expressed in units of the deposition density of time (duration) of their income.

To assess the impact of us suggested the following types of spread of contamination:

the local impact areas created by the heavy soot and dust particles, within a radius of 5-10 km;

areas of the background effects posed by the spread of lighter particles, up to 50-100 km.

An analysis of human impact on the atmosphere shows that air pollution, is stationary, as Zakamensk. informal and mobile sources. The total number of sources of emission of pollutants is 47 units, total emissions from stationary sources 2009 t.

The main and the largest source of atmospheric pollution was the Jida tungsten-molybdenum plant, where intensive pollution occurred in the process of production, transportation and processing of ore concentration plants.

Tungsten and molybdenum deposits were exploited in more than 50 years. In the ores of combine present elements relating to (I) hazard class: cadmium, lead, zinc, fluoride; class II-fewer elements molybdenum, copper and class III-beryllium, tungsten and bismuth, caesium, rubidium.

Emissions over the past 15 years are presented in table 2.

Table 2

Indicators	1980	1985	1987	1988	1993	1995
Thrown in AB, t		5824.9	4827	4756.7		
solid		1376.1	1566	1494.9		
gaseous		4448.8	3262	3261.8		
sulfur dioxide		756.3	1455	1455.9		
Carbon monoxide		3559.0	167	167.2		
oxides of nitrogen		133.5	1440	1440.8		
hydrocarbon		-	198	198.4		

Now with the closure of the plant's emissions had decreased considerably. The main sources are the enterprises of food industry and unorganized storage of man-made sand that the wind scattering create high background concentrations of dust fraction in the surface layer of the atmosphere.

To identify local pollution we have defined area under the building (industrial, urban, infrastructure) and calculation of emission density per unit area. This assumes that the bulk of heavy particles deposited within built-up areas.

The main source of local pollution of the atmosphere is the areal area sand waste processing plant Džidakom binata-located on the eastern edge of the city and extended to the 5.5 km. The tailings dam has the most significant influence on the radiation situation in the town of Zakamenske, as containing the carcinogenic elements above the sands of sanitary-and-hygienic standards. So, the lead content is 2-31 MPC, sporadically up to 62, beryllium-3-MPC, sparsely-40 to 80, copper-3-MPC, sparsely-65 to 260, zinc-2-7 MACS, sporadically, until 20, molybdenum-2-100 MPC, sparsely-200-266. (Report on the results of ecological-geochemical research Zakamensk, 1992, 2005).
Using the Methodology of leadthrough of taking of inventory of extrass of contaminents in an atmosphere "(Moscow, 1992), the US calculated emissions from the tailings by means of the following formula: **Ki * (K)** $_2$ *** (K)** $_3$ *** (K) 4 * (K)** $_5$ *** (K)** $_7$ *** T *** ^{6}in 10!

$$M=A+B=\frac{\text{Ki * (K)}_2\text{ * (K)}_3\text{ * (K) 4 * (K)}_5\text{ * (K)}_7\text{ * T * }^6\text{in 10!}}{3600} + K_3 * K4 * To_5 * and_6 *_7 to * with * p, \text{ where}$$

M-total emissions, h/s;
(A) emissions from processing, h/s;
In emissions when static storage material, h/s.

As currently no sailings are no processing, we use only the second part of the formula in which the$_3$ -factor, taking into account local conditions;
The$_4$ -factor, which takes into account the degree of protection from external influences, site conditions of dust; The$_5$ -factor, which takes into account the humidity of the material; To$_6$ coefficient that takes account of the surface profile of the stored material and defined as the ratio:

$$For_b = \frac{P_{fact}}{P} \text{ where}$$

P_{fact} -the actual surface of the material, taking into account the topography of the area, m^2;
N-surface dusting in the plan, m^2;
The$_7$ -factor, which takes into account the size of the material;
C-dust entrainment with one m^2 the actual surface, h/m^2.

Rates are as follows: the$_3$ -at an average speed of wind in July, 1.1 m/s = 1.0;
To$_4$ -provided storage with 4 opening sides = 1.0; To$_5$ -if the moisture content of material up to 3% = 0.8.

The area of the pile 1 (fig. 1)-30.43 acres (361 m away x 843 m) = 304323 m^2.
Height of-37 m.
Blade 2 area (fig. 1)-170.4 ha (1637m x 1041m) = 1704117 m^2.
Height-86 m.
KB-for blade 1-1.37
for Blade 2-1, 51
The$_7$ -when size material from 1 to 3 mm = 0.8;
With-at warehousing sand = 0.002 g/m/sec. ^

Emissions under these conditions is: m! = to$_3$-to$_4$-to$_5$-to$_6$-to$_7$-p-c = 1.0 -1.0 -0.8 -1.37 -0.8 -304323 -0.002 = 533.66 g/s; M_2= 1.0 -1.0 -0.8 -1.51 -0.8 -1704117 -0.002 = 3293.72 g/s

When the concentration of dust, we used the program for calculation of fields of concentrations of pollutants.

The source data used in the calculation are as follows: Von Mp = 0.2 mg/m^3
code 2908-dust inorganic with contents **Sio 2** from 20 to 70%;
$MAC_{M\cdot R}$= 0.3 mg/m^3;
code 2902-suspended solids;
$MAC_{M\cdot R}$= 0.5 mg/m^3
Weather Conditions: $_{1\ L}$ = +24.1° c;
V = 8 m/s
June and July average speed = 1.1 /sec Settlement area (fig. 5) applications. Total estimated area: 6000 x 8000 m living area:
site no. 2, no. 3, no. 4, no. 5, no. 6-provided by the configuration of the city; Rate of relief passed = 1.2;
Wind speed and direction taken as follows:

* * *

1. a search of 0.4 m/s; V; 0.5 1.0 1.5 V; V; 8 m/s to 0 sector from 180°, pitch 30°
2. sector E; b; N; n-e wind direction
   South of 34° to 56°; In-from 79° to 101°; W-124°-146°; Yu-from 169° up to 191° in steps of 5°
3. fixed couples; with a speed of 8 m/s-45°, 90°, 135° and 180°.

Results For:

1. dust 2908 (fig. 5 applications)

PL. 5	56.82 (2125/3408)	**YU**	0.5 m/s	Dozer blade No. 1-56.78
PL. 6	28.26 (2740/5216)	**in the afternoon**	0.8 m/s	Dozer blade No. 2-28.26

2. the amount of 6056 (dust 2908 +2902) (fig. 6) application.

Table 4

PL. NO.	max Konz.	chance of rain	speed	background	Contribution To
PL 2	19.06 (1492/2042)	**NE**	1.1 m/s	0.08	Dozer blade # 1-13, 44 Dozer blade No. 2-5.54
PL w	9.86	**NE**	8.0 m/s	0.08	Dozer blade No. 2-

	(1878/1066)				7.82 Dozer blade No. 1-1.96
4 sq.	44.76 (1912/3416)	**SW**	0.5 m/s	0.08	Dozer blade No. 1-44.69
PL. 5	56.90 (2125/3408)	**Yu**	0.5 m/s	0.08	Dozer blade No. 1-56.78
PL. 6	28.34 (2740/5216)	**in the afternoon**	0.8 m/s	0.08	Dozer blade No. 2-28.26

Thus, the results show that the maximum concentration of dust (2908) exceeds the maximum allowable concentration in all settlement areas residential zone Zakamensk. Highest dust concentration is within the boundaries of the site no. 5-56.82, lowest at site no. 3-9.78. calculation of the combined effect of the dust concentration and suspended solids showed virtually the same results as in the first option identified results lead to the conclusion that the residential zone Zakamensklocated in the immediate vicinity of the DVMK surface, there are piles of background concentrations of more than 15 MACS. With more than 15 MACS pollution on atmospheric pollution assessment criterial refers to class environmental **disaster zones.**

Cumulative emissions in the atmosphere.

Provided that the total number of days a dusting of the surface of the HVO-stohraniliŝ-90 (about 3 months), the total mass emissions of half-lûtantov with blade 1 at specified concentrations 533.66 g/s is:

$M1_{YEAR}$ = 533.66 g/s • 90 • 24 * 3600 = 4149 tonnes/year

Blade 2-If the estimated concentrations of 3293.72 g/c mass is: m_{2god}= 3293.72 g/s • 90 • 24 • 3600 = 25606 t/year.

Obgcij emissions from fugitive sources is 29.7 thousand t/year. Emissions from mobile sources are on the methodology of Scientific Research Institute of motor transport, Moscow. With an annual consumption of gasoline in 1300 t and diesel fuel in 794 tons, the emissions amounted to 1128.6 tonnes, of which carbon-monoxide 859.4 t, nitrogen oxides-83.76 tons, sulfur dioxide-18.48 t, HC-153.82 tons, soot -13, 1T, benzo [a] pyrene-0.55 kg.

Aggregate emissions from stationary and mobile sources, unorganized in Zakamensku amounted to 32.9 thousand tons.

To neutralize air pollution are important features of the natural environment, particularly the air regime, provision of emission sources in relation to the terrain. Zack-guards of the province's territory is located in the Intermountain trough that creates congestion of air and surface inversion combined with long periods of weak winds, and refers to the area of dangerous air pollution potential. Given the characteristics of the terrain, it can be assumed that the dispersion of contaminants occurs above residential area city of Zakamensk.

The local pollution per unit of residential (built-up) area area of 70.97 km^2, is 53.1 t. usually, local levels in 50-100 tonnes or more per 1 km^2 is located in territories with high air pollution and high.

Comparative analysis of local emissions of 1 km^2 site (RB) shows that the most "polluted" areas include all industrial sites that obviously, because the Foundation of industrial development are thermal power generation, building materials industry, pulp and paper, etc. However, the combination

of anthropogenic impact in combination with natural and climatic features of the territory contributed to the ecological environment of the city.

The results of sampling of snow cover on the territory of Zakamensk in 1991-1992 biennium Gudžirskoj EMG (Kuzmin et al., 1992) show on air pollution material industrial Halo high common sand. mineralization of snow water reaching in some samples 12-160 mg/l in General coincides with a halo of soil contamination (fig. 3) the Ionic composition of the snow water everywhere is the sulfate ion consisting of a solid balance of waters are chemical elements tails: Pb, b, Mo, Zn, Ag, Li. all this shows that major air pollutants are industrial waste GOK.

4.2. soils

Based on the results of ecological-geochemical soil mapping (Kuzmin et al., 1991) throughout the city is an integrated geochemical Halo high contents of 1 St, 2nd and 3rd class risks and potentially dangerous: Cd , Pb , Cr , Ni , Co , Cu , Mo , Sb , Mn , W , Sr , (V) , The Be , Ag , Bi The contrast of anomalies. these elements generally increases towards the tailings, indicating that they are the source of pollution of soil composition elements that detect elevated concentrations in soils, inherits their man-made sands tailings (table 1.2 of the annex).

Evaluation of chemical contamination of soils is made on total index Zc according to ecological-geochemical survey, adjusted for qualitative chemical definitions.

$$Zc = \sum_{1}^{p} c_j - (n-1)$$

where $\sum_{1}^{p} c_j$ -the sum of the coefficients of p elements on the

their baseline contents.

The area of environmentally hazardous and of high risk items with a total coefficient of concentration (Zc) of more than 32-128, covers more than half of the square (1.8 km) g. Zakamensk (fig. 7 adj.). the environmental situation in this area is rated as a crisis and catastrophic (criteria..., 1992). the area of a strong and very cMobile soil pollution okonturivaût two hvostohrani-the intimate and the train demolished the sands, including the del′tovuû part (Modonkul′skoe pond). In the central part of the city areas of strong and very soiled in some cases involved man-made sand used to fill roads, courtyards of apartment houses, kindergarten and secondary school No. 5. The low pollution (Zc = 8-16) are located on the periphery of the high minimum pollution pollution (Zc < 8) indicated to the left bank of the river Modonkul′ and in the sides of the Valley.

Contamination of the territory of Zakamensk continues. In addition to anthropogenic contamination through the use of man-made sand for roads, construction and other economic needs, intensely are natural processes of dispersion of tailings. Among them were: 1) wind rating, 2) sklonovye processes, 3) the activities of temporary and permanent watercourses. The most extensive development has a wind rating. In its pure form it is celebrated on the slopes of the Valley of the river Modonkul′. The total flow of pollutants from the surface of the tailing dams in the area, the estimated average Zakamensk 2300 tonnes per year at 1 kV. km (Yatsenko, 1994, 1999).

Plane wash material with substantial storage tailings surface directed towards the city and passes through all of its territory. for his account expansion of zones of weak pollution (Zc = 8-16) at 25 m per year, average (Zc = 16-32) to 17 m a year, strong and very strong (T > 32) to 6 m per year. gidrootvala surface with sand Flushing occurs through the destroyed dam in catch r. Modonkul′ and r.

Džidu., it can imply speed of displacement of polluted areas close to zones of pollution from tailings were substantial storage. Cessation of the production of the Džidinskogo Gok aggravated the situation, as the pollution of the natural environment became involved material gidrootvala.

The expansion velocity of polluted areas to predict that by 2010, the territory of the town of Zakamensk soil, located on the starboard Modonkul′ Valley, will be contaminated severely, heavily, and as much as possible. The environmental situation of this whole area will be evaluated as an emergency and as environmental disaster (fig. 8 adj.).

4.3. radioactive contamination

The radiation situation, the Zakamensk approached 1990 г. (Raven et al., 1991) and in the 1991-92 years. (Kuzmin et al., 1992) on the instructions of the Executive Committee of the city of Zakamensk. The following meetings were held: Aero-ray Spectrometry and pedestrian shooting in the city and the surrounding area, a radiation and radiation-nuklidnoe inspection of buildings. Found that man-made sand both tailings are characterized by elevated radioactivity and are a dangerous source of pollution of the surrounding area. Intensity gamma field in which reaches 40 MCR/h, the content of U -1.5 -1.8 x 10^{-4}, T″ -10-15 x 10^{-4} to-3.5 -4%.

On the anomalous values of radiation fields traceable paths were substantial piles of tailings and gidrootvala, as well as the plume of demolished sands that stretches across the eastern outskirts of the city and along the bed of the river Modonkul′ (fig. 9 apps). Radioactive anomaly, formed a train, has a width of 350-400 m. in the wellhead part of Modonkul′ it expands up to 1.2 x 2.5 km, covering the territory of the country the co-operative "gornyak"; Here there has been an increase in the intensity of anomaliesthat indicates deposition of mobile forms of U on the Delta sedimentacionnom and recovery barriers. recovery Wednesday in the sands of the Modonkul′skoj reservoir due to elevated content of sulfides, concentrating in clay layers that are characteristic of rhythmically-layered cut loop Traces of man-made deposits. Sands, the occurrence of elevated gamma field values, continue along the right bank of the Džidy River downstream from the mouth of the Modonkul′ at a distance of 1.5 km.

The majority (80%) of the the territory is characterized by the Zakamensk background radiation with gamma radiation from 9 to 17 μSv/h, that is, on the whole, consistent with existing standards. Against this background are the anomaly intensity of up to 30-38 μSv/h, from material piles Of mine when filling water protection dykes along the right bank of the Modonkul′. Spotlights anomaly intensity of up to 30-38 μSv/h installed in kindergartens, dispensary, Office Džidinskogo Gok et al. They involve in building construction materials (brick, concrete, plaster) using waste molybdenum factory. Under existing rules, for residential construction materials can be used with gamma radiation not exceeding 20 μSv/h.

4.4 potable water

As a source of drinking water, the Zakamensk, mainly uses ground water abstraction in the Valley of the river Modonkul′, at 50 km above the mouth of the manual. Inkur. According to the study of groundwater in the city (Kuzmin, 1992), water, chosen from the columns of the central water supply, fresh, hydro-carbonate-calcium-magnesium, contains no harmful impurities. In General, it meets the existing rules (criteria..., 1992).

Part of the population, living on the left bank of the Modonkul′, use water from individual wells and wells. It mainly hydro-carbonate-sodium-calcium-magnesium. At some point there is a high content of nitrates, most likely because of the excessive use of organic fertilizers in gardens.

5. evaluation of the change of natural environment and natural ecosystems

g. Zakamensk

5.1. air pollution

5.2. surface water

Clean River water-neutral, is hydro-carbonate-calcium-magnesium composition, General mineralization- -0.2 0.1 g/l. close to the characteristics of the water of the river Modonkul′ in the background of the site, located outside the city of Zakamensk-above the site where the flowing water, Miner dreniruemye galleries of Western mine Holtoson (tab. 3 adj.). exceeding of MACS for reservoirs destined for fishing here is for c and Fe (General) below the waters of the river Western Modonkul′ gallery-the main reservoir c. Zakamensk and Inkur creeks, Barun-Zun and Naryn have hydrocarbonate-sulphate-magnesium-natro-potash compound acidic reaction (pH of 5.8 to 3.27). the content of most of the components in them exceeds MPC. Thus, in the water stream Inkur (see table 3 adj.) exceeds MPC content: SO 4 '² -in 2-7, 6 times, SA^{+2} -in 1.5 times, Fe (General)-the 5-98 times, Si-in 140-6700 times Zn -in 52-270 times, suspended solids up to 7 times according to the sampling of bottom sediments (Kuzmin et al., 1991), in the said streams are contrasting threads scattering Mo , W , Si, The Be , Li , Bi , Pb , Zn , Ag , Cr , (V) .

The elements-pollutants in water and sediment of these watercourses inherits the them in mine adits, otkatočnyh waters which drain the lower horizons mine Holtoson (North and West). According to long-term observations (see table 3 adj.) is an acidic sulphate water pH that ranges from 1.7 to 7.5, depending on the time of year. content of polluting components in them exceeds the MPC: As -up to 11 times, on Ni up to 56 times, CR-525 times Zn -up to 27 times, according to SI-to 19840 times on the weighed substances is up to 32 times, sulphate-up to 6 times (see table 3).

These bioassays in accordance with Rd 118-02-96 by Ulan-Udenskaya integrated State inspection of the Republic of Buryatia October 8, 1996, indicate that water of the Western Gallery of the extent of influence of the day-Rachkov Daphnia magna are gipertoksičnyh with rate 2 because they require dilution in 100 times in comparison with control, 100% loss of test objects in a natural sample and all dilutions came through 50 minutes of the start of the experiment, the waters of the river Modonkul′. above the mine discharge waters Gallery West, according to the same bioassays, are non-toxic.

For total evaluation of dangerous levels of water pollution in the allocation of environmental emergency areas and ecological disaster is a formal summary indicator of chemical pollution (GGHZ-10). It is especially important for areas where there is contamination of several chemicals, each of which is many times greater than MPC (criteria..., 1992.) This is the territory of Zakamensk. UGS-10 for items 3-4 classes of danger in the waters of the Modonkul′ River in the city, according to a sampling of 1996, 1998, 1999 гг., ranges from 355 to 526, that according to the adopted estimates (criteria..., 1992), describes the aquatic environment r. Modonkul′ as the object at an environmental emergency and disaster situations (table 5 adj.). Rate Donna c accumulation of Zn, Cr, As, in the river

Modonkul′ of $3x10^4$, also allows you to assess the situation as the environmental disaster on the destruction of aquatic ecosystems in the lower reaches of the Modonkul′, Inkur, Barun-streams and Zun-Naryn is the lack of algae, the disappearance of all fish species (see table 5prilož.).

The above data indicate deep irreversible changes of important components of the environment, the Zakamensk, affecting soil and surface water, as well as the destruction of natural ecosystems throughout much of the city. Having said that, we consider it necessary to assess the overall environmental situation in the city as an environmental disaster zone.

6. public health

When assessing the health status of the population of Zakamensk used comparison methodology with relatively ecologically healthy city, located in the same climatic and geographical area of Kyakhta (Kyakhta district). The methodology for the identification of links in the system environment-health "is based on the following principles:

- in assessing the impact of the environment on the health of the population as the primary public health option choose the incidence of child population;
- The response of the organism to atmospheric and soil pollution in descending order forms a series: 1) immunological reactivity; 2) acute respiratory disease allergic nature; 3) abnormalities of the functional and physiological indicators-violation of the harmonic physical development, the increase in the number of leukocytes in the blood when hemoglobin (anemia); 4) growth of chronic diseases; 5) an increase in the frequency of congenital anomalies, tumors, blood diseases, circulatory system, responsive to the quality of the living environment.

One of the main criteria for adverse environmental conditions is the deterioration of the public health impact of anthropogenic pollution and other factors. Major medical-demographic indicators on the prevalence of several health disorders are congenital malformations of newborn, spontaneous miscarriages or abortions, the incidence of children and adults, oncological diseases) according to the criteria of evaluation of the environmental situation of the territories in order to identify areas of environmental emergency and disaster zones ". G. Zakamensk is one of the industrial cities of the Republic of Buryatia, an analysis of these indicators of health assess the effects of the pressures on the environment and human health.

Our analysis of the level and dynamics of demographic indicators for 1988-98 Gg.(fertility, mortality, infant mortality, natural population growth, expectancy of life at birth, General and child morbidity, etc.) the city has demonstrated a steady Zakamensk troubles in the health of its inhabitants.

The following sections of the main sources of pollution are the following violations of the health of the population of the city:

- general population morbidity, sickness of different classes and types of toxic effects resulting from the effects of different compounds, mostly on non-specific mechanisms of regulation of the body's resistance to pathogenic causes (increased concentrations of iron, leading to cirrhosis, diseases of the circulatory system);
- malignant neoplasms diseases of different localizations: cancer of the respiratory system, gastrointestinal tract, skin cancer and effects of modifying action of chromium, nickel and cadmium; lesions of the musculoskeletal system, upper respiratory tract and the lungs,

digestive system, skin, and endocrine imbalance as a result of exposure to fluoride and fluoride;

• birth defects, spontaneous abortions and miscarriages, perinatal mortality, as effects associated with mutagenic (genetic) and teratogenic action of environmental pollutants.

The demographic situation the city against the backdrop of a dysfunctional, also looks at the background of environmental pollution on the health impact and socio-economic crisis of 1994 with g for the first time in many years marked by natural population decline due to the excess of deaths over births overall. for example, the birth rate of the population of the city for 8 years (1991-1998) had dropped from 15.0 to 10.5 per thousand, the mortality rate has increased from 10.0-13.0, far exceeding the average rate of 11.9 per 1000 population-all indicators we compare relatively clean city-the Kâhtoj City of Kyakhta fertility rates for the period from 1994 to 1998 he was. fell from 12.2 to 11.0, the mortality rate also decreased from 12.1 to 9.3 per 1000 population natural decrease (or increase) grew in 1998, in the Zakamensk. -2.4, for the city of Ulan-ude-+1.7.

The main causes of death among the population are diseases of the circulatory system and malignant neoplasms, which died 80.3% of the total number of dead. Proportion of malignant neoplasms in the total mortality rate was 13.1%. Increased mortality among the active working age up to 38.4% of all deaths. There has been an increase in the working-age population mortality from cardiovascular disease to 29.5%, respiratory diseases to 72.6%.

Negative demographic situation in effect on life expectancy. Male life expectancy decreased from 1989 at 6 years old, among the male population to 3.4 years 5.7 years among women. In 1996, the average life expectancy for men was 54.1 years, women-65.0 years.

Morbidity of population of Zakamensk

Our study methodology included a record of diseases during the first year of life in the maternity hospital, a children's clinic, the hospital. Fee information was collected from the medical records of women's clinic, a maternity ward REGION and child health clinics, the Zakamensk and the histories of diseases of the children's ward CENTRAL HOSPITAL. This suggests the most posted (at the level of medical care available in town), including morbidity morbidity according to the negotiability, preventive check-ups of infants hospitalized, official statistical data.

The overall incidence of**.** In the general morbidity of the population of the city there has been a significant growth in recent years, disease of bodies of blood circulation, respiratory, nervous system and sense organs and tumors.

Respiratory diseases are, despite the decline in the incidence of up to 23353.4 per 100 thous. in 1997, the population (in 1996-24586.4) occupies 1-e-th rank place in the structure of morbidity. Significantly increased incidence of asthma compared to previous years with 141.6 on 100 thousand. population to 175.3 (in adults, in children cases 246.6-57.1). At 2-ohms ranked place steadily from year to year is the incidence rate of disease of the nervous system and sensory organs, making 13505.7 on 100 thousand. the population.

In 1996 year was marked by a significant increase of diseases of blood and blood-forming organs among all categories of the population, so the incidence of adult population increased by 22.6%, children and adolescents in 1.8 times. And ' a large proportion of this group of diseases are anaemia-21.5%.

One sign of the impact of environmental pollution on human health is the incidence of neoplasms. So the cancer morbidity in Cherkassy Zakamensk is stomach cancer, while for the

Republic and for the city of Kyakhta this place belongs to lung cancer. In 1998, the incidence of stomach cancer has increased by 1.5 times compared with 1989 g.

The incidence of the child population. While lowering the infant mortality rate in the city there has been a significant increase in congenital malformations in children, compared with g. Kâhtoj increases were almost 2.1 times during the period under review, the overall incidence rate reached 69093.9 per 100 000 population, compared to 1992, the figure had risen to 1.2 times.

The lead, as in the rest of the Republic, in the city of Zakamenske were respiratory diseases and even tend to decrease, this is largely due to the low obraŝaemost′û of parents for medical help. Second place in the morbidity of children belongs to the diseases of the nervous system and sensory organs. The endocrine system and an eating disorder due to the greater prevalence of malnutrition and diseases of the thyroid gland, which is associated with eating disorders, quality of drinking water. A special place in the structure of morbidity of children are diseases of bodies of digestion, which is unusual for the Republic as a whole.

Reduction of the total morbidity of children of Zakamensk mainly due to the fact that after discharge from the maternity hospital and at an older age, sharply declining demand by parents for medical help for economic reasons.

In the town of Zakamenske at a low level of infant mortality at a relatively low level registered general morbidity (3428-3274 ppm) within classes are more serious and long-running condition; a high proportion of perinatal pathology, which is directly connected with the deterioration of women's health and disabilities to provide obstetric care. In 90-s ' years marked by significant growth in the registration of birth defects in children, as compared to the more prosperous 1988 year index increased more than 1.5-2.5 times.

However, during the study period, despite an increase in the adult population of women of childbearing age (3896 in 1988 to 1998, the 4705) in the number of births declined from 276 in 1988 to 92 in 1998, 2005, and has dramatically increased the number of premature births and spontaneous miscarriages. State of health of pregnant women in the last decade

-44 24.5% of women suffered from anaemia of varying degrees of severity, from 29.5% of pregnant women with severe gestosis, bleeding, habitual miscarriage; chronic intrauterine hypoxia and fetoplacen-fetus suffer deficiency of the tare 22.7%; with the condition of-13.6%; with the threat of termination of pregnancy, every fifth woman; diseases of the genitourinary system available to 20.5% of pregnant women. In recent years among pregnant women-women, the disease has become more frequent as Zakamensk chronic nonspecific diseases of lungs in severe obstruktivn′j: chronic bronchitis, bronchial asthma. Draws attention and significant growth in recent years, diseases of the thyroid gland (from 3.5% in 1995 to 19.7% in 1997, 2005).

Table 5

Characteristics of reproductive health Zakamensk

Indicators	Intensity indicator (number of cases per 1 OOO pregnancies or births) {									
Medical genetic indicators	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Congenital malformations	21.8	46.5	46.5	86.9	70.0	39.5	5.1	51.7	30.8	32.6
Spontaneous abortion	64.4	113.5	114.7	94.6	135.6	127.4	147.8	154.4	133.6	129.9
Morbidity of newborns	116.7	129.0	223.2	233.2	158.4	146.8	253.8	160.9	277.7	237.8

Table 6

Description of the health status of the city of Ulan-ude

Indicators	1994	1995	1996	1997	1998

Total population (thousands of persons)	18.8	22.783	18.849	20.311	22.353
Birth rate (per 1000 population)	12.2	13.1	13.3	12.3	11.0
Death rate (per 1000 population)	12.1	9.3	12.2	10.8	9 3 G
Infant mortality (per 1000 live births)	17.4	21	18.3	15.3	23.3
Female fer-til′nogo age	3636	3720	4050	4350	4824
The number of births	234	213	262	250	246
including premature	13	7	10	12	9
spontaneous miscarriage	23	15	17	22	14
The number of live births	231	212	264	251	248
stillbirths	1	1	2	1	2
Congenital malformations	0	1	1	2	1
The overall incidence of children (in 10000)	-	1345.2	2224.9	1893.1	1754.5
Endocrine with-we	1	1	1	2	1
Diseases of the nervous with-we	37	39	41	40	43

Diseases of the respiratory system	10	37	41	38	40
The overall incidence of	29700	29200	18580	19134	18755
Onkozabolevaemost′	124.3	125.3	126.6	178.7	190.0

7. the analysis of the system of monitoring of the environment and public health.

State of the environment in the town of Zakamensk and its impact on the health of the population completely objectively are troubling over the past decades. The Džidakombinata, as you can see from the previous material, have now caused devastating changes in the environment and as a result, the health of the population of Zakamensk.

Has the administration area and the Džidinskogo mill, attempts have been made to improve the ecological situation in the city, however, in connection with the termination of the work of the basic city-forming enterprise and the general economic situation in the country they do not lead to a change.

In connection with the planning of remediation activities and adjustment of the master plan were Zakamensk environmental assessment "Sibcvetmetniiproektom" Krasnoyarsk and "Burâtgraždanproektom" respectively. In addition, some sample studies of the natural environment and other enterprises and organizations with environmental goals, as well as related search and evaluation of mineral resources.

So major studies were carried out in 1990, the CDU Burâtgeolo-GIA (Central geophysical expedition party no. 1) to study the radiation environment, the Zakamensk. that same year, Gudžirskoj AF was ecological-geochemical survey Samples were selected from the soil. over 100 x 100 m and 50 x 50 m

(in kindergartens, schools, hospitals), from the bottom sediments (p) . (p) . Inkur and Modonkul′ at intervals of 200 m of surface water samples were also selected watercourses.

Periodically examines the State of surface and waste water and water that runs Goscomecology and by hydrometeorological Centre of Republic of Belarus, as well as regularly monitored the status of drinking water to the District of SES.

Unfortunately, systematic and integrated monitoring of the environment in the territory of the town of Zakamensk is not carried out.

AOR

Analysis of the health status of the population is carried out by the Ministry of health of BELARUS on the basis of health insurance, the Zakamenskogo district and the Zakamensk appropriate methodology.

h In accordance with the environmental assessment and the anthropogenic pollution sources, in the territory of Zakamensk to a comprehensive systematic monitoring, which should be controlled by parameters of atmospheric air, content items (I) and (II) risk groups in the soil and snow layers, surface watercourses, State of the geological environment and geological processes also need radiation control. due to the high content of toxic elements in ovoŝevodčeskoj products of a garden cooperative "gornyak"attention should also be given to control the food.

In order to adequately assess the State of the organization is its integrated monitoring in accordance with zoning the territory of Zakamensk in intensity of pollution sources.

8. Socio-economic and demographic situation

Current state of the issue of including g. Zakamensk and the adjacent territory to the disaster area is not new. Yes, and in fact the question, if you look at the problem not only with the problems of ecology and nature management, but by the economic and social factors is much wider and sharper. The problem is, to finally answer the question of whether to keep Mr. Zakamensk as production complex, with all its social infrastructure, if yes, what will be the structure of an industrial complex territory, its scale, its associated social, if not, to determine the costs of liquidation, preservation, repurposedUW selected productions. And it is the environmental factor in unity as one of the major limiting factors of the production process, and making a contribution to the financial results of enterprises engaging in the production of natural resources. If we want to solve the problem, rather than maintain inefficient production due to the financial support of the Republic and the Federal Center, it is clear that the transition from the first to the second only a matter of time. The sooner we are determined to take this step, the more likely the population to adapt to the new conditions of management.

On the basis of objective, we must, on the basis of the structural analysis of the situation in the fields of economic, social, environmental, demographic situation, determine the strategic direction of development of the territory to deal with the global problem of equilibrium development.

The plan to achieve strategic objectives, i.e. the Declaration of a zone of ecological disaster, is for the most part of the territory of Zakamensk and the adjacent small square, as almost 100% of industrial production, and, consequently, the total load on the natural environment, lies with the city and adjacent territory. All the same the rest of the district is within the permissible environmental parameters. The challenge, therefore, is divided into 2 parts: 1. the analysis and prospects of

development of Zakamenskogo area, 2. the relationship between the structure of production in the area and the possibility of creating a rational structure of production in the city of Zakamenske in order to create the optimum territorial structure of production.

8.1. analysis of industrial production.

An analysis of industrial production, which is located on a fairly compact area, with territory, as the only industrial production which is quite difficult. And at a time when production actually ceased to exist. It is clear that from the beginning, when you create a primary industrial production were, above all, the interests, the situation of the time. The establishment of such industries as food processing, textile enterprises, individual enterprises construction, power was due to the need for employment and living conditions for their stay. The effectiveness of such proceedings is clear. In the following years, especially recently, has been given enough attention to the economic development of the area, first of all, the Zakamensku. Almost all were analysed by socio-economic activities of the area. We would not wish to repeat what has been said before in terms of analysis. But we need to have some numbers that will be needed to define the strategic directions of development of the territory.

First, look at the financial performance of the industry of the territory and the structure of gross product:

Dynamics of gross output in comparable prices, mln. rub.

Table 7

Dynamics of gross output in comparable prices, mln. rub.

Table 7

1991

1992 1993

1994 1995 1996 1997

The volume of gross Pro- 194848 173417 134295 89928 74093 67305 66601
in the sopostavi-
accommodation prices (million USD)
The growth rate of the (fall), 100.00 89.00 68.92 46.15 38.03 34.54 34.18
'on the

Industry growth rate (fall),
'on the
share in total volume,%

the processing rate of growth (decline),%
Share in total volume,%
66
64
128846 110807 83105 100 86.00 64.50

62
49

56396 44553 40543 100.00 79.00 71.89

44 40
50
35
44877 32760 25553 22998 34.83 25.43 19.83 17.85

44 38

25542 18646 11374 6597 45.29 33.06 20.17 11.70

57 57 29 44

easy	11112	10712	4499	945	274	49	107
growth rate (the fall), %	100.00	96.40	40.49	8.50	2.47	0.44	0.96
the share in the total volume, %	**9**	10	5	**2**	**0.8**	0.2	0.5
Agriculture	66002	62610	51190	45051	41333	41752	43603
the share in the total volume, %	34	36	38	50	56	62	65
growth rate (the fall), %	100.00	94.86	77.56	68.26	62.62	63.26	66.06
including							
crop production	12976	12212	10346	10478	7902	8790	11494
the growth rate of the (fall),%	100.00	94.11	79.73	80.75	60.90	67.74	88.58
the share in the total volume, %	**20**	19	20	23	19	21	26
animal breeding	53026	50398	40844	34573	33431	32962	32109
the growth rate of the (fall),%	100.00	95.04	77.03	65.20	63.05	62.16	60.55
share ob″ë-IU, %	80	81	**80**	77	81	79	74

Industry:

mining: mining and production of tungsten concentrate

Main indicators of functioning Džidinskogo WMC

Tablica8

	1991	1992	1993	1994	1995	1996	1997
Commodity products, world wide warranty leaflet, prices in USD	84838	940771	2600478	3891958	8550613	5928000	433
Ore mining, (thousand tons)		1411	1014	278	252	90	
Conditional percent contained. (WO in the ore)		0.629	0.718	0.507	0.446	0.280	
Fashion sterling silver production. the Infor.(TN)	2472	2243	1413	548	565	321	-
Full s/b production. koncentata (USD/Mt)	34.32	419.43	1840.39	7102.11	15133.83	18467.29	
Dynamics of world[1] prices WO (USD/t) in West European market ATR				6431.67 5528.03	5289.09 4390.9	5673.92 6326.79	
The ratio s/b to the level of world prices, units				1.104 1.285	1.343 1.617	1.252 1.123	

in the West European market, ASIA PACIFIC							
Gold production (kg)		-	65.8	97.4	123.1	148.9	99.2
The average number of people			198	211	250	243	248
The Debtor. For- the post.(i.e. USD) Lender. Aging (t. USD) Balance						1737 2465 - 728	1180 7105 - 5925
The average s/b production. 1 gram (rub) the average s/b production. 1 gram of the debt (USD)			50.15	49.90	49.94	45.43 50.32	90107, 47, 63
Dynamics of world gold prices * $/ounce USD \ Gram quote dragmeta-fishing SOURCE: CENTRAL BANK of RUSSIA (gold) (1998 year) USD \ Gram				.	384.05 88.055	387.87 88.931	331.29 75, 958149, 955
The ratio s/b to the level of world prices, units 1 gram (USD) 1 gram of the debt (USD) to quote SECURITIES					0.567	0.510 0.565	0.630 1.416 0.319
The debts on the logs t $ vnebûdž in Debts. funds, i.e. USD						140.5 46.6	256.8 84.1

*) on materials "Metal Bulletin"

The table shows that production is profitable, but alluvial gold there are problems related to the impact on the environment. Placer gold mining technology is no different in principle from the technology of the past. The question is the extent of excavation works and of course the dramatic increase of pressure on the natural environment. The average gold content ranges from 280 to 600 mg/m3 of sand, gold-bearing sands of depth 1.8 m to 8-10 m, formation thickness ranges from 40 to 150 cm, the flushing volume 1 m3 of sand requires 3.5 to 5 m3 of water. Then, every kilogram of metal is nature the following losses:

Environmental damage produces 1 kg of gold in the Zakamensk

Table 10

	1991	1992	1993	1994	1995	1996	1997
Extracted gold, kg			65.8	97.4	123.1	148.9	99.2
Volume of excavated soil total, t m including gold-nose, peskad. M3			987164.5	1461 243.5	1846, 5307, 75	2233, 5372, 25	1488 248
Area of land cover, HA			16.45	24.35	30.775	37.225	24.8
Water consumed, t m			658	974	1231	1489	992
The volume of waste waters, t m			282.94	418.82	529.33	640.27	426.56

Moreover, according to the articles of the tax paid by artisanal, no direct reclamation of disturbed lands, and the land of traffic annually are lost more and more land and water resources. Direct costs of restoring the natural balance is estimated at $ 20019 USD/ha of land area and 2000-2500 rub. restoration of each cube. m water balance.

Forestry and wood industry:

the most promising industry is logging and sawmills. This was largely due to the large supply of raw materials. The total forest area in the district, according to the Ministry of forestry is 1179794 hectares, or 75.5 per cent of the total area of the district, estimated annual cut at 602.6 thousand cubic meters of wood. The general trend in the industry in recent years is presented in the table:

Dynamics of volumes of harvesting timber and lumber

Table 1!

1991 1992 1993 1994

1995

1996

1997

Commodity products 1337 16829 (t-r)

173675 472332

1040297

1144

1897

The total volume of timber (m3)

58517.06 50110.1 40088.11 21489.22

19097.24

17416.25

19377.57

26852 29600 timber (m3)

18158 9875

9269

7898

9154 ***G***

Sawnwood (cubic m)

Cutting area, HA

6391
7547 3942

87.45 74.89 59.91 32.12

3142

28.54

3372
3272

26.03 28.96

Agriculture:

Agriculture is the main occupation of the rural population of the region. Statistics on production of main agricultural products in various categories of farms is presented in the table:

Output of basic agricultural produce

in some categories of farms

personal podsob. Hawes							
Vegetables (TN)	781	883	585	465	530	1012	1025
with agricultural enterprises	621	678	204	116	82	101	138
farm owner					50	62	103
VA	160	205	381	349	398	849	784
personal podsob. Hawes							
Livestock, poultry (alive.	6096	6095	5002	4091	4228	3546	3778
views)	3364	3388	1842	908	877	385	290
with agricultural enterprises					115	130	119

farm owner WA personal podsob. Hawes	2730	2707	3160	3183	3236	3031	3369
Milk (TN)	10999	9811	7801	6961	6177	7501	6634
with agricultural enterprises	4570	3280	2272	1399	558	301	352
farm owner					526	731	710
VA personal podsob. Hawes	6429	6531	5529	5562	5093	6469	5572
Wool (TN)	97	87	61	50	37	27	18
with agricultural enterprises	59	50	33	21	4	7	5
farm owner					1	2	2
VA personal podsob. Hawes	38	37	28	29	32	20	13
Egg (i.e., PCs) with agricultural enterprises	206	190	402	233	264	401	362
farm owner					21	14	12
VA personal podsob. Hawes	206	190	402	233	243	387	350

As can be seen from the table in the whole agricultural production remained at the level of the year 1991, changed only the structure of production, by categories of producers, became even more evident the fact that (J) 11 (IX) except for the production of certain products, is a major producer of agricultural products in the region and reducing the production of food products is due to subjective reasons.

eries (TN)
beer (thousand Dall)

Light industrial Ness 100 the index of physical volume.	86.9	23.9	9.1	0.011	0.007

8.2. in the social sphere

First of all, pay attention to the dynamics of the population of the area:

The population of Zakamenskogo district

Table 14

	1991	1992	1993	1994	1995	1996	1997
Number of population tion only , ths. Pax	35.0	35.5	35.7	35.2	35.3	34.8	34.8
including urban	18.8	19.1	19.5	19.2	19.1	18.6	18.6
Rural	16.2	16.4	16.2	16.0	16.2	16.2	16.2

As you can see, the population is stable enough, despite the production halt. The term substantive improvements in the number is not expected. The employment structure has changed dramatically-today employment is 2782 person in all industries, including the manufacturing-1331, communication-145-162, transportation, construction-120, 169-forestry, trade-229-7, services, housing and public utilities-559, other-60. The unemployment rate is about 9000 people, completely not working or partially working. Today the share of employed in material production amounts to 30.7%, that is, each employee had 17 people dead.

Hence the excessive burden on the budget and a sharp decline in living standards of the urban population:

Table 15

	1991	1992	1993	1994	1995	1996	1997
The balance of income and expenditure (thousands) USD					-19.3	-18.8	-18.0
Income per head of population							
ING	3.6	24.9	173.3	787.5	1485,	3287	4104
(ths. USD)	72	70.2	68	61.1	6	44.8	32.1
including through	12	13.2	17.1	21.4	50.1	29.1	32.4
property income, %					28.3		
at the expense of social payments , %							
The budget provision constraints,	1.3	13.8	211.0	541.4	1125,	1736,	2224
1 the inhabitants. ths. rub. in					8	0	
year							
The share of own incomes, %	26.8	18.3	14.8	19.5	17.9	20.8	10.7

oil	**2.6**	**2.57**	**2.39**	**1.37**	**0.45**	**0.11**	**0.11**	**0.29**
egg (PCs)	**155**	**5.89**	**5.35**	**11.26**	**6.62**	**7.48**	**11.52**	**10.40**

As the level of food consumption has changed not much on the region in General, but significantly reduced the level of real income of urban population. The pace of falling real incomes of the urban population is 6 to 9 per cent a year.

Ensuring housing, communal and household services paid nature relate mainly to the urban population. Housing Fund, the Zakamensk is 192.9 million. SQM total area, 70% of them is decent housing. On average, 1 inhabitant has 14.8 sq m of total space.

Maintenance of the housing stock is the housing and utilities sector, which includes health technology enterprises, energy, transport, foreign enterprise improvement. the total number of people employed in the housing and public utilities-858 people or 30% of all employed in material production. the overall cost of UTILITIES in 1997 year 22810 thousand rubles, the amount of losses was 2560 thousand roubles, and including accounts payable balance of 4445 thousand rubles, total debt amounts to 7005 thousand rubles Of the total amount owed for water and heat are 3174 thousand rublesand to pay for other utilities 3785 thousand roubles. In 1997, all users were 2428.5 thousand cubic meters of water, **etc.** h. population and household needs of 1276 MCM or 1 inhabitant per day 84 M3 under norm from 0.35 up to 1.75 m.

Heat supply of the boiler rooms with the total capacity of 80 3 Gcal/hour. In 1997, were released 110.1 thousand Gcal of heat, that work is a continuous loop 76 -80 days of work, taking into account that heating season lasts about 6-6.5 months (180-195 days), approximately 50% of the net power is used for other purposes, and given that the 1997 year burned 14600 tonnes of fuel oil and 50 tonnes of coal, the inefficiency costs is obvious.

Electrical supply to the district and the city of Zakamensk in two sources: the town of Zakamensk, draws energy from the "Inkurskaâ" substation, district by District e networks, part of Džidakombinata. The consumption of electricity. energy is steadily rising, not only in the sphere of production, that is obvious, but falls off and the energy consumption of the population. Total consumption of electricity. energy decreased from 76% in the year 1991, the population of 55%.

8.3. the main direction of economic development Zakamenskogo District.

System of indicators presented above allows to draw some conclusions and predict the direction of development of industries had agricultural complex, possibly defining the main activities to achieve the goal.

It is clear that the main objective of the development of society as a whole is achieving a high level of well-being of its citizens. Everything else is only a means to achieve this goal. Unfortunately, there was a tendency in the development of the economy, namely, that the production works without taking into account the demand for a product, i.e. the production of sake production. Did not take into account the objective economic laws, economic leverage on the economy and so on, the situation occurred in the Zakamenskom area and Zakamenske in many ways there is a confirmation of that conclusion and prospect development is viewed through the prism of political solutions, though they say the interests of people living in that territory. In such situations, when the population of only expects help from the State, it is necessary to make clear that the achievement of well-being is the work of the workers themselves with the help of the State. You must deliver a clear strategic goal,

enough to clear the majority of the population, to identify ways of achieving this objective, taking into account production, cultural traditions, domestic, to focus on its own raw materials base and continually inculcating the idea that no one else who can not cope better with this on this earth. In turn, State assistance would be the validity of the proposed projects and activities, technical, financial, legal, organizational, and marketing.

Industry: the main production, on which and around which everything else was based kompleksuûŝee production, it was the extraction and processing of tungsten-molybdenum ore. in connection with reform of the economy and the introduction of the market mechanism of supply and demand, inefficiency of this production became apparent, firstly, had sharply decreased demand for Wolframovom concentrate within the country, and secondly, high cost of production does not compete with the product on the world market, thirdly, the remoteness of the territory, lack of reliable transportation artery, inadequate to respond quickly to changes in demand and supply, fourthly, there is little prospect, because the sharp agethe output volume of the application by other countries, in particular. In 1997, the deposit was discovered in China tungsten-molybdenum ores, metal production capacity is 1 million. tons of ore, 1000 k. tons per year, with 50 years in the reserves, in the fifth, the pollution of the environment. If you have any unique technology of extraction of ore processing, waste and pollution, and pressure to nature and people. This is indicated by the medical findings and statistics of disease, especially malignant. And obviously, more importantly, continued production as a source of subsistence of the population either abandoning production in order to better enable people to see the future and preserve the unique nature of the region.

Gold Mining: the industry has good prospects for development. but there are some points which have a negative effect, first, small and unstable production volume, secondly, significant pressure on the environment, the contribution to the budget of the district, about 1 percent of the size of the budget, would not allow today to bet on a major development of this production. the effective solution of these problems, first of all, the environmental plan will enable more meaningful to talk about gold miningand in the future, and other minerals.

Forestry and wood industry ', the most promising industry in the area is the timber industry. with good raw material base and bring in the future up to 25-30 thousand cubic meters of wood, common stocks will last 20-25 years. in the light of the reforestation, fundamentally different approach to technology procurement and processing industry can become a leading industrial production.

Agriculture: the stable branch is the production of agricultural products, and farm and FORESTRY gradually increased their share in the structure of production volume of blanks with agricultural raw materials significantly exceeds the amount of the consumer market. with this in mind, and the fact that the district is bordered by the Džidinskim area with significantly greater with agricultural potential requires a completely different approach to the structure and organizational started agricultural production.

Other branches: the above digital materials allow to say with a high degree of assurance, that the further development of such industries as textile, beer production does not meet any requirement on the needs of the people, neither in productivity or competitiveness of other products, particularly food production, coal production, provision of services require substantial restructuring in terms of optimization of volumes of manufactured products, services, their quality and usefulness from the point of view of the quantitative and qualitative composition of the population.

8.4. directions of future development

So, we have decided on key industries, which gives proper development perspective for district development-agriculture, wood production, partly by gold mining. Now the task is to choose products, which will focus on key industries. In our view, this issue of high-quality raw materials for further processing outside of the area, i.e., to become a supplier of quality products for major manufacturers outside the region and the establishment of their commodity production at its raw material base by virtue of objective and subjective reasons, will be ineffective.

Once you've determined specialized area, you must take the following steps: 1) study the demand for our products; 2) to analysis of the raw-material base; 3) clearly define the scope of necessary raw materials; 4) select the optimal production technology, first of all, in terms of environmental safety; 5) reallocate labor resources; 6) to conclude partnership agreements with major users; 7) explore the possibilities of self to market.

To implement the proposed plan requires the following tasks:

1. legal organization created productions. it must be State enterprises that will allow more efficient use of the capacity of the State.
2. Restructuring resource base (direction, amount of material, quality and so on) depending on demand or conditions of the partner agreement.
3. Changes in the reproductive processes in agriculture-the creation of centralized technical services to provide services to farmers, SMALLHOLDERS, based on treaties; establishment of a unified service, providing advanced reproduction of raw-material base;
4. Redistribution of the labour force-the need, re-training, creation of social conditions, creating a stationary training items;
5. Development of kompleksuûŝih productions-reconstruction, volume of production, etc. in strict accordance with demand;
6. Lead the development of the social sphere (medicine, education, culture) and serving infrastructure in strict accordance with needs;
7. State financial assistance (grants, subsidies, etc.) should be directed to support farmers and SMALLHOLDERS.

We have deliberately not operated all sorts of numbers of productions and the required financial investment, considering that in conditions of instability, first of all, you need to have a clearly defined purpose. This would already deliberately going towards its realization. Speak knowingly about any financial investments prematurely, because inflation will force recalculate all over, give up some options. A simple multiplication by the inflation factor is a false path. Perhaps in response to such an approach, there is a problem with the sources of funding, since all signs at the beginning of the year, but in this case it is necessary to consider as a source of financing that is refilled with regularity in the form of taxes, royalties, and so on. the solution to the problem of the whole area is worth it to go for such a step.

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Application

The content of chemical elements in soils, the Zakamensk, mg/kg
(12 tests)

. Element	Table Of Contents	MPC for soils	Rule *	The MPC	Table Of Contents
					norm
Pb	50-500:	20 (32)	100-400	' 3-15, 6	0.5 -1.2
Hg	1.2	2.1		0.6	
Sr	up to 800		600		1.3
Ni	50-300	45	100	1.1 -7	0.5 -3
Co	10-30		25-50		0.4 -0.6
Mo	30-150		2-10		15
Cu	100-500	40	60-125	2.5 -12.5	1.6 -4
Mn	1000-5000	1500	1500-3000	0.7 -3.3	1.6
(V)	60-150	150		0.4 -1	
Zn	600-1500	150	70-400	4-10	3.6 -9
IN	8		6-30		0.3 -1

, (I) 5 eia -^- aiea : MPC for soils are on (harmful chemicals..., 1988; 1989), standard software (Kabata-Pendias and Pendias, 1989).

Table 4

The content of chemical elements in vegetables from gardens, the Zakamensk, mg/kg of dry matter

NO. samples, binding	Elements Yes.														
	Sr	Va	Mp	Sg	(V)	Ni	With	Si	**Ag**	Zn	PB	Sn	Mo	IN	**Hg**
potatoes															
3-3-3 school vegetable garden	-	100	400	10	10	-	-	80	0.1	100	-	-	400	2	0.004
3-8-3 dacha "gornyak"	-	100	200	-	10	30	-	100	0.1	1 5	-	-	80	1.5	4
3-8-5 dacha "Gornyak"	-	100	300	10	10		-	100	0.1	150	10	-	500	1	4
rule *	8	3.1	4.8	0.3	0.8	0.5	0.04	5.4	0.013	8	0.54	0.08	0.07	3.8	-
cabbage															
3-8-4 dacha "Gornyak"	-	400	100	-	-	-	-	50	-	-	-	-	600	1	4
rule *	35.2	19.5	6.9	0.4	0.4	0.5	0.05	4.1	0.06	7.4	0.7	0.07	0.44	20.2	-
* rate *	45	-	-	-	-	-	-	2.9 - 4	0.07	24-31	1.7 -2.3	-	-	-	0.006
Plants on polluted soils															
Kabata-Pendias, 1989			UP TO 500	17-49	8-13 (until 26)			up to 19	> 5 to 1500	UP TO 1000	27-57				0.5 -0.8

Note: *-on (Tolkachev, 1999), * the *-on (Kabata-Pendias, 1989); dash-the content of èlmenta below the limit of sensitivity analysis, an empty cell-not available

7 .\ *4*	1990-1999 Gg.	Area of degraded areas, %: dumps of toxic tech-sand with UG-nogennyh rose pollution groundwater (not for groundwater-ŝiŝeny)	more 20	Environmental disaster

its

№ p.p.	Period monitoring	Basic indicators .	Values are-performance, evaluate by on «Criteria... "	Assessment of natural environment indicators pollution
1	1990 g.	Process chemical pollution-the substances water r. Modonkul′ 2 hazard class: Cd A1 3 hazard class: Zn	Excess MPC 170 17.3 67	Environmental disaster Environmental emergency the democratic situation

	1996 g.	3-4 hazard class: C	107	Environmental disaster
		Zn	44	Environmental emergency the democratic situation
		Sg	375	Environmental disaster
	1998 g.	2 hazard class: As	8	Environmental emergency
		3-4 hazard class: C	44	the democratic situation
		Zn	46	
		Sg	265	Environmental disaster |
2	1996 g.	Chemical indicator -water pollution r. Modonkul′ (GTHZ-10) for elements 3-4 CLAS- CA risk	526	Environmental disaster
	1998 g.	« «	**355**	Environmental emergency the democratic situation **(J)**
3	1998 g.	Rate Donna the accumulation of C. Zn, Sg, A s r. Modonkul′	3 x 10^4	Environmental disaster (j)
4	1990-1999 Gg.	State of ecosystems r. Modonkul′	The lack of in- doroslej The Disappearance Of The all species of fish	Environmental disaster
5	1990-1999 Gg.	Land area, dur- transferred from land- as a result of soil degradation	More 50% about- common area City	Environmental disaster
	1990-1991 Gg.	Excess in soils MPC chemical substances from:		
		1 hazard class: R″	more 3	Environmental disaster
		As	more 3	
		2 hazard class: Ni	more **5**	Environmental emergency
		Sg	more 5	the democratic situation
		Si	more 10	Environmental disaster
		Sb	more 10	
	1998 g.	1 hazard class: PB	more 3	Environmental disaster
		2 hazard class: C	more 10	Environmental disaster
6 (ii)[1]-	1990-1999 Gg.	Perekrytost′ on top- abiotiče-soils of the marine sediments of techno- Gene sands	power of Bo- more 20 see	Environmental disaster

[1] adapted from " Metall Bulletin "

Gold mining: mining of alluvial gold mining team roles sheltered key performance indicators