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DEVELOPMENT TRENDS OF METALLURGICAL SECTOR IN PRIMORSKI KRAI*

The article reviews the status and development trends of the mining and smelting industry in the Primorski Krai. Within the bounds of this project the database of the enterprises ready to use foreign labor can be formed. The partners of the program will be regional large enterprises ready to participate in the project. The companies - members of the so-called "Unity" will be suggested to sign up the Declaration on expectancies concerning the labour force use. In the long term there should be made efforts for the involvement into the "Unity" of larger number of local companies and enterprises of the Russian Far East. The network of companies can request for staff recruitment from abroad.

Keywords: nonferrous metallurgy, mining and smelting, industrial production, city-forming enterprises.

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ТЕНДЕНЦІЇ РОЗВИТКУ МЕТАЛУРГІЙНОЇ ГАЛУЗІ В ПРИМОРСЬКОМУ КРАЮ

У статті розглянуто стан і тенденції розвитку гірничо-металургійної галузі в Приморському краю. В рамках даного проекту може бути створена база даних підприємств, готових скористатися іноземною робочою силою. Партнерами за проектом буде визначено великі компанії на місцевому рівні, готові брати участь у проекті. Компаніям, що входять до складу так званого «Об'єднання», буде запропоновано підписати декларацію про наміри відносно використання робочої сили. У довгостроковій перспективі повинно докласти зусилля до залучення до «Об'єднання» все більшої кількості місцевих компаній і компаній Російського Далекого Сходу. Мережею компаній можуть формуватися заявки, на основі яких можна проводити підбір працівників за кордоном.

Ключові слова: кольорова металургія, гірничо-металургійна галузі, промислове виробництво, градоутворювальні підприємства.

Літ. 12.

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ТЕНДЕНЦИИ РАЗВИТИЯ МЕТАЛУРГИЧЕСКОЙ ОТРАСЛИ В ПРИМОРСКОМ КРАЕ

В статье рассмотрены состояние и тенденции развития горно-металлургической отрасли в Приморском крае. В рамках данного проекта может быть создана база данных предприятий, готовых воспользоваться иностранной рабочей силой. Партнерами по проекту будут выбраны местные крупные компании, готовые участвовать в проекте. Компаниям, входящим в состав так называемого «Объединения», предложено подписать декларацию о намерениях относительно использования рабочей силы. В долгосрочной перспективе должны приложить усилия на вовлечение в «Объединение» все большего количества местных компаний и компаний Российского Дальнего Востока. Сетью компаний могут формироваться заявки, на основе которых можно проводить подбор работников за рубежом.

Ключевые слова: цветная металлургия, горно-металлургическая отрасль, промышленное производство, градообразующие предприятия.

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* Krai – regional unit in Russian Federation. Primorski Krai literary stands for "Seaside territory".

Determination of the problem in its relation to key scientific and practical tasks.

At the present stage of development, mining and smelting industry is characterized by the number of specific peculiarities. In recent years, investments into extractive industries have increased in China and India.

Review of the literature on the problem. In this context, scientific organizations around the world conduct research aimed at improving the efficiency of mining enterprises, proposing both general policy recommendations (Vivoda, 2011; Hilson and Barbara, 2000) and best practices for specific regions and companies (Amankwah and Anim-Sackey, 2003; Changhai et al., 2012; Jinghua et al., 2011; Filippou and King, 2011).

Definition of the target problem for the analysis. Mining industry of the Primorski Krai (Russia) is based on a unique mineral resource base which includes more than 45 kinds of mineral deposits, and its share in total industrial production in the Primorski Krai is about 5%.

The share of nonferrous metals in the total industrial output of the Primorski Krai is 5.1%. Though its significance is determined not so much by the total industrial output, as predominantly by the fact that leading companies in this sector are city-forming enterprises, as well as availability of unique raw material resources for fluorspar, tungsten, and polymetals (International business portal "Investments. Innovations. Business").

Over 90% of exports are shipped to Asia-Pacific countries. Since 2005, all lead and zinc concentrates are exported. Overall commercial output (in current prices) of industry leading enterprises has increased in 2011 by 2644 mln RUB (60%) as compared with the previous year, and amounted to 7072 mln RUB (International business portal "Investments. Innovations. Business").

The average number of employees in non-ferrous metallurgic companies in 2011 was 4915 people (104% compared to the previous year), and their average salary amounted to 25656 RUB per person (133% to the previous year) (International business portal "Investments. Innovations. Business").

Two entities, forming a consolidated processing complex (plant) for the extraction and processing of tungsten ore, were established in consequence of the privatization of the former "Primorsky GOK":

a) Open Joint Stock Company "Primorsky Mining and Concentrating Mill" for ore mining.

b) Joint Stock Company "AIR Mining Company" for ore processing.

The plant was built on the richest tungsten deposit in 1977 in the spurs of the Sikhote-Alin 230 km from the railway. Vostok residential settlement for 7500 people was built nearby.

JSC "Primorsky GOK" is Russia's largest mining company for tungsten ore (extracting 66% of the total tungsten ore in Russian). About 50% of the company's production goes to Russian domestic market, as well as to China, Japan, and Australia.

The enterprises are focused on the following businesses: developing tungsten deposits, mining and ore processing, and production of tungsten and copper concentrates. Both concentrates are sold worldwide (Group of companies "Primorsky GOK" and OJSC "AIR Mining Company").

A study on the current status of enterprises in the mining and smelting sector in the Primorski Krai was carried out based on the internal information available for public from the company records and statements.

In 2011, the number of employees at JSC "Primorsky GOK" totaled 313 people, and the average salary was 30800 rubles (114% compared to 2010). The number of employees at "AIR Mining Company" was 891 people with the average salary of 25900 rubles (113% compared to 2010).

In 2011, the total production of tungsten concentrate amounted to 2.6 bln RUB (186% compared to 2010), while copper concentrate production amounted to 203.7 mln RUB (137% compared to 2010). The amount of taxes and charges paid was 470.7 mln RUB (280% compared to 2010).

Despite the stable operation of JSC "Primorsky GOK" in 2009–2011, provision of proven commercial reserves of the Vostok-2 deposit is 5–7 years.

Commissioning of the "Skrytoye" deposit will allow to:

- maintain the tungsten-mining industry of the Primorski Krai;
- ensure the sustainability of the company businesses over 30 years providing product output at amount of 2 bln RUB and get profits of 400 mln RUB;
- create 600 new jobs and increase employment in depressed regions of the Primorski Krai;
- increase the tax base and provide additional revenues to the budget at all levels.

The investment project "Field development of a "Skrytoye" tungsten ores deposit" is included to the list of priority investment projects in the Far Eastern Federal District.

The current status of the project. Geological exploration has been performed, technological sample has been collected, washability studies have been conducted by X-ray radiometric separation with the release of 50–60% of dead ground and obtaining tungsten middlings. Total costs of the deposit amounted to more than 350 mln RUB. The feasibility study of ore quality requirements has been completed and estimations on inferred ore have been made. The "Skrytoye" mine development project (phase 1) has been designed by the "Uralmekhanobr" Institute in Yekaterinburg (Ageev, 2002).

Affiliate of the State Unitary Enterprise "Primteploenergo" of Lermontov mine is located in the northern part of Pozharsky Region in the Primorski Krai, 20 km away from the Bikin train station of the Far East Railroad. Urban-type settlement Svetlogorye was built along with the enterprise.

JSC "Dalpolimetall" is a modern mining and concentrating complex with advanced technology, high production facilities, and skilled engineers and technicians.

It includes Nikolajevsky mine camp, 2nd Soviet, Primorsky and Upper mines, processing factory, transport and stevedoring plants, as well as numerous auxiliary units to ensure the needs of the enterprise.

The company produces lead and zinc concentrates. All concentrates containing small amounts of precious metals are exported to the Asia Pacific Region.

JSC "Dalpolimetall" is provided with mineral resources for a period of 20 years. There are several ore fields in the vicinity of the enterprise requiring exploration works that will make it possible to discover new deposits of lead and zinc with a high silver content.

In 2011, the total output amounted to 1924.4 mln RUB (110% compared to the previous year).

On the basis of quantities, the following was produced in 2011: 17534 tons of lead concentrate (94% to the previous year), and 31477 tons of zinc concentrate (97% to the previous year).

In 2011, the company had paid the following taxes: 27233 ths RUB to the federal budget (184% to 2010), 78311 ths RUB to the regional budget (142% to 2010), and 43828 ths RUB to the local budget (248% to 2010).

In 2011, the average wage amounted to 20256 RUB (114% to the previous year).

Development prospects. Company development master plan provides for the implementation of the following investment project: "The maintenance and development of facilities for the extraction of ore and diversification of production at JSC "Dalpolimetall" for the period from 2010 to 2015".

Implementation of the project will diversify the existing mining operations through involvement into development new deposits with a high content of metals, including precious ones.

While 72.19 mln RUB was spent on investment activities in 2009–2010, 78.64 mln RUB was spent for investments and upgrade of basic equipment in 2011.

In addition, the advance payment for leasing in the amount of 87.3 mln RUB was made for 10 items of machinery 9 of which have been already received. The imported underground self-propelled machinery park has been increased by 2 dump trucks and 3 LHD machines.

In 2012, it is scheduled to continue construction of the adit level at Nikolaevsky open-cut mining (horizon -420 m). Further slope sinking below the horizon of +440 m is scheduled for the South minefield, as well as changing the mine to remove lower reserves by self-propelled machinery. Continuation of the works on mine construction at Silinskaya minefield and production of 10 ths tons of by-ore is scheduled for 2012. Broken working at this minefield will start in 2013.

It is also planned to ensure production growth and extend the life length of the Upper ore mine. In 2012, it is scheduled to produce 760 ths tons of ore. To accomplish this, it is planned to purchase 24 items of equipment by leasing for the total of 243 mln RUB with the estimated payment in amount of 55 mln RUB in 2012. This will increase the production in 2013 up to 850 tons of ore.

Presentation of the research material, including methodology description and key results of the research. The project is included into the "Comprehensive investment plan for the development of Dalnegorsk town for 2010–2015" (Order of the Administration of Primorski Krai). The implementation of this plan would increase employment and output, and would be essential for securing social and economic stability in the single-industry town of Dalnegorsk.

Currently, the JSC "Industrial investments", the management company, is working on the development of investment programs to upgrade production and increase production capacity. Largest banks, including "Vnesheconombank", are involved for these purposes. An action plan is being developed, and a working group has been set up.

Investment program provides for the ongoing modernization of the main facilities. In particular, new equipment will be implemented to the boric acid production

line. Operation of this equipment will help to stabilize the technological process, increase production output, and reduce manufacturing costs.

Unfortunately at the present time, in the Primorski Krai there are no non-ferrous metal works associated with the titanium feedstock processing. Australia, South Africa, Canada, and Norway are the world's major producers of titanium concentrate. According to the analytical agencies forecasts, the production of titanium dioxide in the period from 2008 to 2015 will be increased by 3% (especially in China) that will consequently increase the demand for titanium-containing raw materials. Titanium feedstock market (titanic iron ore and rutile) will develop progressively in connection with the steady increase in demand for titanium dioxide, which is the primary product yielding from this raw material (Titanium-containing raw material market trends).

Conclusions and further studies prospective. The production technology existing at operating domestic enterprises provides the opportunity to produce a very limited number of titanium dioxide grade compositions – no more than just 3–4 grades, that does not meet the needs of the industry, while the domestic market capacity of titanium dioxide pigment is now virtually unlimited. The analysis of open and explored deposits, as well as exploited deposits of titanium raw materials shows that the conventional titanium-containing resources in Russia are limited.

The Ariadnenskoe titanium deposit can become the basis for one of the major projects. This deposit is located in the Central Primorye Region with area of 8000 km² in the Eastern part of Dalnerechensky and Krasnoarmeyskiy municipal regions within the strip 160 km long and 20–60 km wide, stretching from Pozhiga village to Melnichnoje village, and further to lower Armu and Kolumbe rivers.

The Ariadnenskoe placer deposit of ilmenite, situated in Dalnerechensky Region, with the inferred resources of 71 mln tons of titanium is included by the Federal Agency for Subsoil Use to the list of sites of subsoil resources in the Primorski Krai, granted for use in 2012.

The Ariadnenskoje deposit can become the basis for creation of mining and concentrating mill producing and processing of 2–5 mln tons of ore per year, as well as extracting 150–300 tons of titanium oxide concentrate, 6 tons of vanadium oxide, and 100–250 tons of iron.

The technology on hydro fluoride complex processing of ilmenite concentrates to produce titanium dioxide in a special economic zone (SEZ) of industrial type called "Titanium Valley" in the Sverdlovsk Region, proposed by the Institute of Chemistry, should be proved by a feasibility study and viable investment project that could get support and be implemented in the SEZ.

Construction of a pilot module to implement the proposed technology would be possible at the expense of investors or owners interested in applying this technology at existing plants processing titanium-raw materials, including "Titanium Valley".

If the proposed technology will be competitive, perhaps in the future it would be possible to implement it while designing mining and concentrating mill based on the Ariadnenskoje deposit in the Primorski Krai.

It is planned to develop the mining base, and to update the existing fleet of mining equipment and machinery in the first instance. Enhancement of ore production is essential, first of all, to meet the intended output growth.

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Стаття надійшла до редакції 15.01.2013.