

**State Agency on Environment and Forestry under the Government  
of the Kyrgyz Republic**

**PROJECT**

**SOCIAL AND ECONOMIC INVESTIGATION OF  
PRIMARY MERCURY PRODUCTION AT THE  
KHAIDARKAN MERCURY PLANT**

**(Version #1)**

**PREPARED WITH ASSISTANCE OF UNITAR**

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## 1. Introduction

Kyrgyzstan abounds with high-grade mercury deposits. Under some appraisal at least two of them contain more than 40 thousand tons of mercury. The greatest one is Khaidarkan. As of today Kyrgyzstan is almost the only producer of primary mercury in the world after the Almaden in Spain was closed in year 2004.

Besides another two deposits are situated in Southern Kyrgyzstan which used to cooperate with Khaidarkan mercury plant (KMP). However unlike KMP these shafts stopped functioning at the beginning of the 90<sup>th</sup>. Neither environmental rehabilitation nor environmental monitoring of the contaminate sites has been performed so far yet.

Economy of Osh province is mainly of agrarian type, whereas main industrial enterprises (including mercury and antimony production, as well as coal production) are located in Batken province. Thus the subject of present project is investigation of the problems which are specific to Batken province.

The Khaidarkan mercury plant is the operating city-forming enterprise of great importance for the region where it is situated. Its staff numbers more than 600 employees. More than 20 thousand people, residing in this region, depend on operation of the plant.

In the course of investigation the analysis of economic state of the Khaidarkan mercury plant was implemented as well as inquiry of its employees and inhabitants of Birlic ail-okmotu and Aidarken settlement, situated close to the plant.

Additionally to the economic analysis the investigation was aimed at gathering some social information with regard to public, group and individual concerning facts, events, appraisals of their vital activity and of possible changes in consequence of KMP's operational activity.

The main target group of the investigation includes adult residents of Aidarken settlement and some villages, located in the impact area of the Khaidarkan mercury plant.

The control target group is represented by residents of the settlements located outside the impact area of KMP. Mixed methodology was used. The main questions of the questionnaire were aimed at gathering information regarding the content of the phenomenon investigated.

It was revealed that the plant is of great importance for the respondents. The evidence of this consideration is that when answering the question "Is the Khaidarkan mercury plant of benefit to you?" 94.4% of the residents replied "yes", 2.8% replied "no" and 2.8% did not reply at all though they didn't possess any sufficient information about the plant and didn't obtain any assistance from its side. Answering the same question 80.6% of the plant's staff replied answered "yes" and 9.7% replied "no" and 9.7 % did not reply at all. The quota sampling was applied within the investigation. Not substantial but closely correlative characters were used. Representative sample was formed theoretically.

During the investigation four ages groups were polled: 16–25, 26–35, 36–55 and from 55 years old and elder. Besides, the respondents were divided according to such features as gender, marital status, education, place of residence, family income and etc.

The main conclusion of the Preliminary estimate is following. The Khaidarkan mercury plant continues its operation, in spite of serious technical difficulties and continuous discussions

regarding its environmental impact. The administration of the Khaidarkan plant intends to expand its mercury production.

As mentioned above, KMP enjoys wide support among the local community and some organizations unrelated to environmental protection. It is caused by a role of the plant in the national economy. KMP is a significant taxpayer at the national level. Besides it is the largest employer in Aidarken settlement. It is also connected with the fact that water and energy supply and gas hitting for some part of the inhabitants residing near the plant is provided via the services of the plant.

Electricity costs incurred by the plant amount 25% of total costs. Reduced electricity tariffs allowed to the plant by the State department for control of fuel and energy complex under the Ministry of industry are insufficient measure in the judgment of the majority of the staff. Meanwhile the enterprise doesn't enjoy any reduced tariffs for natural gas. According to the questionnaire results the majority of the staff believes that the plant fails to solve such existent difficulties on its own and they expect assistance from the government's side.

According to expectations of the plant's administration explored but unopened reserves of monometallic mercury ores and complex mercury-antimony-fluorite ores will be enough for 10-12 years of breakeven and stable operational process of the enterprise. The plant independently concludes agreements with consumers and establishes the prices in the negotiation process without any assistance from the government authorities.

There are various signs of the fact that mercury pollution persists essentially impacting on human health and environment. Particularly there are some apprehensions with regard to pollution of agricultural lands and wastewater. Besides, another risk factor consists in accessibility of slag disposal sites for the residential population and for the cattle as well. Answering the question "Is an activity of the Khaidarkan mercury plant harmful?" 84.5% of Khaidarkan residents replied "yes", 2.8% replied "no" and 12.7 didn't reply at all. Answering the same question 67.6% of the plant's staff replied "yes" and 32.3% replied "no". In spite of the negative impact of KMP on human health and environment that is considered by some respondents the attitude towards the plant remains positive. This is cause both by historically established public image and a soviet enterprise or habitualness of existence in such conditions. Approximately 70% of respondents (basically the elder age group) used to estimate the plant's operational activity rather useful in the past. Younger generation basically relies on themselves. It is proved by the fact that when addressing the question "what will you do if the plant closes down" such reply as "I will go away" was basically received among the youth. Moreover the family budget of 70% of respondents forms owing to their children working abroad in Russia and Kazakhstan.

In general no negative attitude with respect to the Khaidarkan mercury plant can be revealed among the community of the settlement itself. This might be caused by the reason that the inhabitants are used to living nearby the plant as stated above and that the settlement's infrastructure is closely associated with the plant's activity. Being asked the question "What do you gain from KMP?" the residents who do not have any relatives and close friends among the plant's staff were not able to reply. The main answer was "KMP provides a lot of people with job".

97.2% of residents get the information about KMP's operational activity from their relatives, neighbors and friends. The reasons of such situation are clear: they are the problems that the plant experiences and lack of public work with inhabitants. It is noteworthy that the number of plant's employees amounts a bit more than 600 people and population size of Aidarken settlement makes up 10 938 people. Another side of plant's economical influence on

people's life consists in a problem of functioning of the social services that used to be on the enterprise's balance but don't serve the population any more.

## **2. History and brief review of the Khaidarkan mercury plant's activity.**

Flourishing of mercury mining industry fell on the VIII and XII centuries. Almost all of the known mining areas were discovered following the traces of ancient shafts. There are large-scale deposits of mercury in Kyrgyzstan the largest of which have been developed by the Khaidarkan mercury plant since year 1941. According to some appraisals two of these deposits (Chonkoy (Ulugtau shaft) and Khaidarkan) contain more than 40 thousand tons of mercury, up to 20 thousand tons each. It means that Kyrgyzstan still is a place of significant availability of mercury resources. After closure of Almaden shaft in Spain in year 2004 Kyrgyzstan is considered to be the world leader of mercury production.

The main consumer of metallic mercury is military-industrial establishment; the secondary consumers are electrical, chemical-engineering and other industries.

During the full operating cycle (mining – processing – commercial-grade mercury producing) the Khaidarkan mercury plant involves the following objects: open-cast mine, two underground mines (on mining mercury ores and on mining and processing complex ores such as antimony and fluorite), concentration plant on antimony and fluorite concentrate working, mercury metallurgical plant. Mercury ores and flotation sulphide concentrate are processed at the metallurgical plant that is a separate production unit with auxiliary shops and tailing dump.

By present time the Khaidarkan mercury plant has been reorganized into the Khaidarkan state mercury joint stock company and currently performs mining of monometallic (mercury) and complex (mercury-antimony-fluorite) ores from only Khaidarkan deposit. The principal product of KMP is metallic mercury and its compounds as well as antimony and fluorspar concentrate.

During the concentration process of complex ores the mill tailings (sandstone) are formed at the concentration plant. Concentration plant tailing facilities have been operated since year 1967. The tailing sludge is transported from the factory to the tailing dump along a special sludge pipeline of 5500 m length. Diameter of the main sludge pipeline is 219 mm. Length of the distributive sludge pipeline is 1200 m.

The mill tailings are stored in a specially equipped tailing dump made under the project of the institute "Kazmehaobr" (Almaty).

During its active production period the plant annually emitted up to 13.22 tons of metallic mercury, 315.9 tons of dust, 295.3 tons of carbon monoxide and 45.02 tons of sulphur dioxide to the atmosphere. Emission of production wastes is performed through a smoke stack at an altitude of 1980 m above sea level<sup>1</sup>. Production statistics of the Khaidarkan mercury JSC (Appendix 1).

### *Power consumption*

Khaidarkan mercury JSC obtains electric energy directly through high-voltage OHL-35 kV including up to 40% from power supply network of the distributive company OJSC "Oshelectro" that services Aidarken settlement. Further electric energy distribution is implemented within the enterprise by means of its own step-down substations 35/6 kV. All costs

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<sup>1</sup> The project "Risk assessment at the Kadamzhai Antimony Plant OJSC and the Khaidarkan Mercury JSC

of maintenance, repair and leakages are incurred directly by the enterprise<sup>2</sup>. Average annual electricity consumption by KMJSC amounts 46 million kilowatt-hour. Average annual natural gas consumption amounts 3000 cubic meters. Installed capacity of kilns amount P=2962 kilowatts. The power supply organizations servicing KMJSC are OJSC “Power plants of Kyrgyzstan” and OJSC “National electrical grid of Kyrgyzstan”. Average annual power costs of KMJSC are 43.3 million soms that is 25% from total costs. The main energy consumers are water pumping stations, compressor house, metallurgical plant, concentration plant.

#### *Investments required for continuation of mining*

At present the Khaidarkan mercury JSC develops mercury-antimony-fluorite deposit “Novoye” that contains 5469 tons of mercury, 46880 tons of antimony and 447 tons of fluorite. Because of deficient financial resources the enterprise doesn’t have any possibility to prepare bottom lift ore reserves to developing. The sum of investments that is required for execution of such works amounts 3.0 million USD per year. Financial assets invested in maintenance and development of the plant will be directed to constructing of a pump station of 3000 cubic meters volume and to upgrading of concentration and transport facilities. For the purpose of production process regulation and further development of the plant as well for completion of “PESAC” program searching for a strategic investor is being carried out. Approximate volume of required investments makes up 6.0 million USD.

Within the program “PESAC” SJSC “Khaidarkan mercury plant” is considered to be an economic entity entered in the State register of natural monopoly entities and allowed monopolies dominated in the market.<sup>3</sup>

For the purpose of supplementary exploration and preparation to the reserves excavation the enterprise is to implement about 21.3 thousand running meters of mine workings and to drill 60 thousand running meters of exploratory wells. Total cost of preliminary works including the charges for purchasing of required mining equipment makes up about 4.0 million USD. Execution of preliminary works within this scale will allow providing the implementation of scheduled work of the mine #2 and concentration plant for a period of more than 10 years.

In May 2007 the enterprise was visited by a delegation of Russian and Chinese experts interested in developing of bauxite and nepheline syenite ores in Batken province. Expected reserves of these ores amount more than 4 milliard tons. Therewith the possibilities of detailed exploration and development of these ore deposits were examined.<sup>4</sup>

### **3. Review of existent social maintenance system at the Khaidarkan mercury plant (*Appendixes 5-6*)**

According to the reports of state authorities and plant’s administration the present pollution levels are lower than 15 years ago. That is explained by a significant reduction of production volume. However there are some indications that mercury pollution remains essentially impacting on human health and environment. Particularly there are some apprehensions with regard to pollution of agricultural lands. And another risk factor consists in

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<sup>2</sup> Letter by the Khaidarkan mercury JSC to the KR Prime-minister “On retention of reduced tariff” dtd. 03.01.2007

<sup>3</sup> Program of privatization of state property in the Kyrgyz Republic for 2006-2007, government regulation dated February 13, 2006 No. 91

<sup>4</sup> Mass media



accessibility of highly polluted wastewaters and slag disposal sites for the population and for the cattle as well.

The charges of the Khaidarkan plant for social maintenance and personnel's health protection make up 1.8 million soms per year. Due to reduction in number of the plant's employees the capacity of preventorium was decreased up to 50 beds. Every year nearly 500 workers (80% of total staff number) undergo the procedures of health improvement. The preventorium offers the courses of physiotherapy, various medical services and recommendations on balanced feeding. These measures are supposed to improve the capacity for work and decrease the number of cases of temporary disability and diseases by 30%. Annually 20-30 workers are sent to the health resorts of Issyk-Kul, Issyk-Ata and Djalal-Abad. The miners daily get 0.5 liters of milk or kefir.<sup>5</sup>

Basing on the results of medical statistics of Batken province it may be concluded that the plant and medical services take certain measures to protect the personnel's health and to prevent diseases.

According to the annual balance sheet of KMP for year 2007 a sum of paid one-time allowances made up 1.499 million soms.

Khaidarkan hospital reports the following morbidity structure for year 2007: diseases of urogenital system – 13.5% (371 cases), cardiovascular system – 9.9% (271 cases), respiratory system – 9% (248 cases), gastrointestinal tract – 7.8% (261 cases). Diseases of cardiovascular and respiratory systems (49.5% and 22.6% respectively) are the main reasons of fatal outcomes. No cases of acute or chronic mercury poisoning among the plant's workers or local population have been registered.

The institute of the medical problems under southern division of the national academy of sciences of the Kyrgyz Republic investigates the factors of negative impact on environment and human health.

Priority directions of ongoing investigations include radioactivity impact and antimony poisoning as well as experimental methods of extraction of heavy metal salts and intoxication reduction. New directions of the institute's researches are known to include the issues of mercury pollution as well.

Radiation monitoring is implemented by the radiological department of the Osh center of sanitary-epidemiological inspectorate. It is reported that normal background radiation levels of 13-15 mR/hour are registered around the settlement Khaidarkan including the plant's territory, shafts and tailing dump.

The monitoring of mercury concentrations in working zone (in the air first of all) is executed by the Kadamzhay sanitary-epidemiological station. The Kadamzhay SES jointly with the Batken territorial department for environmental protection fulfills environmental control (arrangement of joint inspections etc.) over the Khaidarkan mercury plant's activity.

Preschool and education institutions of the settlements are closely located to KMP. They number 2 kindergartens, 9 secondary schools and 1 high school. All these buildings are of the soviet period however the current repairs are fulfilled regularly thus their technical state is rather satisfactory. As for medical institutions there is the hospital which medical personnel numbers

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<sup>5</sup>A.A. Sharshenova, K.S. Omurzakova, B.S. Saipbaev, Urgent aspects of environmental monitoring of mercury-antimony biogeochemical region. Ministry of health of the Kyrgyz Republic. Data of NGO "Preventive medicine" (Bishkek 2000)

242 people, 2 feldsher-obstetric stations and 3 pharmacies. As for cultural and entertainment objects there is the functioning Palace of culture, club and 2 libraries.

#### **4. Review of environmental projects and initiatives financed by the Khaidarkan mercury plant and other funds.**

According to the questionnaire results the Khaidarkan mercury plant doesn't finance any environmental projects and initiatives but fulfills environmental reporting under the current legislation.

State agency on environment and forestry under the Government of the Kyrgyz Republic (further as SAEF) is a specially authorized state body that is responsible for implementing of various activity in the realm of environmental monitoring such as: inspections, licensure, establishment of emission and discharge limits, expertise of environmental plans, environmental assessment etc. It is the State agency of environment and forestry that was assigned as a leading agency to coordinate this project in Kyrgyzstan. The Osh-Batken inter-territorial department for environmental protection under the State agency on environment and forestry is responsible for protection of Batken and Osh provinces environment.

The Batken inter-regional state inspectorate of environmental protection fulfills quarterly inspections of the enterprise as well as annual analytical control jointly with the Kadamzhay sanitary-epidemiological station.

Once per three moths the enterprise submits the reporting about ecological situation, emissions and discharges as well as waste generation to the Batken IRSI. The enterprise is fined for every case of exceeding of fixed emission and discharge limits. Moreover the enterprise makes contributions to the Environmental protection fund under the Osh-Batken inter-territorial department for EP.

The national statistical committee of the Kyrgyz Republic (further as NSC) obtains data on environmental pollution (emissions to the atmosphere, wastewater discharges, water consumption, waste generation) directly from industrial enterprises and publishes the summary statistics of environmental conditions.

#### **5. Taxes and payments for subsoil use arranged by the Khaidarkan mercury plant for the state budget.**

In year 2002 the enterprise got approximately 50 thousand USD of net profit (total production volume summed up 125 million soms or 541 tons of mercury), while the authorized capital was estimated to be 3.0 million USD. In year 2003 the enterprise was put up to bid for the purpose of privatization with 2.0 million USD initial price under the condition that additional 6.0 million USD would be invested within next three years after acquisition.

For the period from January till March 2008 the sales of industrial products of the Khaidarkan plant made up 35.6 million soms (65.2 tons of mercury) that is 5.6 million soms more in comparison with the equivalent period of previous year. The rate of contributions that are considered to be an indemnity for negative impact of the enterprise's activity depends on scale of natural resources and ecosystem services. Annual contributions of the Khaidarkan plant to the fund amount approximately 300 thousand soms (about 8500 USD). Almost three quarters of contributions remains in local budget.

According to KMP reporting wage level increase for year 2007 summed up 17-19% in comparison with year 2006. Wages, taxes and other contributions paid in January 2007 summed up 108.2 million soms including profit tax (28.6 million soms) and contributions to the social fund (95.4 million soms)<sup>6</sup>.

## **6. Role of political parties and labour union(s) connected with activity of the Khaidarkan mercury plant.**

The public survey revealed the following. The plant's administration tends towards concealing such kind of information and defies any conflicts with the personnel. However during the questionnaire of population it was established that there was a conflict occurred between administration and plant's workers during the soviet period as well as trials appealing for disability indemnity with regard to the plant's workers.

No significant attention from the side of political parties with regard to the plant was revealed except only formal interest during election period from the side of the dominant party Ak-Djol.

## **7. Information about population and household size in Batken province of Kadamzhay region. Migration.**

In year 2008 there were 1341 households at the territory of Aidarken settlement and population size was 10938 people (including 4950 men and 5988 women) (Appendix 2). 90% of households were provided with electric power, 20% – with natural gas, 50% – with coal and 80% – with firewood. 65% of the residents of Aidarken settlement (ail Kenesh) had access to clear potable water.

Population size of 11 villages of Berlik ail okmotu amounted 11824 people in year 2007, at that 6119 of them were able-bodied. Number of households amounted 2232 (Appendix 5). The greatest increase in able-bodied population for the last five years is registered in Osh, Djalal-Abad and Batken provinces (9-12% in each) (Appendix 6). 75 people moved in and 200 people moved out of the territory of Aidarken settlement in year 2007.

### *Structure of migration*<sup>7</sup>

Since the moment of the province formation the migration outflow has made up over 6 thousand people. In fact there is no information about occupational migration. Incompleteness of delimitation and demarcation of borders with the neighboring republics influences on the migration process as well.

	2005		2006		2007		2008	
	moved in	moved out	moved in	moved out	moved in	moved out	moved in	moved out

<sup>6</sup> Letter from OJSC "Khaidarkan Mercury JSC" to the Prime-Minister of the Kyrgyz Republic "On maintenance of reduced tariff" dtd 3.01.2007

<sup>7</sup> Program of social and economic development of Batken province in 2008- 2010

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18-30 years old	40	556	45	763	57	824	32	179
31 years old and older		11		12		18	3	29

## 8. Development and present state of the Khaidarkan mercury plant.

On the basis of observations and interview made the marketing strategy of the plant has a spontaneous character. Agreements and contracts are signed on a one-time basis for production of 1-5 tons of mercury maximum. In spite of existence of the Marketing department there is no clear conception of marketing procedures (including hedging and futures transactions) at the enterprise. Due to the world crisis the situation is permanently getting worse.

At present the price of 1 kilowatt-hour for industrial consumers in Kyrgyzstan amounts 1 som (about 3 cents USA). Recent decisions of the Government stipulate double increase of electric power price by year 2012. The main energy consumers at the plant are shaft water pumps and rotary kilns of the metallurgical plant. The kilns use natural gas supplied from Uzbekistan which price during the period from year 2007 till year 2008 was about 150 USD for 1000 cubic meters).

The gas price is reported to have increased by 50% in year 2007 in comparison with previous year. This tendency is expected to remain in future. The machinery of the prime-minister of Kyrgyzstan proclaimed that the gas price might double up to 300 USD per 1000 cubic meters in 2009. The information about total energy consumption at the Khaidarkan plant will be obtained later.

### *Final product and consumers*

The information about export of the plant's product differs in available sources. It is not clear when it refers to final mercury consumers and when to the traders. According to various sources the plant's product isn't used for internal needs of the republic. All product of the Khaidarkan SJSC is exported to different countries. According to Kyrgyzstan national profile for the management of chemical substances, the main purchaser of metallic mercury is the People's Republic of China (up to 80% of KMSJSC's product) and countries of the European Union and the USA (20%). Some of them probably act as intermediate sellers.<sup>8</sup>

As the Ministry of industry, energy and fuels resources of the Kyrgyz Republic and administration of the enterprise report, 80-90% of mercury product was supplied to American companies and 10-20% – to the consumers in CIS countries (Russia and Azerbaijan) during the period 2007-2008. In the last few years after expiration of validity of long-term contract on mercury supply from Kyrgyzstan, China has restricted mercury import and expended its own mercury production. To all appearance the existent level of mercury production in the mines of Guizhou province generally satisfies mercury demand in China at that decreasing its dependence on external metal resources. Khaidarkan fluorspar concentrate is supplied generally to Russia (80%), Ukraine (15%) and Kazakhstan (5%).

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<sup>8</sup> "On the condition of mercury-related problem in Kyrgyzstan". K.M. NORUZBAEV, B. TOLONGUTOV. Kyrgyz Republic, Ministry of Ecology and Emergency Situations, Chui ecological laboratory

The Khaidarkan plant possesses the technical facilities for processing of mercury-containing wastes that used to be repeatedly performed. The Khaidarkan plant has the required license for implementing abovementioned activity. Wastes for mercury processing and extraction were delivered from Russia, Uzbekistan and Great Britain. Several times the plant has received some proposals related to processing of mercury lamps for the purpose of safety utilization of the latter. In the judgment of some local experts, the processing of mercury-containing wastes might be considered as one of probable alternatives to primary mercury production at the plant.

### *Shafts*

The fact of presence of intensive karst waters intrusion (240 m<sup>3</sup>/hour or 66 l/sec.) was approved by the experts of UNEP/GRID-Arendal during their visit of the shaft "Vspomogatelnaya" at a depth of 400 m. The same situation is observed in other shafts. Therefore a permanent pumping of over 800-1000 m<sup>3</sup>/hour is quite necessary for implementation of mining works in Khaidarkan. In year 2001 a power outage for six hours caused a serious shaft flooding. Resumption of mining process at the bottom lifts took 2 years.

The mining is implemented via drilling and bursting method. Inside, on the surface, the shaft waters are drained to the stream Shahtnaya. These waters are used by local communities situated downstream for the purpose of land irrigation the total area of which amounts 500 hectares or about a quarter of all agricultural lands in Khaidarkan oasis. According to the information presented by the environmental protection department of the enterprise and to the results of field mission, the shaft waters don't contain excessive mercury concentration.

In addition to mercury the Khaidarkan plant produces fluorspar concentrate generated by means of concentration process. It is a concentration process that leads to formation of the whole volume of tails that are placed in the tailing dumps. Content of mercury is regularly measured in the produced concentrate. If the content exceeds the definite rate then this batch of concentrate is directed to the metallurgical plant (boiling-bed' kiln) for extraction of mercury. The plant also has all necessary facilities for production of antimony rich concentrate. However, now such corresponding capacities are not enabled.

At present the volume of mining operations provides a possibility to use only 30% of total production capacities of the metallurgical plant (consuming cinnabar ores) and of the concentration plant (consuming complex mercury-antimony-fluorite ores). Average content of mercury in the ore that is currently mined is about 0.3%. The plant's administration intends to develop deeper deposits (at a depth of 400-800 meters) and currently realizes an exploratory drilling and pilot operating of the deposits.

### *Metallurgical plant*

The metallurgical plant processes cinnabar ore that is received directly from underground workings and concentrated ore as well. The latter one is received from the concentration plant that usually produces fluorspar concentrate. In the past the metallurgical plant used to receive the concentrated ore from Tajikistan (Anzob OPP) for supplementing its own resource base. Currently about 100 people are employed by the metallurgical plant.

The purity of final product reaches 99.99%. The official amount of atmospheric emissions doesn't exceed the limits approved by local environmental authorities. Essential height of the smoke stack at the metallurgical plant might facilitate the decreasing of harmful substances concentration near the enterprise. But then the pollutants are spread to a larger distance. It is noteworthy that the stack is more than 50 meters height according to visual

evaluation and is situated on a hill crest. According to the report of the plant's environmental protection department, the enterprise takes proper measures for air protection by regularly replacing the sealing of rotary kilns and of ventilation system. Refining and repairing of the condensation system and of pipelines as well are also executed from time to time. The condensate is removed from filters as sludge, and then it is accumulated and returned into the production process for kilning.

### *Concentration plant*

Concentration process is applied to the low-grade cinnabar ores or complex ores for generating the concentrate with sufficient content of mercury and for producing the fluorspar. Since year 1967 a section of boiling-bed' kiln at the metallurgical plant has been used for the mercury extraction from concentrated ores. As for the high-grade antimony concentrate, it can be supplied to common consumers (to the Kadamzhay plant for example).

Final product of the concentration plant is fluorspar concentrate. About 2.5-3 thousand tons of the concentrate are produced every year. However this production is unprofitable and in fact is subsidized by mercury production.

Specification of operational process of the Khaidarkan plant is accompanied with a range of problems:

- Low quality of the ores and growing energy prices complicate economical conditions of the deposit development;
- The mining conditions are rather difficult due to increasing depth of mining and water intrusion to the shafts;
- Moral and physical obsolescence of equipment used is a factor of impediment for operational and ecological effectiveness of the plant;
- Another problems are connected with essential remoteness of the enterprise (particularly a large distance to the railway network) and with difficulty of the borders crossing procedures.

Recently the production volume at the Khaidarkan mercury JSC has decreased: 236.3 tons of mercury have been mined for a sum of 132.3 million soms. Thus the decrease of production rate is 87.6%. And the reasons are following:

- depletion of high-grade metallic ore reserves;
- difficult mining conditions of bottom lifts in the shaft "Vspomogatelnaya".

It is extremely important to attract a strategic investor in current situation that is possible by means of selling the government share holding on a competitive base. Probable privatization that is planned for a period of 2008-2010 might result in significant rise in production at the plant but under some special conditions. One of such conditions is necessity of transport infrastructure improvement that will favour the development of alternative kinds of activity and the attraction of foreign investments to the region. Thus it is quite necessary to consider activity on infrastructure development and correlative effects in the course of further project implementation.

## **9. Review of possibilities for small and medium-scale enterprise development (SME) in Batken and Osh provinces within the current policy and legislation.**

*Industry* (data for year 2003)

2.2% of economic entities is in state property, while 2% is in municipal property and 95.8% is in private property.

For the purpose of industry development the following measures are required: creation of new enterprises, implementation of high technologies, modernization and technical re-equipment of production capacities, formation of favorable investment climate for attracting foreign and domestic investments, entering the world market with competitive product. The following reforms in the industry of Batken province are planned for realization of the abovementioned measures:

### *Oil and gas industry*

Oil and gas industry of Batken province includes the deposits of Arkin and Burganda massifs of oil and gas. Recoverable reserves of these massifs make up 1.9 million tons and 4.6 milliard m<sup>3</sup> respectively. Daily oil output is 100 tons and gas output – 40 thousand m<sup>3</sup>. For effective exploration with further oil processing the construction of two oil refineries with production facilities for petroleum, diesel fuel, aviation kerosene and fuel oil is required to satisfy the consumers needs in the province.

### *Processing and food industry*

Processing complex of Batken province is based on processing of local feed stock.

Priority direction of processing industry development in the region is revival of viticulture and plantations expanding including further feedstock processing for getting high-grade wine product at local wineries (Beshkent, Tort-Gul, Burganda BVP). For these purposes such measures as enhancement of wine production technologies and acquisition of bottling equipment are required at that providing attraction of investments and creation of joint ventures.

The region is famous for its apricot plantations with the gross yield up to 12 thousand tons per year. For processing of these resources it is necessary to construct mini shops on drying and processing into concentrates.

8.6 thousand tons of tobacco are sweat in this region. The main tobacco sweating enterprise in the region is Kyzyl-Kya TSF. At present the factory is operating but only on the customer's feedstock. For commissioning of total production capacity the investments are required for feedstock purchasing as well as for its sweating that will facilitate profit earning.

At the moment the production of raw cotton is increasing in the region. The construction of cotton mini ginnery is required to process the cotton. For this purpose a credit for a sum of 1.5 million soms is necessary.

### *Constructional materials production*

This sector is represented by such enterprises as Nur-KM JSC and Temir-Beton JSC (Kyzyl-Kia) and Tunguch JSC (Sulukta). The possibility of transformation to output of the most competitive constructional products (tile, facing tile) is being presently searched. For this

purpose feedstock and outlet are sufficiently available. Additional investments and establishing of joint ventures are required for the full use of mineral raw material base of the abovementioned enterprises. The construction of a cement plant is being currently carried out in Kayly-Kya.

There are sufficient silica sand reserves in Leylek region. There is a possibility to establish a joint venture on production of empties and highly demanded sand-lime brick on the base of Kosh-Bulak JSC.

#### *Light industry*

Light industry in Batken province is represented by two clothing factories: Dinamo factory in Kyzyl-Kia and Kadamzhay clothing factory. It is noteworthy that these enterprises possess large capacity potential for reorientation to output of more competitive garments. For this purpose the investments and creation of joint ventures are required.

#### *Mechanical engineering and metal processing*

Due to the breach of economic ties with CIS countries the enterprise “Mashzavod” in Kyzyl-Kia reduced the production of drive and saw chains, furniture fittings. The factory had to develop new products salable in Kyrgyzstan. For these purposes certain types of product (such as safety devices, low-voltage and high-voltage disconnectors, traverses) were developed for Kyrgyzenergo holding company. By present time the factory has developed the production of saw chains that are used in logging industry of Russia.

ZEMM JSC specialized in production of spare parts and optional equipment used in capital repairs of mining equipment. However, now the factory uses only 7% of its full production capacity due to such reasons as closure of a number of shafts, sharp reduction of coal mining in the country and lack of customers. Investments are required in order to use operational potential of this factory that has the capability to produce agricultural equipment and machinery and to establish serial production.

#### *Transport and communications*

Actually the burning question is to provide potable water to Batken city with population size of 25 thousand people. The construction of water channel Kara-Kol – Batken is required for solving this problem at this attracting the investments in amount of 105 million soms.

One of the main tasks of infrastructure development in Batken province is construction of the highway Kyzyl-Kia – Kadamzhay – Batken – Isfana round the territory (enclaves) of neighboring Uzbekistan. Foreign investments should be attracted for this purpose.

Geopolitical features of the region and state of transport communications require urgent measures for air transport development. Now the question on foundation of Batken air company. The airports Batken, Kyzyl-Kia and Isfana as well as required aircraft fleet will be transferred to the company's balance.

The investments at the rate of 50 million USD are required for reconstruction of Batken airport and for purchasing the aircraft technical equipment and machinery.

At present the priority directions for development of telecommunications network in Batken province is conversion to new kinds of digital communication.



### *Mining industry*

The mineral raw material base of mining industry in Batken province is mainly focused on development of large mining and processing enterprises. There are considerable estimated reserves of certain minerals (uppermost of mercury, antimony and gold).

Established antimony reserves of the deposits Kadamzhay, Tereksay, Bolshoy Khaidarkan and Abshir sum up about 16 million tons containing 272.6 thousand tons of antimony. The Kadamzhay antimony plant JSC plans to implement the processing technologies with regard to oxidized and arsenic-containing ores. This will ensure continuous operation of the plant for a period of 15-20 years. Realization of measures on exploration of antimony and gold deposits reserves Nichkesuu, Savoyardy, Terek and Terekkan will premise stable operational process of the plant in future. The Kadamzhay antimony plant JSC has produced antimony and its compounds in amount of 2470.5 tons. Investments at the rate of 5 million USD are required to increase antimony production that will result in increasing of currency earnings to the state budget.

Mercury feedstock is represented by explored reserves of mercury and mercury-antimony-fluorite ores in the deposits Khaidarkan, Novoye, Besh-Burkhan with demonstrated reserves in amount of 40 million tons.

Explored brown coal reserves of Sulukta deposit make up more than 180 million tons. Operational activity of this enterprise is possible only in case of purposeful investments or establishment of joint ventures on coal mining and sale.

### *Gold mining*

The development of commercial gold mining will require thorough exploration of revealed deposits mainly in upper reaches of the river Soh. These are the deposits Altyn-Djilga (25 tons of reserves), Duvatash (16 tons) and Chakush (36 tons) with average gold content of 4-6 g/ton. The gold deposit Nichkesu (12 tons) with 3-7 g/ton gold content is located in upper reach of the river Isfairam (35 km southward of Kyzyl-Kia).

Some years ago a group of Japanese geologists visited the region where the deposits are located in order to investigate the possibilities of gold mining. According to the estimation made by Mr. Noruzbaev, the national coordinator of the primary mercury project in Kyrgyzstan, the expenses for development of these deposits would sum up 150 million USD. However this estimation was based only on the expert's own experience rather than on any systematic research and it requires further analysis. The slag heaps of Chauvai and Khaidarken might contain some amount of gold, though extraction of these gold reserves is considered to be unprofitable.

### *Individual gold mining*

According to some appraisals, about five thousand people in small groups are engaged in individual gold mining in Kyrgyzstan.

As the World Bank reports, a number of gold prospectors is almost 1000 people less than a number of legal employees in gold mining industry. According to the assertion of some experts nearby 3000 people are engaged in the legal gold production.

In the judgment of independent experts up to five thousand people implement individual gold mining in a high season. For the most part they are unemployed (local) inhabitants residing in the remote regions of Kyrgyzstan.

Dealings with the gold mined by prospectors are often made in the illicit market. Such gold is often purchased by foreign entrepreneurs from Uzbekistan and China. They are believed to pay 300-500 soms for a gram of the precious metal.

The black prospectors don't have a possibility to deliver their output to a legal processing as any illegally mined gold doesn't exist in juridical aspect. Consequently, the gold mining and gold processing have extremely expanded into a huge hidden sector of Kyrgyzstan's economy. Gold is panned out in Tien Shan mountains. Being the nearest city to the goldfields Osh has become a center of precious metal processing, both legal (at the registered enterprises) and illegal (in numerous underground shops). In some cases the placer gold is refined under primitive conditions with application of various acids and amalgamation process.

### *Cement production*

The Khaidarkan plant has realized a feasibility study for construction and operation of a cement plant that is considered to use slag wastes (cinders) of mercury production in the capacity of feedstock. About 13 million tons of slag (cinders) accumulated in the territory adjacent to the plant can be used for cement production due to high lime content. Accumulated slag volume will be sufficient for providing the planned cement production (where about 100 people are intended to be engaged) with necessary production facilities. However the plant has not received any resources yet to start the construction of the cement plant. Currently the enterprise endeavors to obtain funds for initial stage of the project that will probably cost about 3 million USD. State agency on environmental protection has expressed its concern with respect to the enterprise's plans. This option is reported to be environmentally inappropriate alternative due to high mercury content in the slag and to a possibility of mercury release during the cement production. An issue on availability and profitability of such cement production methods that are more ecologically conscious and able to reduce the potential mercury emissions is a subject to further investigation.

### *Other options*

Production of such construction materials as lime, sand and marble was considered among the other possible options of mining operations. However none of these options was approved as being sufficiently promising due to the limited market size and relatively high transport charges. Cement production can be based on investments from the outside of the Central Asian Region (China, Russia) or on local investments (Kyrgyzstan, Kazakhstan) since there is an essential demand for cement.

Some investigations with regard to oil and gas exploration in Batken province as well as restoration and expansion of antimony production in Kadamzhay were implemented. If such activity is assisted then it will promote the alternative development options both for Khaidarkan and the region in general. Batken province undoubtedly possesses a significant potential for developing the tourism and recreation sectors (especially such kind of mountain sport and recreation forms as hiking tourism, speleological tourism, mountaineering, hunting and tourism on the base of local communities). However the possibilities for development of local tourism are considerably restricted by essential remoteness of the region from Bishkek and other large cities of Central Asia as well as difficulties related to access of foreign and local tourists to the region.

### *Bauxite mining and aluminum production*

In 2007 the Khaidarkan mercury plant participated in a bid on construction of bauxite-aluminum complex that had been promulgated by the Government of the Kyrgyz Republic. Although eventually the preference was given to Batken region for the most part because of more developed infrastructure. However, some investors from Russia, Denmark, Kazakhstan and China are reported to be still interested in realization of such a project on the base of Khaidarkan. It is not certain whether the discussed project provides only for bauxite mining or for construction of aluminum plant as well. The latter stipulates substantial requirement with regard to the infrastructure since metallic aluminum production consumes large amount of electric energy. According to appraisals of Russian companies the operation of such bauxite-aluminum complex would require employment of about 10 thousand workers. Russia is also concerned with concurrent investments into development of hydropower industrial complex in the river Naryn that is a very important hydro power source for the Kyrgyz Republic.

Zardalek nepheline syenite deposit containing 200 million tons of reserves with 22% content of aluminum (AL<sub>2</sub>O<sub>3</sub>) is situated in upper reaches of the river Soh (on the right bank). There are some other aluminum deposits in the territory of the region that are less explored and contain about 400 million tons of reserves. The iron-ore deposit Nadir is situated approximately in 5 km northwards the settlement Khaidarkan. The deposit ores are of magnetite-hematite composition with average iron content of 45% and total metal reserves of 900 thousand tons.

Oil and gas reserves containing 13 million tons and 3.5 million m<sup>3</sup> respectively are located mainly in the northeast of Batken province in the foothills of Fergana valley. Approximately 18-20 thousand tons of oil (25% of total national production) is annually produced in the region. The reserves of the coal deposits in Sulukta, Shurab and Kyzyl-Kia coal regions as well as of other smaller deposits sum up 355 million tons. At present 60-100 thousand tons of coal (25-30% of total national production) is annually produced. Batken province also disposes reserves of such nonmetallic minerals as marble, lime, clays, shale, mica and gravel.

## **10. Economical and social development of Osh and Batken provinces and links with the country development strategy.**

Analysis of gross regional product for years 2004-2006 indicates that consecutive and systematic implementation of planned measures on raising of the production rates in the main sectors of economy has strengthened and enhanced positive tendencies in social and economic development of the region. Real GRP growth based on development dynamics of the previous years averaged 10% (3550.3 million soms) in year 2006 that was 3.1% of GDP of Kyrgyzstan (Appendix 6).

The growth of such sectors as industry, construction, trade, service and agriculture has had the greatest influence on GRP increase for the past three years.

GRP made up 8439 soms per head that was 2.5 times less than average country level.

Total cost of investments into fixed capital in 2007 made up 1463 million soms that was three times as much in comparison with year 2000.

Industry is the second largest sector of the region's economy. Its contribution to GRP is 10%. Employment rate in this sector is 8.0 thousand people.

Food production constitutes a significant share of 52.7%; metallurgical production and production of finished metal goods both account for 24.8%; production of tobacco goods – for 11.5% and textile industry – for 3.7%. An average increase of production rates of food (including drinks, flour, vegetable oil, bakery, confectionery etc.) amounts about 10%.

As for metallurgical industry (including antimony, mercury and metal production), the volume of production annually increases by 4-5% on the average. Production of tobacco goods annually increases by 1-3 %.

The volume of production in textile and clothing industry annually increases by 15-20% on the average (including clothes production, fur dressing and dying).

Industry is represented by the following enterprises: Kyzyl-Kia–Dan JSC, Kyzyl-Kia ZEEM, Mashzavod of Kyzyl-Kia, NUR KM JSC, Agroplast CC, Kyzyl-Kia Nan JSC, Kyzyl-Kia Tamekisi JSC, Temir-Beton JSC, Khaidarkan mercury SJSC, Kadamzhay antimony plant JSC, Sulukta-Shakhtastroy JSC, Sulukta Komur JSC and Kyzyl-Kia Komur JSC.

### *External economic activity of Batken province*

(Export and import; Appendix 6)

Experience in external economic activity has been accumulated and its principles and basic foundations have been formed by the region. The main items of export to other regions of the country are represented by natural, vegetable and animal feedstock. The main priority and stable market for exporting from Batken province is Djalal-Abad province as well as Osh and Bishkek. Oil and silica sand are exported to Djalal-Abad province; coal, gypsum, hand-made carpets, fruit, vegetables, watermelons, melons and gourds, dried apricots, wine and cocoons are exported to Osh; meanwhile tobacco, wool, leather, hand-made carpets, dried apricots and wine are exported to Bishkek.

The following products are imported to Batken province: finished goods from Bishkek and Chui province, as well as cars, office equipment, home appliances, construction materials, clothes, shoes and food from Osh province. Lubricants, furniture and electrical goods are supplied from Djalal-Abad province.

In conditions of established economic relations, production sector of the region's industry remains targeted to the CIS markets. Activity on commodities exchange with CIS countries in 2005 was specified by the active trade surplus of 8.7 million USD. Total turnover of commodities (import and export) amounted to 14.8 million USD in the following proportion: 2.9 million USD from import and 11.8 million USD from export. Russia, Belarus, the Ukraine, Uzbekistan and Tajikistan are the main partners of the region in exchange of commodities. Goods supplied for export include antimony, silica sand, fluorspar concentrate, limestone, coal, shale, tobacco, cotton, dried apricots etc. The imported goods are following: antimony concentrate, used containers, mining equipment, electrodes, cement, roofing slate, fertilizers, steel sheets etc.

External trade development in Batken province was unsteady within the period from 2002 to 2006. In 2007, foreign trade turnover doubled and thus increased by 17.8 million USD. In comparison with the rates of year 2002, the increase in 2.3 times was registered.

Foreign trade turnover with CIS countries decrease by 48% within the period 2002-2007. Foreign trade turnover with other countries increased from 6.5 million USD to 151 million USD for the same period. Thus in comparison with year 2005, the turnover increased in 2.4 times.

During this period the main volume of earnings from import was received from CIS countries (90.9% in 2002, 78.7% in 2003, 92.6% in 2004, 95.2% in 2005, 81.8% in 2006).

Priorities: Increase of frontier trade with adjacent states and creation of FEZ<sup>9</sup>.

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<sup>9</sup> Batken province Social and Economic Development Program for 2008- 2010

According to the Country Development Strategy (CDS) till year 2010, the priority sectors in Batken province are: (a) agriculture and (b) processing industry.

For 74% of population in Batken province, agriculture is a dominating sector of economy (its contribution to Gross Regional Product in 2004 summed up 54.7%). The region produces tobacco, grapes and fruit of the highest grade that are exported after processing as wine, dried apricots, canned fruit and sweat tobacco. In addition, there are potential possibilities for developing goat and yak breeding in the region. One of priorities of agriculture development in the region is utilization of new land areas due to construction of Kara-Kyshtak-Boz and Sarkent-Too-Zhailoo canals. The region possesses significant production facilities for tobacco sweatomg, production of wines, canned vegetables and fruit. Increase of agricultural production will provide the necessary prerequisites for the processing industry development and for construction of new enterprises.

Creation of transport communications (including completion of the detour roads Kok-Talaa-Pulgon-Burgondu-Batken and Aigul-Tash-Sogment-Charbak as wells as reconstruction of internal roads) is extremely important for economic development of the region.<sup>10</sup>

Points of increase (Appendix 6) by districts and towns of Batken province have been determined for rationalization of economic branches of the region and for their effective geographical allocation in perspective to ensure sustainable economic development and subsequently to increase the population income level and to replenish the regional budget.

#### *Osh province*

According to CDS, the priority sectors in Osh province are: (a) agriculture and (b) processing industry.

Stable operation of Kadamzhai antimony plant and completion of cement plant construction in Kyzyl-Kia will provide a significant contribution to economic development of the region.

Contribution of Osh province to agricultural production of the country sums up 18.7%. Share of agricultural sector in gross regional product is 59.7%. Agricultural sector engages 71.2 % of the total employed population.

Osh province is one of the producers of export-oriented product such as cotton, tobacco, fruit and vegetables. There are nine ginneries, a large tobacco processing plant Osh-Dyubek and seven tobacco sweating shops in the territory of the province.

Manufacture of ecologically clean products (organic cotton), implementation of alternative technologies (trickle irrigation etc.), creating of enterprises on advanced processing of agricultural output will be highly important for agricultural output expansion.

In addition to the development of enterprises providing the population of Osh with food, construction and initiation of new production facilities is planned for manufacture of finished goods in cotton, tobacco and fruit processing industries.

Reconstruction of the road Osh-Gulcha-Sary-Tash-Irkeshtam and construction of the railway Osh-Kara-Suu-Djalal-Abat-Torgugart will facilitate strengthening of trade and economic relations with China and Tajikistan and will increase the role of the region as a traffic center in Central-Asian Region.

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<sup>10</sup> Country Development Strategy, 2008 - 2011

Processing industry is a priority of Osh city.

Industrial sector of Osh is mainly represented by agricultural processing enterprises. The following large enterprises on cotton processing operate in the city: Textilshik OJSC, Limatex LLC and Osh-Tex JSC.

Development of Osh as southern capital and the largest city in southern region is major precondition for food production. For the purpose of providing the population of Osh city and Osh province with food, the branches of food industry (dairy, drinks, vegetable oil, bakery, macaroni foods etc.)<sup>11</sup> will be developed.

## **11. Review of existent infrastructure.**

Currently, the total stretch of roads serviced by Osh-Isfana RD in the province is more than 1 200 000 km; 21% of which are the roads with improved pavement, 24.4% – with cement concrete, bituminous concrete and black gravel pavements, 37.6% – with gravel pavement and 17% – with ground pavement. Up to year 2007, financing of repairs and maintenance of public roads was implemented only by 20 % of required volumes.

The initial stage of the road development program in the province implies preservation of the existing road network and its improvement to the level ensuring appropriate consumer qualities of the roads; implementation of the projects for maintenance of current state of the existing roads and for increase of road bearing capacities. The program stipulates annual implementation of rough-surface treatment, patchwork of bituminous concrete pavement, repairs of bridges, artificial constructions and restoration of hazardous sections.

Currently, more than 1000 taxi cabs operate in the territory of the province, about 15% of them work on a patent base. Due to insufficient organization and systematization of their work, the taxi cabs cannot be accounted for taxation in a view of absence of appropriate tax collection mechanisms.

As for engineering services, the major part of the settlements in the province is not provided with pure potable water especially with regard to rural areas. Gas is supplied only to the north-east part of the province.

### *Transport infrastructure*

The number of the available transport in Ail Okmotu; roads and bridges (Appendix 5)

Kadamzhai is connected with Fergana by an asphalt road of satisfactory quality that allows single-lane traffic in both directions. Along the whole stretch (30 km) the road goes through densely populated kishlaks of Fergana valley; therefore the speed can hardly exceed 60 km per hour.

The road in Kyzyl-Kia is of rather poor quality and goes along the edge of Fergana kettle that is much less populated.

There are two airports near Kadamzhai settlement: in Fergana and Kyzyl-Kia town. In the previous times, use of Fergana military transport airfield has always presented a serious problem for military personnel and in spite of its excellent properties the use of this airfield for civil purposes was limited. The airport in Kyzyl-Kia is very small. Its airstrip is suitable for business-jet planes only meanwhile the air navigation equipment has not been renewed for a long time.

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<sup>11</sup> Country Development Strategy, 2008 - 2011

Industrial cargos were transported to Kadamzhai and Khaidarkan via Uzbek railway to Margelan station.

Kadamzhai plant had its own transshipment terminal in Fergana for intermediate storage of cargos.

## **12. Public health, education and other public services and their quality in Khaidarkan, as well as in Batken and Osh provinces in general.**

### *Public health (Appendix 7)*

3500 people are employed in the sector of public health (2.3% of the employed population by year 2006); 585 people of them are physicians and 2915 people are paramedical personnel.

In 2006, coverage of the population by medical services (per 10 thousand people) was as follows: 14.0 doctors compared to 15.8 in 2002; 70.1 people of paramedical personnel compared to 81.7 in 2002.

To create conditions meeting the requirements of the present time in the sphere of public health, only at the expense of donors and sponsors 15 buildings have been built and 21 buildings have been repaired to the amount of more than 10,0 soms. For the last few years, public health institutions have been equipped to the amount of 2.0 million soms and provided with ambulances.

Within implementation process of new methods of public health financing, compulsory medical insurance (CMI) is being gradually introduced in the province. At the present time 8 centers of family medicine (CFM) and 77 family doctors work within the CMI system. 86.7% of the population is insured under the CMI system. International donor organizations provided support for capital repairs to the amount of 12.7 million soms for 19 objects and to the amount of 18.1 million soms for CFM.

### *Education*

Educational system includes 220 schools, 18 preschool institutions, 5 higher educational institutions, 4 secondary special educational institutions and 10 technical schools. Moreover 2 special schools successfully function in the province. Advanced study of certain school disciplines is provided in 21 schools. For a period of 5 years a insignificant increase of the number of daytime comprehensive schools was registered (from 210 schools in 2001/2002 school year to 220 schools in 2006/2007). The number of higher educational institutions remained at the level of year 2005 and numbered 5 institutions. At thus the number of pupils in daytime comprehensive schools tends to decrease (from 107 500 children in 2001/2002 to 99 600 children in 2006/2007). Meanwhile the number of students in higher educational institutions increased from 12 100 to 15 600 and in secondary special educational institutions – from 1 700 to 2 500. The number of students in technical schools also increased from 2 400 to 2 600. Preschool institutions are attended by 2 870 children. 16 700 people are employed in this branch (11.0 % of the employed population in 2006). In comparison with year 2005, the number of teachers increased by 3 900. Educational institutions have carried out the appropriate work aimed at establishing of cooperation with such international organizations as: ADB, UNICEF, GTZ, IYC, FCIS and UNDP. Assistance to the amount of more than 38 million soms was provided by donors to repairs and construction of schools.

In October, 2006 it was found out that 13 children at the age of 7-17 did not attend any comprehensive secondary schools.

### **13. Male and female rate of employment in agriculture, industry and service in Khaidarkan, as well as in Batken and Osh provinces in general.**

Appendixes 3, 6.

Khaidarkan Mercury Plant enjoys wide support of the local population and organizations not connected with environmental protection, because the population considers the enterprise to be of significant economic importance. However no one including the plant's workers could answer the question about taxes to the budget.

KMP can hardly be considered as the most important employer in the region, because 90% of the interviewed residents could not give any precise answer to the question about the number of employees of the plant. However, KMP is a large employer for Aidarken settlement itself and currently provides 700 families with means of subsistence.

#### *Human resources*

In the past (year 1989), 3500 people of Khaidarkan settlement, that numbered 11 500 residents, were employed at the mercury plant. From the time of formation of independent republic, the number of the workers at the enterprise decreased to less than 1000 people (860 people in year 2008) and the settlement's population decreased to 9200 people in 2007. However the enterprise remains a vitally important source of income for the local population. The community that numbers 15 000 – 20 000 people depends on the enterprise directly (if they are employed by the plant or have some relatives employed) or indirectly (if they provide certain services to the plant and use water pumped from the mines for agricultural purposes etc.).

#### *Labor market*

During the period from 2000 to 2008 (except year 2002) the cases of registration of unemployed population increased as that by the end of year 2007 it had numbered 6,597 persons (1.4% less than in 2006).

The majority of unemployed population in 2006 was represented by young people at the age of 30–40 (30.8% of the total number of registered number of unemployed population). 66.8% of unemployed population was men, while every ten unemployed person had high or specialized professional degree.

### **14. Work environment in Khaidarkan.**

#### *Labor protection and occupational safety*

2.874 million soms were spent on labor protection measures in 2007 (including 1.871 million soms on special nourishing, 695 thousand soms on milk). 915 thousand soms were spend on nomenclature measures. 307 thousand soms were spent on protective clothing and personal protection equipment, 279 thousand soms of which were spent on self-made products.

No incidents on occupational safety or occupational traumatism were registered in 2007. Two cases of occupational diseases (Raynaud's phenomenon) were revealed.



In 2007 the plant paid 1.499 million soms as indemnity for labor injury and for occupational diseases, 793 thousand soms of which were paid in a form of one-time allowances. Such amounts have a profound impact on the general financial situation at the plant (Appendix 1).

## **15. Development of tourism and environmental protection programs in Khaidarkan, as well as in Batken and Osh provinces. Disposal of critical resources.**

### *Nature*

The southern part of Fergana valley to the westward of Tar River basin to Ak-Suu River basin is called Alay-Turkestan province. This is an area from the northern slopes of Alay and Turkestan ranges to the foothill plains that is 550 km lengthwise from west to east from the border with Tajikistan to the border with China. Its eastern width is 110 km; the western width is 75 km; the total area is more than 30 thousand km. There are no natural barriers in the north. Its borders coincide with the state borders with Uzbekistan and Tajikistan.

The main orographical boundaries are Alay and Turkestan ranges. Alay range stretches in the shape of convex bow for 400 kilometers southward of Alay-Kuu valley to Sokh valley. The range's average height is 4000-4500 meters, the highest point is Tamdykul Peak (5539 m) at the watershed of Sokh River. The territory of Kyrgyzstan includes only the eastern part of Turkestan Range (approximately 150 kilometers). The remaining western part of the range lies in the territory of Uzbekistan and Tajikistan. The average height is 4000 meters, the highest point is Askaluu Peak (5621 m) in Karavshin River basin, which is the basic component of Isfara.

The fauna of the region includes 40 mammal species, 250 species of birds, 10 species of crawlers, 20 species of fish. In the submontane and median montane zones the following species are of economic importance: marmot, hare, muskrat, polecat, fox, wolf, jackal, ermine, least weasel, boar, roe, badger, marten, dove, turtledove, quail, Daurian partridge, pheasant. In the highland the same importance have ibex, Pamir sheep (Marco Polo's sheep), chukar, snowcock and others.

### *Tourism development*

The region has vast opportunities for development of tourism, recreation and sport industries. 10 tourist objects operated in the region in 2006. During this period the region was visited by 10.2 thousand tourists. The region has a considerable potential in the realm of tourism and recreation, especially international one. Unfortunately, today the tourism potential of the Kyrgyz Republic is not used in full. Dugaba mountaineering base is the main element of the recreational system in the region. It is located in Pamir-Alay on the slopes of Alay range, 31 km away from the center of Kadamzhay region. The mountaineering base is located in the ravine of Dugaba River, 2100 meters above sea level. The bank of the river and its feeders are covered with broadleaved and coniferous forests. In the latter juniper and Tien Shan spruce prevail. Vast Alpine meadows stretching to the perpetual snow lines spring above the base level. There is a nameless glacier in 6-7 kilometers away from the base. A few glaciers of 3-4 kilometers length are located near the base. Dugaba base meets international standards (such as availability of professional alpinist instructors, control and rescue service etc.). Many world-class alpinists visit Dugaba base thanks to well-established service and unique routes. The tourist base offers a comfortable, pleasant atmosphere for businessmen and travelers.

Piramidalnaya Peak and Asan-Uson Peak are situated in the territory of Ak-Sai settlement of Batken region, in the neighborhood of Gerevshin. A distance between Batken and Kurbak is 80 km and from Kurbak to Gerevshin (40 km) only animal drawn transport can be used.

Piramidalnaya Peak (5509.9 m above sea level) is the main pride of mountaineering and tourist area not only in this region, but also throughout Kyrgyzstan. It was exactly this peak where the alpinism championships of the USSR were held.

Undoubtedly, the tourist sector is promising trend of the region's development due to the natural and climatic, historic and cultural potential of the region, as well as the existing health resort and rehabilitation infrastructure.

Attraction of investments into the tourist sector and into its infrastructure is rather profitable and promising business. There are all necessary prerequisites for the development of equestrian tourism.

## **16. Incomes of community in Khaidarkan and Batken province**

In 2007 the average monthly wage was 2779.4 Soms, which is USD 77.2 at the National Bank of the republic rate. The increase in wages in 2007 as compared with 2006 was 43.6 per cent, and since 2002 it was 2.8 times more, which is 400 Soms lower than the republican number. At the same time the minimum consumer budget was 2013 Soms, which is 66% more as compared with 2006.

The significant growth of nominal wages in 2007 was observed in all sectors of economy, but hotels and restaurants, state administration sectors that underwent 14.1 per cent wage cut in 2006 as compared with the living wage of able-bodied population.

There is growth of differentiation in wages; the highest paying employees in 2007 were employees in the following fields: finance (10,579.7 Soms), real estate transactions, lease and customer services (7,487.7 Soms), processing industry (4,523 Soms), education (3,341.1 Soms).

The foreign industrial intake becomes active.

The level of wages of budgetary employees and of income in agricultural sector is of grave concern.

The labor market of the region undergoes registered unemployment growth trends. The number of registered unemployed (6,691 in 2006) has declined (6,597 in 2007). However, there are practically no vacancies of the working places.<sup>12</sup>

## **17. Legal framework in the realm of mining industry and other kinds of industrial activity.**

It should be noted that a range of respondents have negative attitude towards Khaidarkan mercury plant due to uncontrollable tailings storage area. The respondents are mainly the inhabitants of Bel and Sur villages that have applied to various authorities and complained that the plant have not placed the tailings storage to another place.

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<sup>12</sup> Program of social and economic development of Batken province in 2008-2010

It should be noted that the development of these villages near to the tailings storage is deemed illegal by the local administration. At the same time, the tailings storage is directly near to the main road Osh-Aidarken, which entails many questions as to how and why the tailings storage was built so close to the main road. Besides, as it was already mentioned, no security was found in the territory of the tailings storage during the investigation.

Legislative, regulatory acts in the field of medicine (hygiene requirements) as well as environmental requirements in the field of environmental protection regulating mercury handling have been partially developed and are still being developed currently. This refers both to the matters of specific hazardous chemical substances in international trade, persistent organic pollutants, and to the matters of control over transboundary movement of hazardous waste and their disposal.

The current situation in the field of hazardous substances handling is quite complex, there is no specific legal basis. There are no laws concerning chemical substance handling. There is a necessity in compilation of the hazardous waste inventory, taking of an inventory, updating of the legislative framework, its compliance with international standards and handling regulations. Adaptation and compilation of database, its commonality with pan-European standards is required. There are also problems of blowout, release of mercury and long-range transportation.<sup>13</sup>

## **18. Investment climate and investment projects review.**

In 2005 to 2007 more than 2.7 billion Soms were raised for development and modernization of fixed assets. In 2007 investment activity in the region advanced significantly – growth in attracted investments was 153% as compared with the 2006 level. In terms of money the volume of attracted investments to the economy of the province in 2007 was 1467.0 million Soms.

In the structure of investments to capital stock by the sectors of economy the industry had the largest specific weight in 2007 – over 60%.

These indices were positively affected by the established social and economic stability in the republic.

The banking system of the province has a significant investment potential. The total loan portfolio of the banking system of the province as of early 2007 was 381.6 million Soms, while the major portion of it was loans to the real economy. As compared with 2005, the number of financial institutions increased 10 times and was 45 in 2007. The loan portfolio was increased 9 times respectively. Every family in the province has 4,000 Soms, which is not enough. This amount should be raised up to 20.0 thousand Soms per every family, which makes the capital of all banks amounting to approximately 2.0 billion Soms. But this task goes beyond the timeline of this Program. However, it is worth mentioning that the banks operate cautiously when it concerns industry-related investment project loans. This is explained by the risks encountered by plant. It is worth mentioning that there are few projects providing for the profitability of investments, as well as there is no insurance against risks system.

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<sup>13</sup> "On the condition of mercury-related problem in Kyrgyzstan". K.M. NORUZBAEV, B. TOLONGUTOV. Kyrgyz Republic, Ministry of Ecology and Emergency Situations, Chui ecological laboratory

**Note:** Out of the total number of such projects the South-Kyrgyz Cement Works performed work amounting to over **1.0 billion Soms** up to 2008; in 2008 to 2010 these projects plan works amounting to **4601.4 billion Soms**; in 2010 to 2015 these projects plan works amounting to **885.0 million Soms**.

*Sources of life activity of the community of Batken Province*<sup>14</sup>

*Agriculture*

Agriculture is the high-priority sector of economy in the province. Its share in the gross regional product was 44.0% (2006). Over 75% of the community of the province resides in rural areas and 32.0% (49.2 thousand people in 2006) of the total number of employed are engaged in agriculture. Total output of agricultural products in 2007 increased 2.4 times as compared with 2000 and was 136% by 2005 (5648.0 million Soms).

There were 697184 hectares of farmland in the province by early 2007. Out of those pastures were 84.7 per cent, farm fields – 10.7, perennial plantings – 2.5, hay-fields and idle fields – 1.7 per cent. In 2002 to 2007 the area of the farm field reduced from 81391 ha to 74447 ha, while the area of perennial plantings increased from 13325 to 17490 ha. The areas of other crops changed insignificantly.

Out of all crop area in 2007 62.0 per cent were occupied by cereal crop, 3.5 – by potato, 4 – by vegetables, 26.9 – by feed crop.

5,739 farm businesses were established in this sector, out of which 5,530 were farms, 197 were collective farms, 12 were state farms.

In 2007 alone agriculture raised 129.6 million Soms investment for irrigation network rehabilitation, 2.6 million Soms for drainage depuration, 1.9 million Soms for repairs of pump stations, 26.2 million Soms for procurement of equipment.

The loan system for agricultural producers is being improved.

In the animal industry there is a trend of herd expansion in recent years. As of 01.01.2008 the stock of cattle was 107,627 head, small cattle was 427,102 head. Such fields as yak breeding (1,283 head) and goat breeding are being recovered.

*Industry*

Industry is the second-priority sector of economy in the province. The share of the industry is 258.8 million Soms, or 7.3% of GRP of the province (as of 2006). Engagement in the industry is 13.1 thousand persons, or 8.6%. Wear of fixed assets is 14.6 million Soms, or 2.1%. The share of private property is more than 65%. Food production (52.7%), metallurgical production and finished metal products production (24.8%), tobacco production (11.5%), and light industry (3.7%) are a significant share.

In the metallurgical production there is a gradual increase in the overall production due to steady operations of Kadamzhai antimony plant since November 2006. The flooding of mines of Aidarken mercury plant in 2003 lead to the drastic fall of the overall metallurgical production. However, since 2006 the plant operate in normal mode, therefore the overall production has increased in 2006 to 2007.

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<sup>14</sup> Website of Ministry of Finance of the Kyrgyz Republic

The actual volume of production of nonmetallic mineral commodities decreased in 2007 by 6.1 per cent as compared with 2006. Such decrease was due to the production of concrete, gypsum and cement products.

#### *Small business.*

Small business has a stabilizing effect on the economy, i.e. flexibility and immediate adaptation to market conditions, ability to quickly change the pattern of production, promptly create and apply new technology and developments.

This sector takes second place after the agriculture in the structure of GRP. (16.5% GRP, 587.5 million Soms in 2006)

According to the forecasted data, the amount of income from realization of goods (works and services) produced by small business entities in 2007 increased by 123.0% as compared with 2006.

Finding a solution to a problem of getting small and medium business out of the shade due to tax burden rebate, elimination of intervention by law-enforcement and tax authorities to business entities activity and increase in real sector loans volume is an important trend.

#### *Consumer market*

In the recent five years the industry of consumer market and paid services to population there was a growth of the actual volume of retail sales and paid services. The volume of retail sales increased 2.3 times in 2002 to 2007.

The real growth of retail sales in five years was 61.5 per cent, of paid services – 58.6 per cent.

The increase in the rate of turnover increase was mainly achieved by the gain in market sales, which share in 2007 was 85.1 per cent of the total volume of retail sales.

#### *Transport infrastructure*

This industry is defined as the third-priority industry in the province. GRP of the infrastructure and services industry is 220.9 million Soms, while **GRP** share in the province was 6.4%. Employment rate in the industry is 4.8 thousand people, or 3.1%. The main transport infrastructure is the Osh-Isfana republican motor way. The motor way is coated with asphalt, but is in poor condition; it was repaired as yearly as 20 years ago.

#### *Development of construction activity*

Construction activity begins to develop rapidly. GRP of the sector was 98.6 million Soms, while GRP share in the province was 2.8% (2006), which was twice as much as in 2001. Employment in the sector is 18.8 thousand people, or 12.4%. Private property share in the sector is more than 98%.

Basic capital investments in the form of foreign loan on the security of the Government of the Kyrgyz Republic were used for the construction of the 220 kW power transmission line "Alai-Batken" at substation "Aigul-Tash" of cement works at Kyzylkiya. Also the main sources were the funds of the community, republican budget and other means. The high-priority economic activities were electrical energy industry (79.9%), construction of water facilities (11.4%), service sector (4.9%), and industrial enterprises (3.8%).

The main portion (more than 60%) in the structure of completed contractual work falls on new construction, reconstruction, expansion and technical retooling of facilities. Private enterprises and organizations perform more than 95% of total contractual work.

#### *Development of power engineering*

In recent years the financial standing of energy companies in the province has not had any progress. Debit indebtedness of energy companies has its impact on their financial relations with other economic entities and on the discharge of credit and tax liabilities to the budget.

System loss of energy in electric mains exceeds a 40% level, which nearly 25% are commercial losses and stealing. Consequently, the quasi-fiscal deficit in the power engineering sector of the province was 497.1 million Soms as of the end of 2007.

Some areas in the province depend on the power engineering of the neighboring state

### **19. Appraisal of the past and recent investigation of interrelation between mercury and other heavy metal pollution and death rate and morbidity of the community in Khaidarkan and the region in general (supplemented with information from the technical assessment)<sup>15</sup>. Appendix 3.**

#### *Mercury pollution in Khaidarkan settlement*

The research organizations of Ministry of Health of the Kyrgyz Republic held incidental surveys of impact of mercury and mercury compounds on the human body in the regions of existing mercury-producing works. Such surveys mainly included the sanitary and hygienic investigations. There were no surveys of the human impact of production of metallic mercury in terms of medicine, environment and biochemistry in the republic. There was neither any investigation of mercury entry into the human body along with food.<sup>16</sup>

Mercury and antimony concentration in all samples taken from the air of the working range of plant 80 times exceeded the MPC. Unlike soil and water, high concentration of these metals in the atmosphere has man-triggered nature, i.e. it is directly related to the emission points of such plant.

Respiratory diseases of workers employed in main and auxiliary shops take first place in the general structure of diseases of workers of Khaidarkan mercury plant.

In addition, the rate of bronchitis and other chronic lung diseases in primary occupation workers is twofold higher than that in workers of auxiliary shops. Neural diseases with autonomic disturbances take second place, while digestive organs diseases take third place.

Malignant neoplasms (20.8% men, 40.0% women) take first place, cardiovascular diseases (17.8%) take second place among men and urinary system diseases (25.7%) take second place among women in the structure of mortality causes among workers engaged in the mercury-related industries. Digestive (69.6%) and respiratory organs (29.1%) cancer takes first and second places respectively in the structure of malignant neoplasms among men. Digestive

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<sup>15</sup> Project "Risk assessment of the Kadamzhai Antimony Plant OJSC and the Khaidarkan Mercury JSC

<sup>16</sup>"On the condition of mercury-related problem in Kyrgyzstan". K.M. NORUZBAEV, B. TOLONGUTOV. Kyrgyz Republic, Ministry of Ecology and Emergency Situations, Chui ecological laboratory

(57.1%) and genitals (35.7%) cancer takes first and second places respectively in the structure of malignant neoplasms among women.

The samples taken during drilling of tailings storage at Khaidarkan, and also soil and water sampled in the adjacent territory were analyzed for the content of basic expected pollutants (mercury, antimony, lead, arsenic, cadmium, zinc, and fluorine) for the purpose of preliminary survey of chemical properties of the source of pollution. The analysis demonstrated that the tailings storage and the surface soil contained a considerable number of pollutants. The primary sources of pollution of air, soil and water were mercury, antimony, arsenic and fluorine. Moreover, the project organized the information campaign and prepared advises for the local community to protect it from the impact of mercury and toxic metals. Also it proposed a range of advises and measures to improve environmental safety of the tailings storage.

Reportedly, there were no other international environment-gearred projects dedicated to the problems of operating or closed mining enterprises or to the problems of related wastes in the region recently. Few research technical projects implemented with the assistance of the World Bank and NATO were dedicated to the safety and monitoring of radioactive waste in Fergana Valley. These projects can be used for development of the Plan of action towards primary mercury production in Kyrgyzstan.

Source: ENVSEC assessment report in Fergana Valley (ENVSEC 2005)

#### Relative hazard of mercury plant release of pollutants into the township atmosphere

Hazardous substances	Release, t/year	MPC for common air	Toxicity level in relative values "T"	Specific weight (%)	Priority
Mercury	13.12	0.0003	43850.0	85.78	1
SO <sub>2</sub>	45.02	0.05	900.4	1.76	3
CO	295.29	5.00	59.0	0.12	4
Dust	324.90	0.05	6298.0	12.34	2
<b>Total</b>	<b>666.34</b>		<b>510.7</b>	<b>100.0</b>	

Data of project "Risk assessment of OJSC "Kadamzhai Antimony Plant" and "Khaidarkan Mercury JSC".

Mercury has the biggest toxicity value, although its specific weight makes 2% of the total releases a year. The releases range by hazard in the descending order: mercury – dust – sulfur dioxide – carbon oxide. These substances fall in 1<sup>st</sup> (mercury), 3<sup>rd</sup> (sulfur dioxide) and 4<sup>th</sup> (carbon oxide, dust) class of hazard by toxicity.

The concentration of mercury in the surface air ranges from 7.7 to 11.2 of MPC (MPC – 0.0003 mg/m), while the concentration of mercury vapor reaches 20 MPC, or 0.006 mg/m, at the boundary of sanitary protection area of the mercury plant. Therefore, mercury is the main

pollutant of community air at Khaidarkan. The values of other gaseous pollutants of air are not substantial enough.

Mean concentrations of mercury in air at Khaidarkan exceed background levels by 11.8 times, while in the country houses area they exceed background levels by 25.1 times ( $P < 0.05$  and  $< 0.001$ ). This fact demonstrates the significant role of the mercury metallurgical works in polluting the township atmospheric air with mercury, although pollution level has not exceeded the maximum permissible levels.

#### *Mercury content in soil*

Soil contamination with various chemical elements can result in their emission into the atmospheric air (due to evaporation), into ground and intermediate water (due to their soil profile migration), and also in their translocation in the agricultural crop, which will eventually lead to their entry into the animal and human organisms through a food chain. The highest concentrations of mercury in soil were observed in the central, northern and south-eastern parts of the residential zone of the township. The rates of over-concentration of mercury in various soils exceeded its background levels by 6.5 to 25.1 times, which indicated different loads imposed by releases of the plant in the surveyed territories and formation of man-triggered mercury abnormalities.

The maximum mercury content (2.6-95.3 mg/kg) was observed in the soil of the holiday village located near by the disposal areas of the plant. The plots in the northern outskirts of the housing settlement adjacent to the sanitary protection area of the plant demonstrate a more contaminated soil. Mercury content was reduced from 3.0 mg/kg (2 km) to 0.38 mg/kg (8 km) as we moved away from the plant towards the irrigation intake. However, mercury content did not exceed the similar value measured in the control area (0.16 mg/kg), which indicated high prevalence of mercury pollution. In the soil of Galuyan River ravine, i.e. in the area of headings and below, mercury concentration was within 0.11-0.85 mg/kg range, with mean value 0.39 mg/kg at 2 to 10 km distance. The 0.39 mg/kg concentration was taken as the background concentration for soils of the investigated region.

#### *Mercury content in water for various purposes*

According to water analysis data obtained from different plant facilities (mine waters; wastewater of concentrating mills, concrete plant; irrigation canal and water basin water at the roasted product disposal area) mercury content ranged from 0.27 to 5.58 mcg/l, which was 5.4-111.6 times higher than the background mercury level in the waters of Galuyan River (0.05 mcg/l).

Mercury concentration in Galuyan River is small (not more than 0.1 mcg/l in average), which meets the background levels for exposed water sources.

Mercury content in the irrigation system water exceeded the background levels for water of the region by 1.4-5.0 times in average.

## **20. Previous and existent infrastructure of housing sector, culture and recreation and programs in Khaidarkan as well as Batken and Osh provinces.**

### *Available housing*

The available housing area in the province was 4.78 million square meters (as of 2006).



The total available housing area in the province was 11.3 square meters per capita, 15.9 square meters in the urban area, and 9.8 square meters in the rural area.

Housing per capital in specific regions is higher than in the province in general. Thus, it makes 16.7 square meters in Kyzyl-Kya, 12.3 square meters in Batken region.

As of January 1, 2007 construction-in-progress volume in the province reduced by 2.1 times as compared with 2002, particularly, by 1.5 times it reduced in the private sector.

2,499 apartments with total area 157.3 thousand square meters of housing were commissioned in 2002 to 2006. 943.5 million Soms of capital investment were spent on housing construction in 2002 to 2006.

Schools of general education for 4,921 students were commissioned in 2002 to 2006 (1,401 seats in 2002, 290 in 2003, 290 in 2004, 1,807 in 2005, 1,133 in 2006).

#### *Provision of clean water*

In the territory of the province the Asian Development Bank project "Provision of infrastructure services for communities" is being implemented in order to provide the rural community with potable water. The project is financed by the Government of the Kyrgyz Republic out of proceeds of the loan granted by the Asian Development Bank and out of private investment of inhabitants.

Currently all repair and construction works have been completed, and 43 villages have been provided with the potable water distribution system.

Currently repair and construction works are implemented in 17 villages, which estimated cost is 145.0 million Soms. The works have been done to the amount of 94.3 million Soms already. Repair and renewal works are planned to commence in 8 villages of the province, which estimated cost is 48.3 million Soms.

#### *Culture*

Notwithstanding the common complexities of the transition period, the cultural and art facilities have been maintained in whole, interregional cultural exchange has been renewed; creative activities in the province have been kept at the same level.

Much effort was done to identify study, keep, restore, popularize the objects of cultural heritage, to develop their adjacent areas in the province, especially in the last decades.

A musical drama theater was established in the province by resolution of the Government of the Kyrgyz Republic. The stock company has prepared 2-3 performances after the works of famous authors of Kyrgyzstan such as M. Baizhiev "Tort Adam", "Peilinden kor", "Kedeikan". A performance dedicated to the 80<sup>th</sup> anniversary of Ch. Aitmatov is planned after the story "Morning cranes", etc.

Moreover, the existing social and economic situation of the province in whole resulting in the community's low capacity to pay makes it impossible for the community to access cultural facilities, to resolve all problems of the sector as planned. The community cannot access information resources due to the lack of necessary material and technical base and human resources.

The existing rural cultural facilities are in poor condition. The level of material and technical support of the sector is still the most critical issue in the cultural sector.

## **21. Review of crime / offense rate, violence, poverty in Khaidarkan as well as Batken and Osh provinces for the last 5-10 years<sup>17</sup>.**

According to the chief of public security department of Batken province internal affairs administration, the most criminal region in the province became Kadamzhai region.

While other regions of the province faced decline in the crime rate, Kadamzhai region faced 20 per cent increase in criminal rate in public places for 7 months of 2007.

According to the province internal affairs administration, 11 crimes committed by drunken persons in public places were registered for 7 months of 2007. The rate of juvenile crimes in public places has increased as well.

Kyrgyzstan-Uzbekistan boundary conflicts appear frequently in Batken and Fergana provinces. This is due to the existence of Uzbek enclaves, Sokh and Shakhimardan, in the territory of Kyrgyzstan. The citizens of border areas have to cross the state border several times a day. For example, to get into Pulgon village of Kadamzhai region, the inhabitants of Kyrgyz-Kyshtak village have to pass through the territory of Uzbekistan in four points. The community of Uzbekistan enclaves encounters the same difficulties when moving beyond the enclave.<sup>18</sup>

The province directly borders upon 9 regions of Sugd province of the Republic of Tajikistan and upon 6 regions of Fergana province of the Republic of Uzbekistan, which total border length is approximately 900 km.

Due to the geopolitical situation of Batken province, it has regular land and water disputes with border republics arising every year during the spring sowing campaign between the inhabitants of neighboring states. But the subversive activities of Islamic extremists, which leaders still intend to overthrow violently the constitutional system in the Republic of Uzbekistan and to establish the Islamic State in the territories of the Republics of Tajikistan, Uzbekistan and Kyrgyzstan, remains the main factor destabilizing the situation in the region.<sup>19</sup>

Due to its geographic location, the Kyrgyz Republic is a popular transit route for drug traffic from Afghanistan and Pakistan to Russia and Western Europe. Weakened policing of borders and local situation in Tajikistan are the main reasons of the increased illegal drug trade.

### *Emergency situations<sup>20</sup>*

According to the Department of Monitoring, Forecasting and Emergency Situations and Tailings Storage Handling (see Appendices 10, 6, 3) of Ministry of Emergency Situations of the Kyrgyz Republic, Khaidarkan Township has the 2<sup>nd</sup> level of seismic hazard with intensity 8 on the schematic map of seismic hazards. Khaidarkan region is marked out on the extended-range forecast of earthquakes as having the first hazard class with the sufficient level of alert, while the eastern part of Khaidarkan Township has potential danger of landslides of second class susceptibility with second risk level.

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<sup>17</sup>Mass media

<sup>18</sup>Mass media

<sup>19</sup>According to the seminar on "Safety of Kyrgyzstan borders" available in the internal affairs administration of Batken town, held by the Institute for Regional Researches in association with the Public Relations Section of the US embassy

<sup>20</sup> Project "Risk assessment of the Khaidarkan Mercury JSC

## Concluding part

The investigation of impact of primary mercury production at the Khaidarkan mercury plant generally confirms the world public fears expressed by UNITAR, UNEP and other international organizations with regard to the harm that is caused to the environment by primary mercury production.

Even the superficial medical researches held in the territory adjacent to the Khaidarkan mercury plant detect that the production of this metal harms everything alive. However it is important to remember that the Khaidarkan mercury plant is a city-forming industrial enterprise with its own history and perspective profile. Moreover it is the world leader in mercury production and it experiences some difficulties with regard to considering any option on reorientation of its profile.

The Khaidarkan mercury plant as well as the whole industry in the region *undergoes the following hardships and has the following disadvantages:*

- the highest level of fixed assets obsolescence and their incompliance with modern technical requirements;
- the technological backwardness resulting in low competitiveness, quality and productiveness;
- the high rate of unprofitability;
- the lack of competent technical and engineering employees and regular labor force;
- the poor marketing and production management.

*The following disadvantages concern the communities in a sphere of agriculture:*

- Unsatisfactory condition of water utilization system, lack of irrigation waters during the vegetation season;
- Unfavorable general conditions of functioning of agricultural sector, primarily, unsatisfactory level of market infrastructure development;
- Restricted access of agricultural producers to the markets of financial, logistical and informational resources and to finished goods as well;
- Financial unsteadiness of the sector due to instability of the agricultural products, feedstock and food markets;
- Low rate of private investments directed at the sector's development;
- Decrease in the productivity of irrigated lands and cattle;
- Absence or lack of agricultural product processing into final product;
- Increase of unused farm field (19,597 ha, which is 26% of the total farm area);
- Poor provision of cattle breeding industry with food reserves;
- Shortage and obsolescence of agricultural equipment;
- Inobservance of agricultural standards (crop rotation etc.) due to disunity of farms.

*Potential of entrepreneurship is not properly used:*

- More than 30% of small and medium enterprises are unprofitable, that is reflected in the questionnaire results (nearly 70% of the whole population in Batken province have their family members working out of the province);

- Existing tax system does not facilitate the savings for investments, as well as export development and encouragement;
- High level of taxation;
- Complexity of the procedures on permitting and licensing;
- Technological backwardness of industrial enterprises and their low profitability.

The following problems are to be addressed in order to significantly improve the investment climate:

- Difficulties connected with accessing financial assets;
- Uncertainty and unpredictability of changes in the country economic policy;
- Low quality of tax administration;
- High financing cost;
- Customs and foreign trade regulation.

*When examining the issues on investment attraction to the region, it is necessary to consider the potato processing mini plants as the most priority and desirable organizational form on industrial processing of agricultural products. According to the questionnaire results the production of potato chips is the most desirable option, while the processing of carrot (for producing juice and baby food), onion, corn etc. takes the second place in the rating. And afterwards the production of brick, roofing slate and gold goes.*

*Absence of general layouts for many settlements as well as absence of plants on production of building materials (such as cement, slate, brick, alabaster etc.) in the region impedes the development of construction industry.*

*Difficulties in energy sector:*

- Dependence of Leylek region and Sulukta on the neighboring countries in power supply;
- Existence of some restrictions on provision of sustainable power supply in the province, especially with regard to the newly established or expanding production entities;
- Backwardness of transmission and distribution networks;
- Obsolescence of power transmission lines and transformers;
- High rate of indebtedness of energy consumers towards the power companies.

*Public health*

Due to the lack of financing or by the reason of incorrectly developed projects, the problems in provision of clear potable water remain as well as the problems in the sector of public health. The relatively low life expectancy and high level of children's mortality are the main indicators of low quality of public health system in the region. The life interval reduces annually: if in year 2001 it was 70.1 years, then in year 2006 it reduced to 69.1 years.

The bed population ratio reduced: from 45.3 beds per 10000 people in 2006 as against 56.3 beds per 10000 people in 2002. During the period 2002-2006 the number of mental diseases

and behavioral disorders increased almost in 4.3 times, meanwhile the diseases of blood circulatory system increased in 3.7 times.

Quite limited means are allocated for updating of material and technical base of public health system. The high rate of mortality from cardiovascular diseases remains the most serious problem in the region, as well as in the country in general.<sup>21</sup> Subject to the malarial genetic potential and the dynamics of epidemic process, the southern part of Kyrgyzstan is considered to be the region of high malarial genetic potential; where imported, secondary infected and local cases of malaria diseases are registered (Batken, Osh and Djalal-Abad provinces).

#### *Boundary contradictions*

Boundary contradictions between Kyrgyzstan and Uzbekistan as well as between Kyrgyzstan and Tajikistan demonstrate several problems simultaneously: on the one hand they are water and territorial disputes, illegal use of pastures and forest resources of the region by foreign citizens; and on the other hand they are border trade problems and impossibility to visits the relatives.

## **Recommendations**

#### *General recommendations*

After having been revised and improved this investigation is to be integrated with its economical, environmental and juridical parts. Decision on further forms of the plant's existence is to be grounded on its gradual and step-by-step reorganization.

Meetings, conferences and trainings are to be held to explain the tasks and objectives of the plant's reorganization. Otherwise, if any confrontation occurs with the employees or the community, there will be no positive effect for a process of investor attraction.

The plant's administration is to be advised to organize a meeting with the employees in order to explain the tasks and objectives of the project.

The Government, relevant ministries and the plant's administration are to be advised to abstain from considering the matter of cinders processing as it is commercially unviable high-cost production that is highly hazardous for the environment. This matter is quite frequently mentioned by the representatives of state authorities and employees of the plant. Therefore, it is an issue potentially considered within the project on reorganization.

The Government and relevant ministries are to be advised to intensify control over the borders with Tajikistan and especially Uzbekistan's enclaves situated in the territory of Kyrgyzstan for avoiding possible conflicts and also to provide energy security to Leylek region and Sulukta.

#### *Environmental protection*

The plant's administration is to be advised to develop the program on environmental protection and emergency response in compliance with international standards by attracting foreign consultants to prepare the enterprise for working with potential investor (most probably under financial support of international institutions). To strengthen the control over occupational safety and state of tailing dumps in spite of the reduction of mining.

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<sup>21</sup> Data of the Republic Medical Information Center

The area of dumps is to be recounted in terms of square meters but not in tons, as it is being done in current practice, for the purpose of further rehabilitation of the areas by taking into consideration additional natural materials and works (such as subsoil, clay, transportation, hayseed etc.) required for relevant covering of these areas.

The plant's administration is to be advised to make a collective agreement with the employees involving the members of the Mining workers trade union of Kyrgyzstan in the capacity of consultants or observers in order to facilitate attraction of investors.

Trainings are to be held for the employees of KMP (most probably under the financial support of international institutions) to instruct them in international regulations on occupational safety with subsequent introduction of these regulations, as well as to instruct them in the regulations on health safety.

The plant's administration is to be advised to pursue a more open policy as for providing the information about the plant's operational activity (which is not legally considered to be confidential) both to the consultants of international project organizations and to the community as well.

#### *Public informing*

The plant's administration is to be advised to create a website in order to inform the community about the project on impact of primary mercury production upon the environment of Kyrgyzstan.

The plant's administration is to be advised to develop the public relations program on informing the community about the measures of the plant's environmental activity and to submit it to the Agency and Donors regardless of the decision about its reorganization, if any is made.

With help of NGOs (including regional or national ones) the training for the inhabitants residing in the settlements adjacent to tailing dumps are to be conducted about life and health safety practice in case of residence near hazardous facilities.

In addition to existing basic course a school discipline on life and health safety practice in case of residence near the mercury mining objects is to be introduced using the Khaidarkan mercury plant in the capacity of case study and involving the plant's employees.

One HGO is registered in the settlement board and is unknown to the community, according to the questionnaire results. Thus a conclusion can be made that the work of this NGO is quite inactive, if any. It is also noteworthy that the term NGO was unfamiliar to 60% of respondents. Despite the fact that such institutions as the administration of KMP as well as the housing and communal enterprise have access to the Internet, none of the leaders surveyed has an email address. It means that the population is passive in matters out of their daily activity.

The Information Education Center is to be organized for the inhabitants, but not necessarily on the base of the plant. Large educational program will be required for the region. It is also necessary to intensify the work of NGOs.

Along with unwillingness to provide any information, KMP independently makes sell agreements, quotes the prices information of which is available only to the administration, and moreover there is no labor union at the plant. Meanwhile 90% of the employees surveyed are not satisfied with the level of wage and what is more it is regularly delayed for several months. Moreover, no one including the plant's employees could answer the question about the amount of payments made to the budget.

The research revealed quite a negative opinion of the region's population with regard to relations with the enclaves. Numerous conflict situations associated with trade between the

countries (mainly of vegetable product) are present. At that the issues of corruption within the customs services of both sides are raised. One more aggravating factor is that there is no broadcasting in Kyrgyz throughout the territory of the whole basin. The main part of information gained by an average resident per day via mass media is broadcasted in Uzbek.

The Government, relevant ministries and potential investors are to be recommended to establish the connection among the settlement, enclaves and the rest part of Kyrgyzstan on the matter of broadcasting Kyrgyz programs on TV and radio, as well as to conduct existing statutory acts with regard to simplified visa regime between the countries with enclaves.

Residents of the villages Bel and Sur have a negative attitude towards the Khaidarkan mercury plant because of insufficient control over the tailing dumps. Several times they have addressed different instances about the removal of the tailing dumps to a different place. It should be mentioned that building of these villages near the tailing dump was illegally done in opinion of the local administration. Moreover the tailing dump is located directly near the main highway Osh-Aidarken. This fact raises a number of questions like how and for what purpose the construction of the tailing dump has been fulfilled in such a proximity to the main highway. Besides, no safeguarding in the territory of the tailing dump was found during the inspection.

All relevant organizations are to be recommended to consider the matter of tailing dump removal from its current location closely to the highway and houses.

It is reasonable to promulgate *some* of the results of this investigation in the mass media upon its final conclusion, namely:

- Information about the identified problems of the community residing in the impact zone of KMP (the results obtained are to be used for developing the strategies on supporting these villages);
- Information about some negative aspects of KMP's activity in order to develop the principals of adequate reporting on its activity for the purpose of modifying public opinion towards a greater loyalty with respect to KMP from the side of the residents of Bel and Sur villages.
- According to the fact that in the respondents' opinion the main factor of positive influence upon development of the villages is the judgments of well-known ecologists, scientists, politicians, members of parliament etc., coordination with them is to be more actively fulfilled in order to inform the community about KMP's activity and opportunities for its.

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## List of laws and statutory acts of KR

1. Constitution of the Kyrgyz Republic dated May 5, 1993, as amended October 23, 2007. Civil Code of the Kyrgyz Republic, part 1 dated May 8, 1996 No. 15, part 2 dated January 5, 1998 No. 1
2. Criminal Code of the Kyrgyz Republic dated October 1, 1997 No. 68
3. Customs Code of the Kyrgyz Republic dated July 30, 1997 No. 61
4. Land Code of the Kyrgyz Republic dated June 2, 1999 No. 45
5. Forestry Code of the Kyrgyz Republic dated July 8, 1999 No. 66
6. Code of Administrative Responsibility of the Kyrgyz Republic dated August 4, 1998 No. 114
7. Law of the Kyrgyz Republic "On environmental protection" dated June 16, 1999 No. 53
8. Law of the Kyrgyz Republic "On protection of common air" dated June 12, 1999 No. 51
9. Law of the Kyrgyz Republic "On production and consumer waste" dated November 13, 2001 No. 89
10. Law of the Kyrgyz Republic "On tailings storages and mountain dumps" dated June 26, 2001 No. 57
11. Law of the Kyrgyz Republic "On water" dated January 14, 1994 No. 1422-XII
12. Law of the Kyrgyz Republic "On mineral resources" dated July 2, 1997 No. 42
13. Law of the Kyrgyz Republic "On health care in the Republic of Kyrgyzstan" dated July 2, 1992 No. 943-XII
14. Law of the Kyrgyz Republic "On sanitary epidemiological wellbeing of the community" dated June 26, 2001 No. 60
15. Law of the Kyrgyz Republic "On environment impact assessment" dated June 16, 1999 No. 54
16. Law of the Kyrgyz Republic "On payment rate for environment pollution (releases, pollutants discharge, waste disposal)" dated March 10, 2002 No. 32
17. Law of the Kyrgyz Republic "On trade unions" dated October 16, 1998 No. 130
18. Law of the Kyrgyz Republic "On consumer protection" dated December 10, 1997 No. 90
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21. Law of the Kyrgyz Republic "On protection of communities and territories from natural and man-triggered emergency situations" dated February 24, 2000 No. 45
22. Law of the Kyrgyz Republic "On labor protection" dated August 1, 2003 No. 167
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25. Regulation of the Government of the Kyrgyz Republic "On measures to protect environment and health of community from adverse effects of specific hazardous chemical substances and pesticides" dated July 27, 2001 No. 376
26. Regulation of the Government of the Kyrgyz Republic "On approval of organizations of licensors and experts in licensing of export and import specific commodities to the Kyrgyz Republic" dated October 29, 1998 No. 709
27. Regulation of the Government of the Kyrgyz Republic "On approval of the Instruction on purchase, sale, storage, recording and transportation of highly toxic substances" dated September 21, 1999 No. 513

28. Regulation of the Legislative Assembly of Jogorku Kenesh (Parliament) of the Kyrgyz Republic "On approval of execution and issue of licenses to export-import operations" dated June 8, 1998 Z No. 1100-1
29. Regulation of the Legislative Assembly of Jogorku Kenesh (Parliament) of the Kyrgyz Republic "On approval of the List of commodities exported or imported under a license" dated June 8, 1998 Z No. 1101-1
30. "Health and hygienic requirements to soil quality" SanPiN 2.1.7. 005-03. Approved by order of Chief State Medical Officer of the Kyrgyz Republic No. 9 dated 20.02.2004
31. Health and hygiene rules and standards. SanPiN 2.2.1/2.1.1.006-03. Approved by order of Chief State Medical Officer of the Kyrgyz Republic No. 9 dated February 20, 2004
32. Regulation of the Government dated July 27, 2001 No. 376 "On measures to protect environment and health of community from adverse effects of specific hazardous chemical substances and pesticides"
33. Instruction on purchase, sale, storage, recording and transportation of highly toxic substances. Approved by regulation of the Government dated September 21, 1999 No. 513
34. Instruction on control of waste disposal in the Kyrgyz Republic. Approved by regulation of Ministry of Environmental Protection dated September 17, 1999 No. 3

**The Republic joined the following international treaties on control of chemical substances:**

1. Rotterdam Convention for the Procedure of Preliminary Justified Agreement in Respect of Specific Hazardous Chemical Substances and Pesticides in International Trade. Ratified by law of the Kyrgyz Republic "On ratification of Rotterdam Convention for the Procedure of Preliminary Justified Agreement in Respect of Specific Hazardous Chemical Substances and Pesticides in International Trade" dated January 15, 2000 No. 15. In accordance with law, functions of the national authority responsible for compliance with the requirements of Rotterdam Convention are vested in Ministry of Environmental Protection;
2. Vienna Convention for the Protection of the Ozone Layer and Montreal Protocol on Substances that Deplete the Ozone Layer. Ratified by law of the Kyrgyz Republic "On ratification of Vienna Convention for the Protection of the Ozone Layer and Montreal Protocol on Substances that Deplete the Ozone Layer" dated January 15, 2000 No. 16 (Amendments to Montreal Protocol are ratified in separate laws). In accordance with law, functions of the national authority responsible for compliance with the requirements of Vienna Convention and Montreal Protocol are vested in Ministry of Environmental Protection;
3. Stockholm Convention for the Persistent Organic Pollutants. Approved by order of the Government of the Kyrgyz Republic dated March 5, 2002 No. 94-p. Order of the Government of the Kyrgyz Republic No. 688-p dated November 14, 2003. Ministry of Ecology and Emergency Situations of the Kyrgyz Republic is appointed coordinating and executive authority to facilitate Stockholm Convention for the Persistent Organic Pollutants;
4. Convention for the Control of Transboundary Transportation of Hazardous Waste and its Disposal. Kyrgyz Republic joined this Convention by orders of the Legislative Assembly of Jogorku Kenesh of the Kyrgyz Republic dated January 18, 1996 Z No. 304-1 and Assembly of People's Representatives of Jogorku Kenesh dated November 30, 1995 P No. 225-1;

5. Occupational Safety and Health Convention 184 of the International Labor Organization in Agriculture. Ratified by law of the Kyrgyz Republic "On ratification of Occupational Safety and Health Convention 184 of the International Labor Organization in Agriculture" dated December 30, 2003 No. 245. Approved by the Legislative Assembly of Jogorku Kenesh of the Kyrgyz Republic dated October 20, 2003;
6. United Nations Framework Convention on Climate Change and Kyoto Protocol. The United Nations Framework Convention on Climate Change was ratified in January 2000, while Kyoto Protocol to the UN Framework Convention on Climate Change was ratified in January 2003. Ministry of Ecology and Emergency Situations is responsible for implementation of obligations imposed by the United Nations Framework Convention;
7. Collaboration agreement on chemistry and petroleum chemistry between CIS members dated September 9, 1994. According to the Agreement, for the purpose of maintenance and development of industrial and technological relations, stabilization and expansion of industrial production at chemical and petroleum chemical plants, of application of technological progress achievements, the Chemistry and Petroleum Chemistry Collaboration Council of the heads of ministries and authorities of the CIS member states should have prepared in 1994-1995 the proposals on establishment of financial industrial groups, transnational companies, joint ventures, joint-stock companies, and other economic structures within the framework of the Commonwealth states. The parties undertake to render reasonable assistance to implement such proposals;
8. Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction. Ratified by law of the Kyrgyz Republic dated April 29, 2003 No. 89 dated January 13, 1993;
9. Convention against the Illicit Traffic in Narcotic Drugs and Psychotropic Substances. The Kyrgyz Republic joined this Convention by order of Jogorku Kenesh of the Kyrgyz Republic dated April 16, 1994 No. 1500-XII;
10. Protocol for the Uniform Procedure of Application of Technical, Medical, Pharmaceutical, Sanitary, Veterinary, Phytosanitary and Ecological Standards, Rules, Regulations and Requirements to Commodities Imported to Member States of the Customs Union Agreement dated December 16, 1999 No. 705. Approved by order of the Government of the Kyrgyz Republic "On approval of Protocol for the Uniform Procedure of Application of Technical, Medical, Pharmaceutical, Sanitary, Veterinary, Phytosanitary and Ecological Standards, Rules, Regulations and Requirements to Commodities Imported to Member States of the Customs Union Agreement". The Protocol defines the uniform procedure of application of standards and requirements as to the commodities imported to the territories of the Member States, includes the complex of measures and regulations oriented at identification, prevention and restraint of violation of the procedure of import of specific commodities that have established uniform standards and requirements. The uniform procedure of application of standards and requirements applies both to the commodities imported to the customs areas of the Member States, and to the produced commodities.